As required by the Washington State Administrative Act, RCW 34.05.

IMPLEMENTATION PLAN FOR THE ADOPTION OF

Water Resources Management Programs for the

Lewis Basin, WRIA 27—Chapter 173-527 WAC

and

Salmon-Washougal Basin, WRIA 28—Chapter 173-528 WAC

12/10/08

Publication Number: 08-11-056

As required by the Washington State Administrative Act, RCW 34.05.

IMPLEMENTATION PLAN FOR THE ADOPTION OF

CHAPTERS 173-527 and 173-528 WAC

Water Management Resources Program for the Lewis Basin, WRIA 27

&

Water Management Resources Program for the Salmon-Washougal Basin, WRIA 28

Prepared by:

Travis Burns

Washington State Department of Ecology

Water Resources Program

12/10/08

Publication Number: 08-11-056

If you need this publication in an alternate format, please call the Water Resources Program at (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

TABLE OF CONTENTS

Implementation Plan for Chapters 173 – 527 & 173-528 WAC
Water Management Resources Programs
for the
Lewis River Basin—WRIA 27
&
Salmon/Washougal River Basin—WRIA 28

A. Introduction

RCW 34.05.328 requires state agencies adopting rules to develop a rule implementation plan. The plan must describe how the agency intends to:

> "(a) Implement and enforce the rule, including a description of the resources the agency intends to use;
> (b) Inform and educate affected persons about the rule;
> (c) Promote and assist voluntary compliance; and
> (d) Evaluate whether the rule achieves the purpose for which it was adopted, including, to the maximum extent practicable, the use of interim milestones to assess progress and the use of objectively measurable outcomes."

The Department of Ecology is adopting Chapter 173-527 Washington Administrative Code (WAC) – Water Resources Management Program for the Lewis Basin, Water Resource Inventory Area (WRIA) 27 and Chapter 173-528 WAC – Water Management Resources Program for the Salmon-Washougal Basin, WRIA 28.

The rules:

- Set instream flow levels for 34 streams to protect aquatic resources.
- Close specific sub-basins to new withdrawals.
- Designate "regional supply areas" for future water supply.
- Create limited reservations of water to meet the community's water needs for 20 years of projected growth.
- Set conditions to accessing the reservations to benefit stream resources and better manage available supply. The reservations created were designed.

Chapter 173-527 WAC has the following sections:

WAC 173-527-010 Authority and purpose.
WAC 173-527-020 Definitions.
WAC 173-527-030 Map.
WAC 173-527-040 Compliance and enforcement.
WAC 173-527-050 Stream management control points.
WAC 173-527-060 Instream flows.
WAC 173-527-070 Surface and ground water closed to further consumptive appropriations.
WAC 173-527-080 Future water rights--Generally.
WAC 173-527-090 Regional supply areas for future ground water withdrawals.
WAC 173-527-100 Future appropriations for interruptible use.
WAC 173-527-110 Reservation of surface and ground water for future uses.
WAC 173-527-120 Priority dates of reservation and repeal of chapter 173-592 WAC.
WAC 173-527-130 Accounting for use under the reservation.
WAC 173-527-140 Future surface water withdrawals for environmental restoration.

Chapter 173-528 WAC has the following sections:

WAC 173-528-010 Authority and purpose.
WAC 173-528-020 Definitions.
WAC 173-528-030 Map.
WAC 173-528-040 Compliance and enforcement.
WAC 173-528-050 Stream management control points.
WAC 173-528-060 Establishment of instream flows.
WAC 173-528-070 Surface and ground water closed to further consumptive appropriations.
WAC 173-528-080 Future water rights--Generally.
WAC 173-528-090 Regional supply areas for future ground water withdrawals.
WAC 173-528-100 Future appropriations for interruptible use from the Washougal River.
WAC 173-528-110 Reservation of surface and ground water for future uses.
WAC 173-528-120 Priority dates of reservation and repeal of chapter 173-592 WAC.
WAC 173-528-130 Accounting for use under the reservation.
WAC 173-528-140 Future surface water withdrawals for environmental restoration.

This rule making action also repeals Chapter 173-592 WAC, which has the following sections:

WAC 173-592-010 Purpose.
WAC 173-592-020 Authority.
WAC 173-592-030 General.
WAC 173-592-040 Reservation source of supply area defined.
WAC 173-592-050 Definitions.
WAC 173-592-060 Petition received -- Notice.
WAC 173-592-070 Reservation.
WAC 173-592-080 Monitoring program.
WAC 173-592-090 Water quality.
WAC 173-592-100 Exemptions.
WAC 173-592-110 Regulation review.
WAC 173-592-115 Appeals.
WAC 173-592-120 Reservation source of supply area map.

B. How the Agency intends to implement and enforce the rule.

Implementation strategies will consist of:

- Education and outreach (see following section).
- Technical assistance.
- Permitting.
- Compliance and enforcement.
- Data collection and management.

Technical assistance

Existing Ecology Southwest Regional Office (SWRO) staff will provide technical assistance for state and local agencies, and those affected by the rule. One existing regional staff member will assist with permitting issues, including changes and transfers.

One other regional staff members hold primary responsibility for compliance and enforcement actions in the 12-county region, with support from headquarters staff. This can also involve providing education and technical assistance to achieve voluntary compliance.

Permitting

New water rights can be gained under the rules for:

- Ground water uses (including permit-exempt uses) in Regional Supply Areas.
- Use of surface water that the rules have not closed.
- Uses shown by the applicant, through sound scientific studies, to not affect closed surface waters.
- Fully mitigated (water-for-water) uses.
- Uses qualifying for the reservations (including permit-exempt uses).
- Temporary use for environmental restoration projects.
- Seasonal interruptible uses (from the Kalama, North Fork Lewis (below Merwin Dam), East Fork Lewis, and Washougal rivers only.

All new water right permitting (which excludes permit-exempt uses) requires processing by SWRO Water Resources permitting staff. This includes working with the applicant and their representatives, and evaluating the application, and any mitigation plan or technical studies submitted by the applicant. This will be performed by one existing water right permitting staff member, supported by staff in the technical unit.

The WRIA 27/28 watershed planning unit will also be assisting Ecology staff with the evaluation of water right applications. The planning unit is preparing guidance materials to help implement the new mitigation requirements (see draft mitigation guidance in appendix I). The guidance and local assistance will provide additional support for processing water rights for water out of the reservation.

The local Lower Columbia Fish Recovery Board is currently developing group mitigation or pooled mitigation options for future small water users. Group mitigation should reduce the burden on smaller entities by giving them an option to pay a fee to meet conditions for accessing the reservation. The group mitigation should also greatly ease administration cost.

There are currently 127 pending water right applications. Many of these will qualify for the reservation or are applying for water outside of closed areas. However, a limited number of applicants for water within closed areas will not qualify, such as agriculture and noncommercial irrigation. Most of these uses will be denied, based on closures put in effect by the new rules (See appendix 2).

Compliance and enforcement

Ecology may regulate new consumptive[1] water rights that will now be conditioned[2] by the instream flows set in the rules. This would include seasonal interruptible uses. Ecology will also be using newly adopted instream flows to evaluate future changes and transfers of senior and junior water rights. We expect the existing enforcement program to be able to cover this added workload.

Enforcement of this amended rule will follow the procedures outlined in Water Resource Program Enforcement Policy (2005). This policy is consistent with section -040 of each of the two new rules.

[1] A consumptive water right is one that the use causes a loss of quantity or quality to the water source.

[2] When a water right is "conditioned" by an instream flow it means that the right contains conditions that require use under the right to stop whenever stream flows drop below the adopted instream flow level.

The Water Resources Program's goal is to work with individuals on voluntary compliance through education and technical assistance. When we are unable to obtain voluntary compliance, enforcement actions escalate as provided for in agency and program policy and RCW 90.03.605. Ecology will issue a notice of violation, a formal administrative order under RCW 43.27A.190, or assess penalties under RCW 90.03.600.

Ecology will take enforcement action immediately where risks to safety, public health, and environmental health are high. This may also occur when other resource protection agencies request we take action.

Data collection and information management

The reservations will require ongoing monitoring and tracking. This is to ensure that we accurately account for use of the reservations. Ecology staff will keep a record of permits issued under the reservation from the effective date of the rules. The tracking and enforcement of permit-exempt wells is being coordinated between Ecology and local county staff (Skamania, Clark, and Cowlitz counties). Tracking of permit-exempt well use will involve monitoring and compiling information from the building permit process of each county. Ecology's watershed lead will work with the planning unit and the SWRO water resources staff to support the managing of the reservations through the accounting system.

Ecology will consider information from any sound scientific studies submitted by applicants and other sources for designating further Regional Supply Areas where new ground water withdrawals will not affect closed streams in the WRIAs.

C. How the Agency intends to inform and educate affected persons about the rule.

Ecology believes that public access to current information is necessary to implement these rules. Ecology and the local Watershed Planning Unit have done extensive outreach as the rule developed. This included several workshops to share information on the rules, as well as news articles, Web postings, and written materials given to the public. Ecology will continue to do outreach and communication on the rules with the counties, cities, water utilities, well drillers, existing water right holders, property owners, and interest groups.

The Public Information Section at headquarters, with the aid of the rule writer and the watershed lead, will prepare various focus sheets and other written materials. This information will be available from Ecology, local agencies with jurisdiction in the affected area, on Ecology's website, and sent to our electronic Listserv and local distribution lists.

Ecology expects to make use of the internet for on-going distributing information on the rule requirements and related water management issues. As well as the Web pages specific to these two rules, Ecology is developing a more comprehensive watershed Web page. It will provide links and data associated with other water management activities in the basins.

We anticipate using 0.25 FTE for two months following rule adoption for outreach and communication.

D. How the Agency intends to promote and assist voluntary compliance for this rule.

Ecology will focus efforts to achieve voluntary compliance with the two rules through technical assistance, training, and well driller licensing activities. Concurrent Education and outreach promotes voluntary compliance. It is important to make the affected public aware of the limits under the rules at the earliest point possible. At the minimum, project applicants will be given information, and any technical assistance they need, when first applying for a plat approval or building permit. Ecology and county staff will work with the applicant to ensure they understand what they can or must do to access water supplies for their proposal.

Education and outreach are key tools, from both before and after rule adoption to promote voluntary compliance. Ecology will maintain informational material on the rules and related water management issues, to be distributed by SWRO, the counties, and available on Ecology's Web site. We will supply training opportunities to well drillers, county staff, and other interest groups.

E. How the Agency intends to evaluate whether the rule achieves the purpose for which it was adopted.

The adoption of the Water Resources Management rules for the Lewis River basin—WRIA 27 and the Salmon-Washougal river basin—WRIA 28 is intended to protect in-stream values and existing water rights, while allowing for economic growth in the community.

Ecology will maintain ongoing monitoring of stream flow levels in basin streams. We will consult with Washington Department of Fish and Wildlife regularly on the effectiveness of mitigation plans and the health of the streams and surrounding ecosystems.

Ecology will also continue communications and cooperation with county staff on use of the reservations and other appropriations. Working together, Ecology and county staff will monitor and track new uses as they develop. The accounting system developed by the counties and other planning unit members will enable this measure. The cooperative relationship developed between the agencies will also be valuable in helping the local jurisdictions identify and develop new water supplies for the future. Ecology will be notifying respective counties and the planning unit when fifty, seventy-five, and one-hundred percent of the reservation has been appropriated.

F. How the Agency intends to train and inform Ecology staff regarding new rule or rule amendment.

The permitting and technical units in Ecology's SWRO Water Resources section need to be aware of the elements of these rules. They will be responsible for evaluating applications for water rights and related mitigation plans and special studies. They write the records of examination and make the final decisions on issuing or denying future permits or water right changes. Enforcement staff is responsible for helping with technical assistance to promote voluntary compliance, as well as stricter enforcement actions.

Representatives from the SWRO section have been involved with the rule development process. Training specific to this rule will also be held at SWRO for permit writers, water masters, and well construction staff, as needed, since their work will be directly affected by the rule. We may also schedule information sessions for other staff from Ecology and other agencies, if requested. The local watershed lead will be assisting SWRO staff in transitioning in to rule implementation.

The WRIA 27/28 Watershed Planning Unit will also be assisting SWRO staff in implementing the rule requirements for accessing reservation water. The Planning Unit is developing implementation guidance to assist in the evaluation of applications for water out of the reservation (See appendix 2).

G. Supporting documents that may need to be revised or developed because of the rule amendment.

- Frequently Asked Questions, or other focus sheet.
- Brochure, for distribution by the counties build and planning departments.
- Press releases.
- Web updates and information.

I. APPENDIX I. Mitigation Strategy for WRIAs 25 – 28

The attached DRAFT of the Integrated Strategy for Implementing Water-Right Reservations—WRIAs 25-28 reflects the planning unit's thoughts in late 2008. They expect to issue a final version of this document in February 2009, which may vary in one or more aspects.

Integrated Strategy for Implementing Water-Right Reservations

Grays-Elochoman and Cowlitz River Basins (WRIAs 25-26)
Salmon-Washougal and Lewis River Basins (WRIAs 27-28)

Updated October 2008 - DRAFT

Prepared by:

HDR Inc.
Olympia, WA

and

Lower Columbia Fish Recovery Board
Longview, WA

For Submission to:

WRIA 25/26 and 27/28 Planning Units
Clark, Cowlitz, Skamania, Lewis and Wahkiakum Counties
Washington State Department of Ecology

Funded by Washington State Department of Ecology Grants
G0800173, G0700278, G0800174

Table of Contents

Tables

Figures

References

Attachments

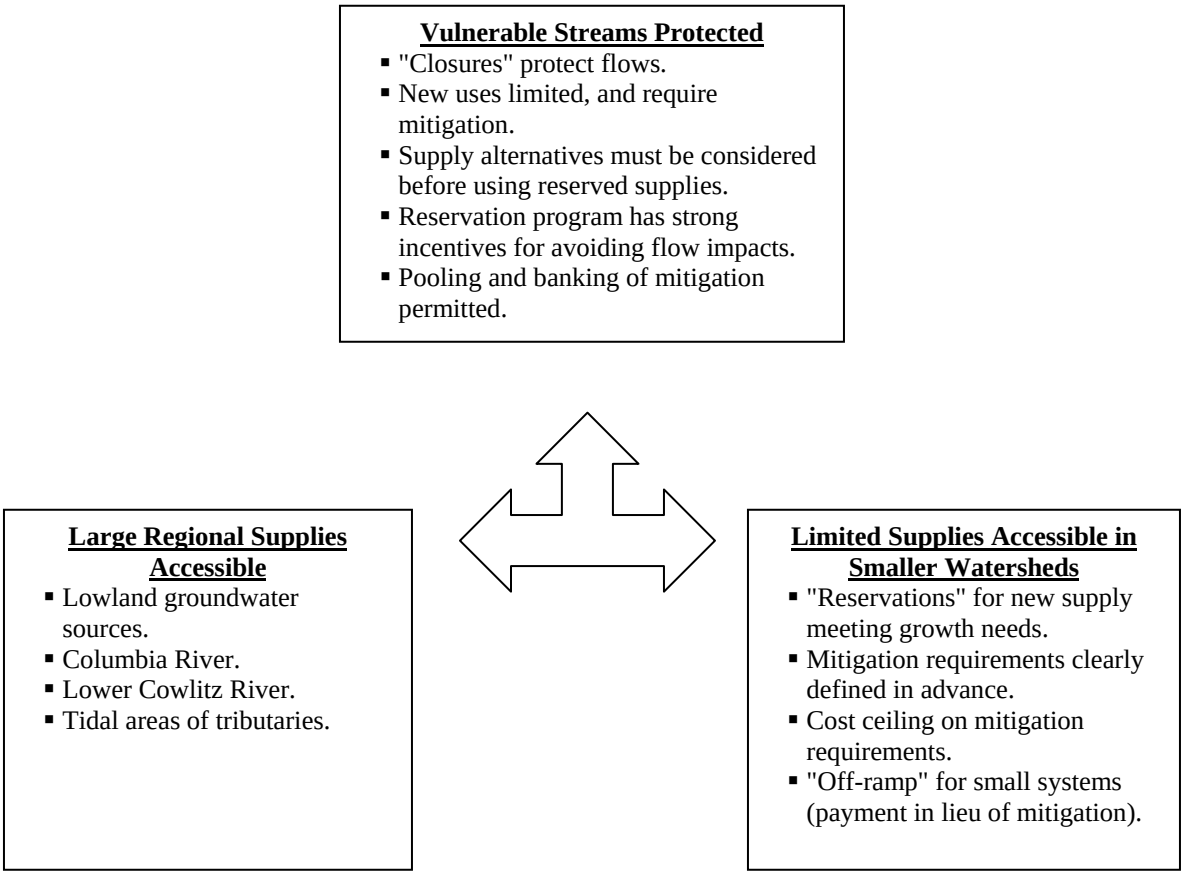
A. White Paper: Reserved Water Strategy Implementation, WRIA 25/26
B. White Paper: Reserved Water Strategy Implementation, WRIA 27/28
C. Alternatives Analysis for New Water Supply
D. Evaluation of Flow-Related Mitigation
E. Evaluation of Habitat/Watershed Mitigation
F. Example of Flow-Related Mitigation
G. Guidelines for Performance Standards
H. Cost Considerations Background and Options Considered
I. Representative Costs for Municipal Water Supply Purchases
J. Numerical Examples of Cost Ceiling for Mitigation
K. Data Used in Determining In-Lieu Payment

Executive Summary

Watershed Management Plans adopted in 2006 for WRIAs 25/26 and 27/28 defined policies to balance stream flow and habitat protection objectives with the need for additional water supplies. The plans identify large water resources that can support regional water supply development without harming fish habitat. The plans also recognize that smaller streams need protection, and establish strict limits on new supply development for these streams. Where available stream flows can support small depletions for supply development, water supply "reservations" are defined. Applicants for these reserved waters will need to mitigate effects on stream flow in order to use these supplies.

Figure ES-1 summarizes key elements of the closure and reservations program adopted by the two Planning Units. The Washington State Department of Ecology is currently in the process of adopting the stream closures and reservations into State law.

Figure ES-1. Reservation Program Elements



In order to effectively implement the closure and reservation program, the Planning Units determined specific procedures should be developed for water rights applicants and the state agencies that review requests for new water supply. A Mitigation Subcommittee with members from both Planning Units was formed in 2007 to develop these procedures. This report documents the Subcommittee's recommendations for consideration by the two Planning Units. The Department of Ecology and Department of Fish and Wildlife

(DFW) have been involved throughout development of these procedures. Upon adoption by the Planning Units, the agencies will use these procedures in processing water rights within WRIAs 25-28.

What is a Water Reservation?

A water reservation is a specific quantity of stream flow within a "closed" stream that remains available for potential use in the future. The Department of Ecology is authorized to issue new water rights, up to the limit of the reservation. Reservation quantities were determined during the watershed planning process based on existing stream flow conditions, habitat needs, forecasts of water supply needs, and related factors. Reservations are specifically associated with specific water users (typically cities or towns) or categories of users (such as private industry, agriculture or small water systems).

Procedure for Accessing Reserved Supplies:

The Planning Units intend that stream flow, even under water reservations, should be protected from unnecessary depletion. A stringent set of conditions were established to carry this out. At the same time, the Planning Units intend that reserved water be available to serve demonstrable needs of growing communities and economic development in WRIAs 25 – 28. To accomplish these dual goals, the following procedures have been defined:

- An applicant for reserved water must show it is eligible for the reserved supply; define the proposed water supply project; and assess its impact on stream flow in any closed streams.
- Applicants must demonstrate that alternatives have been reviewed to determine whether other water sources could meet same need with less impact to streams.
- Where stream flow in closed waters will be reduced by the supply project, the applicant must propose flow-related mitigation actions. These actions must offset at least 50% of the depletion amount through flow restoration at an upstream location, if feasible and economical. The Subcommittee developed a scoring procedure Ecology can use to evaluate "credit" for flow-related mitigation actions.
- Remaining flow depletion must be offset, if feasible and economical, through habitat/watershed mitigation actions. A separate scoring procedure was developed to evaluate credit for these actions. The scoring procedure is based on comparison of habitat effects between the flow depletion and the mitigation actions.
- In order to protect water rights applicants from excessive costs, a cost ceiling has been developed. The cost ceiling is set initially at $2,000 per acre foot per year (AFY) of supply. This value will be multiplied by the number of AFY allocated in the water right. Mitigation will be required only up to the limit of this cost ceiling. The ceiling was set at a level that balances economical supplies with habitat protection.
- If these requirements are met, Ecology will issue a water right authorizing the applicant to develop its supply project. The reservation will be drawn down, based on

the net quantity of stream flow depletion. If water remains in the reservation, the applicant can return later with additional applications.

- The applicant must carry out the approved mitigation actions and provide documentation to the State that the actions were consistent with the approved proposal. Monitoring & maintenance will be required for actions that require time to fully develop. In addition, financial guarantees of the mitigation actions will be required as a condition for approval of water rights.

These procedures are summarized in Figure ES-2.

Off-Ramp for Small Flow Depletion

The Planning Units recognizes that the review and analysis required by this procedure may be expensive to carry out and may require specialized expertise. In the case of small water supply projects, this can be an unreasonable burden, especially for smaller communities in the watersheds. Therefore, an exemption was created allowing some small supply projects to bypass the mitigation procedure. This exemption can be exercised at the choice of the applicant, but only for water rights that would deplete stream flows by a quantity of 0.2 cubic feet per second (cfs) or less. If the applicant chooses to use this exemption, they can pay into a mitigation fund instead of proposing mitigation actions. This in-lieu fee is set at $54,000 for every one-tenth cfs, per mile of stream affected. This fee was established based on the average cost of fish habitat mitigation actions in western Washington. Funds will be pooled and used to carry out mitigation projects within five years. The Subcommittee has recommended that LCFRB be identified as the administrator of the pooled funds, and that it report to Ecology on use of the pooled funds every two years. The in-lieu fee can be adjusted from time to time, so that it provides adequate funds for equivalent mitigation actions.

Opportunity for Banking Mitigation Credits

The Planning Units recognize that some organizations may find suitable mitigation opportunities long before they need to tap their reserved water supplies. In other cases, a third party may be able to carry out mitigation and make mitigation credits available to water users. The procedures provide for both of these situations by allowing mitigation credits to be banked and/or transferred.

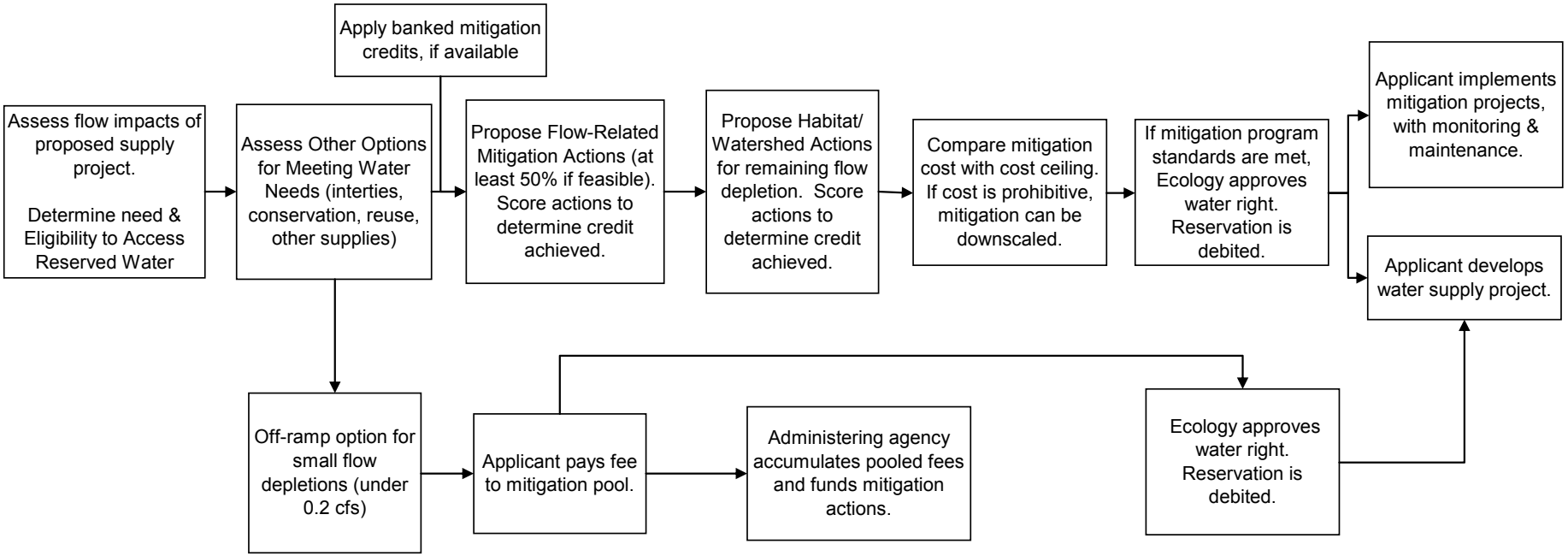
Agency Procedures

This report spells out the recommended procedures in some detail. Even so, it is anticipated that Ecology will need to prepare some additional materials in the form of fact sheets for applicants and standard forms for applicants and agency staff. Some training of Ecology and DFW staff will also likely be needed to support consistent administration of these procedures. In addition, Ecology will need to track use of the water reservations over time so they are not over-allocated.

Advisory Committee

This report recommends that an Advisory Committee be formed to guide implementation of these procedures, and to assist with dispute resolution where applicable. The Advisory Committee should be representative of the WRIA 25-28 Planning Units.

Figure ES.2. Overview of Process to Access and Mitigate Water Reservations



1.0 Background and Purpose

This Report summarizes work completed by the Water Rights Mitigation Subcommittee representing two Watershed Planning Units in southwestern Washington State: the Watershed Planning Unit for the Grays Elochoman and Cowlitz River Basins (WRIAs 25-26); and the Watershed Planning Unit for the Salmon-Washougal and Lewis River Basins (WRIAs 27-28)[3]. The Subcommittee was formed to develop procedures for implementing policies on accessing water rights reservations within these four WRIAs, including an approach to proposed mitigation actions by water rights applicants. This activity is one element of implementation of the two Watershed Management Plans developed for these WRIAs.

This work has been performed under the provisions of Chapter 90.82 RCW; and was funded through grants from the Washington State Department of Ecology. Management of the grant funds and oversight of the project consultant has been performed by the Lower Columbia Fish Recovery Board (LCFRB). Initial work was completed in 2007 and a report was issued and approved by the two Planning Units in February 2008. Follow-up work was then done in 2008 to further develop specific aspects of the strategy for implementation. A set of five briefing papers was prepared as noted in the References Section. This report updates the prior report and presents the full mitigation strategy with results from the additional work. Additional details on selected topics can be found in the briefing papers.

The watershed plans for the two planning areas were prepared by the two planning units and adopted in 2006. Both plans include policies intended to balance the needs of water for growth and development with those of instream flow supporting aquatic life and multiple beneficial uses. The plans recommend that the Washington State Department of Ecology "close" many of the surface waters in these WRIAs to further appropriations. This means that new water rights would not be issued. However, the plans also recommend that the State Rule enacting these closures include "reservations" of water for certain uses. The reservations were carefully defined to minimize further impacts on stream flow from new water uses. Generally the reservations represent flow volumes of approximately one to two percent of existing flows in specific streams during the low-flow season. The intent of the combined closures and reservations was to protect instream flows while providing limited access to new water supplies.

The reservations represent flow volumes of approximately one to two percent of flow in specific streams during the low-flow season.

Attachments A and B to this Report provide policy statements from both Watershed Management Plans regarding water reservations, as well as tables listing the specific quantities reserved, by stream and by user.

The Watershed Planning Units anticipate that most new applications for water rights under the reservations will be for ground water rather than surface water. The reservations are identified in terms of stream flow depletion, rather than the quantity of water used. A larger quantity may be pumped, as long as the stream flow depletion is not exceeded. The Mitigation Subcommittee did not examine methods for quantifying effects of pumping on stream flow. This is because the

[3] WRIA stands for Water Resource Inventory Area

Department of Ecology already has considerable experience in this regard, and the Subcommittee preferred to focus its work on the new procedures required to implement the Watershed Plans.

The reservations are set aside for municipal water systems, domestic wells and certain other types of users. Table 1 summarizes categories of users with access to the reserved waters. For full information, including specific reservations by stream, see Attachments A and B.

Table 1 Categories of Water Users with Access to Reserved Waters[1] (WRIAs 25/26 and 27/28)
Cities and Towns (identified individually)
Public Utility Districts (identified individually)
Small Community Water Systems
Domestic Wells
Commercial Uses
Other Beneficial Uses

[1] Not all user groups have access in all areas. For specific reservations assigned to each group, see Attachments A and B.

The policies in the Watershed Management Plans place stringent conditions on accessing the reserved waters. These include:

- A water right applicant must first review alternative sources of supply that would not deplete stream flow in a closed reach (or would reduce depletions compared with the proposed source of supply);
- The applicant's proposal to withdraw water must include off-setting and mitigating actions;
- Flow depletion must be mitigated to the maximum extent practicable using flow-related actions. No less than half of the stream flow depletion must be offset through flow-related mitigation (with some exceptions); and
- Other mitigating actions, such as habitat improvements, must be carried out to mitigate for flows not offset through flow-related actions.

At the same time, the Watershed Management Plans recognize that imposition of overly restrictive requirements could undermine the plans' policies on provision of new water supply. Therefore the plans recognize that both cost and logistical barriers are valid considerations in evaluating the adequacy of mitigation actions.

Following adoption of the Watershed Plans in 2006 the Planning Units entered Phase 4 of the watershed planning process. Phase 4 addresses implementation of the Watershed Management Plans. As one step in developing a detailed implementation plan, the two planning units formed a joint subcommittee to develop more detailed procedures for implementing the reservations and determining how mitigation proposals should be evaluated. The intent has been to provide specific guidance to the Department of Ecology for processing water rights applications for reserved waters and that the mitigation procedures will be practical, predictable, and transparent for water rights applicants.

Mitigation procedures should be practical, predictable and transparent.

This Report presents the findings and recommendations of the Water Rights Mitigation Subcommittee. The report is organized as follows:

1.0 Background and Purpose
2.0 Reservation Accounting
3.0 Preliminary Steps for Water Right Applications
4.0 Mitigation Actions
5.0 Monitoring and Maintenance of Mitigation Actions
6.0 Cost Considerations
7.0 Small Systems
8.0 Mitigation Banking
9.0 Application and Scoring Procedures

Additional details are contained in the attachments to this Report.

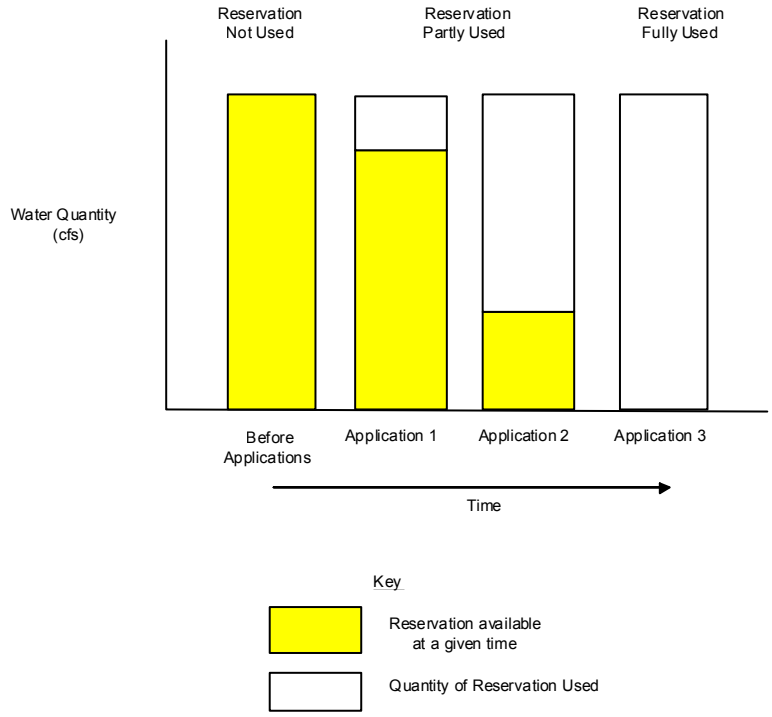
2.0 Reservation Accounting

The Watershed Management Plans established the closure amounts by stream and by eligible applicants, but did not provide a detailed discussion of how the reservations would be tracked and managed over time as new water rights are issued to specific users. The Subcommittee has developed more detailed guidance on this topic.

Water reservation accounting principles are based on the guidance outlined in Section 3.3.1 and Appendices I (WRIA 25/26) and H (WRIA 27/28) of the two Watershed Management Plans. The specific procedures used for determining mitigation "credits" and "debits" are described in Section 4 of this report.

A given reservation may be used up all in a single water-right application; or may be gradually "drawn down" over time. Figure 1 depicts a reservation that is gradually drawn down, by three water right applications over a period of several years.

Figure 1. Use of Reservation Over Time



Successful implementation of the reserved water strategy will require that the Department of Ecology, as the primary regulatory entity, develop a management and accounting system to track the status of water reservations and related data. It is suggested that this system be made accessible over the Internet. The Planning Units recommend that the following general elements be included in this system:

- Reservation amount (original and current, by user or group)
- Complete history of reservation debits and credits by stream
- Complete history of reservation debits and credits by entity
- Project application information:
  - Entity
  - Type (flow, habitat)
  - Status (approved, denied, pending)
  - Description, goals and objectives
  - Location(s) (legal description, subbasin, reach, etc)
  - Project metrics
  - Plans and specifications
  - Debit and credit calculations
  - Permit conditions, restrictions
  - Monitoring
  - Operation and maintenance requirements
  - Relationship to other projects
  - Agreements

- Related flow monitoring data and information, if required
- Number of domestic wells, installed under the reservation policy, compared with number planned at time the reservation was established.[4] .
- Banking metrics
- Web-linkages to related plans, guidance documents, and other information sources

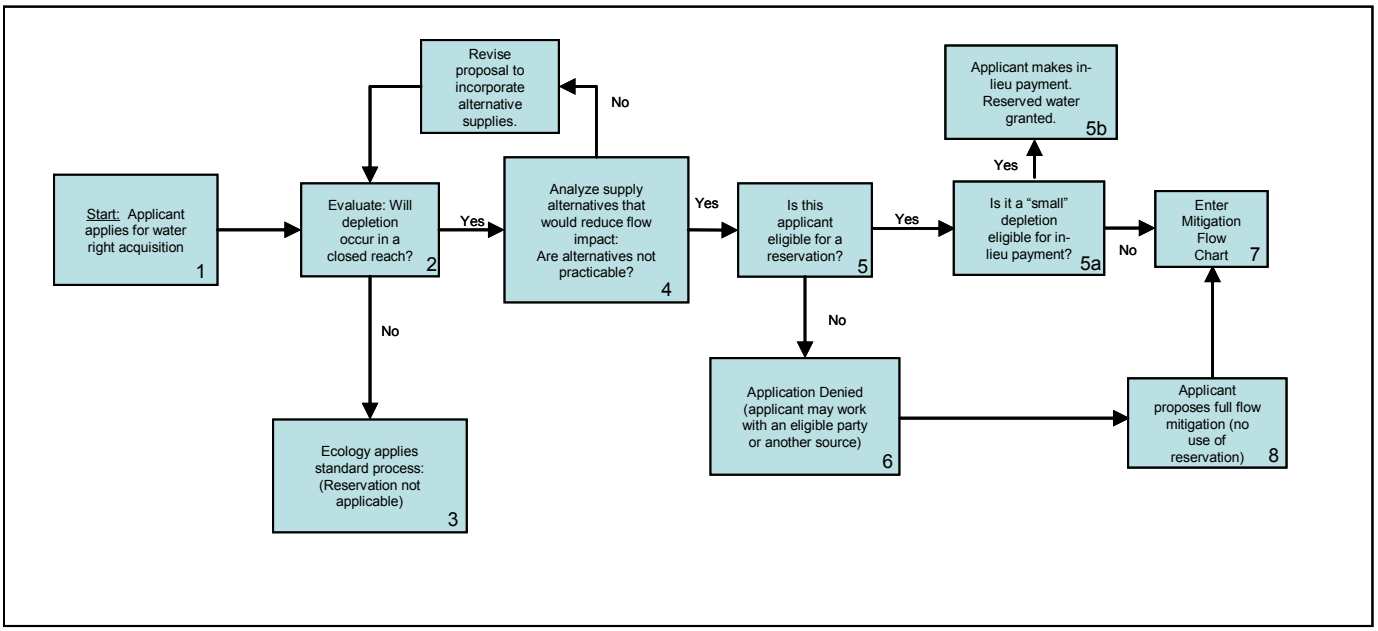
The Planning Units recommend that the details of a water reservation management and accounting system be determined further as part of continued activity during the Phase 4 Implementation period. The Department of Ecology should coordinate closely with the Planning Units, water systems, resource agencies, LCFRB, and other implementation partners during development of this system.

3.0 Preliminary Steps for Water Right Applications

Figure 2 shows preliminary steps to determine whether a water rights applicant can apply for reserved waters, and whether a mitigation proposal is required.

[4] The quantity of water reserved for domestic wells was generally selected based on "predicted land use over a 20-year time horizon" (see Appendix I of WRIA 25/26 Plan and Appendix H of WRIA 27/28 Plan).

Figure 2. Pre-Screening Procedure for Reserved Water



Flow depletion estimates on a stream (Box 2) will be quantified based on standard methods currently accepted by Ecology. Where depletion of closed waters is less than 0.2 cfs, the Mitigation Strategy allows an applicant to use a simplified procedure that requires less information and analysis (see Section 8).

For surface water applications, there will be a well-defined point of diversion on a surface water body. For ground water applications, a discrete "point of impact" on an affected water body will need to be defined, or impacts will need to be defined for different reaches, to enable the steps discussed below.

Box 4 of the pre-screening procedure calls for review of water supply alternatives for the applicant that could reduce or eliminate flow impacts on the affected surface waters. This is a key element of the strategy for implementing water right reservations in WRIAs 25-28. Additional details on this step are included in Attachment C.

Box 5 of the pre-screening procedure requires Ecology to determine whether the applicant is eligible for reserved waters. Eligibility can be readily determined from the two Watershed Management Plans, based on the information reproduced in Attachments A and B of this report.

4.0 Mitigation Actions

Under the policies presented in the Watershed Management Plans, applications for reserved waters must be accompanied by offsetting and mitigating actions. The Subcommittee understands that these actions will normally be expressed as conditions associated with a water right issued by the Department of Ecology. The Subcommittee understands that "offsetting" actions are essentially flow-related mitigation actions that replace water in the stream. Other mitigating actions may include a wide variety of actions that either help moderate streamflow

impacts or provide other benefits to aquatic resources and aquatic habitat. Collectively, all of these offsetting and mitigating actions are referred to as "mitigation" in this report and attachments.

The procedures recommended by the Subcommittee break mitigation down into two main categories:

- Flow-related mitigation; and
- Habitat/watershed mitigation.

These two categories are handled somewhat differently because the plan emphasizes flow-related mitigation actions over other actions. Figure 3 displays the process for an applicant's mitigation proposal to be evaluated.

Mitigation ordinarily must occur within the same LCFRB-defined subbasin (or for the larger river systems, a subbasin that is hydrologically part of the same larger basin). Limited exceptions may be permissible, where greater benefits can be demonstrated through mitigation in another subbasin.

Key steps in the process occur in Box 10 (Evaluate Flow-Related Mitigation) and Box 14 (Ledger System for Habitat/Watershed Mitigation). The evaluation process that occurs within these two boxes is elaborated further in Attachments D and E.

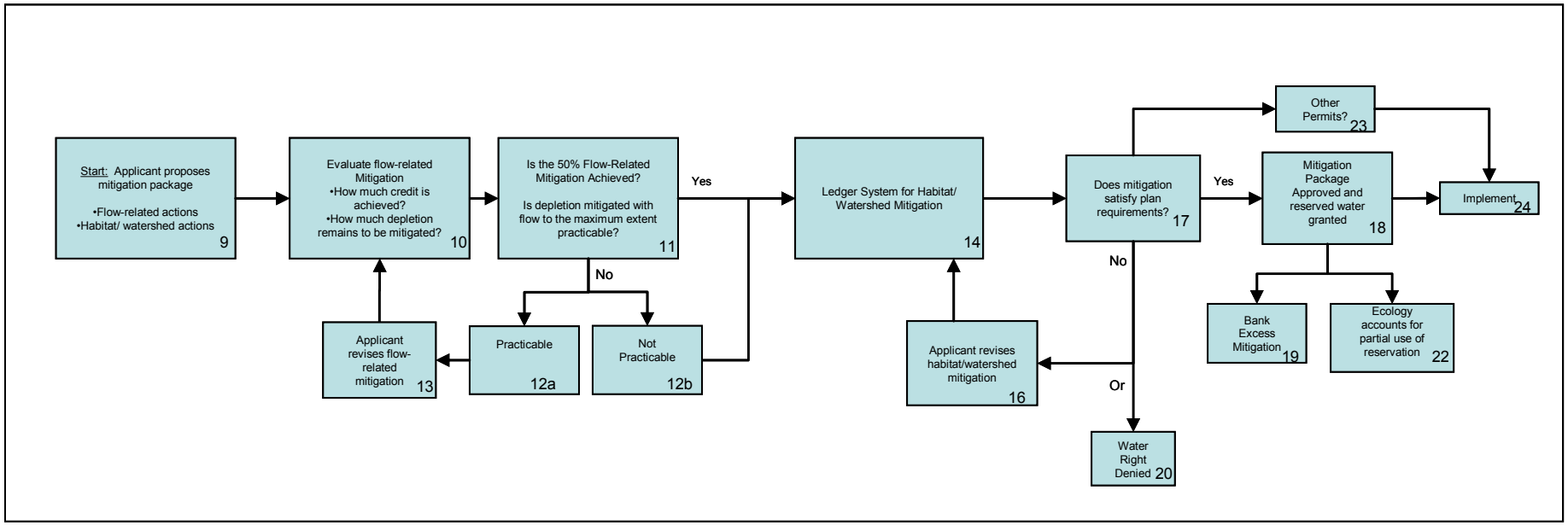
In brief, these two evaluations are conducted as follows:

4.1 Box 10: Evaluation of Flow-Related Mitigation

Flow-related mitigation actions may include a range of actions that directly replace flow depleted by a new water withdrawal or diversion. Actions that may be proposed in this category could include:

- Acquisition of out-of-stream water rights to be dedicated for instream flows;
- Salvaged water obtained through conservation actions not mandated by law, that result in increased stream flows (e.g. conservation on irrigated farmland);
- Pumping of ground water with direct or indirect discharge to a stream at a time and manner to provide net increase in flow;
- Modification of wastewater systems to permit increased discharge of treated effluent to a stream, meeting suitable water quality requirements; and
- Other projects that directly enhance stream flow.

Figure 3. Mitigation Evaluation for Reserved Water



The following basic assumptions apply to flow-related mitigation:

- Flow depletion estimates on a stream will be quantified based on standard methods currently accepted by Ecology;
- For surface water applications, there will be a well-defined "point of diversion" on a surface water body. For ground water applications, a discrete "point of impact" on an affected water body will need to be defined, to enable the steps discussed below. In cases involving more than one pumping or withdrawal location, or variable stream flow capture along a gradient, multiple points of diversion or impact will be established;
- The 50% requirement for flow-related mitigation must be accomplished at the defined point(s) of impact or diversion. For this test, the quantity of flow will be the only metric. However, seasonality will be considered; and
- The required 50% flow-related mitigation may be provided in a location other than at the defined point(s) of diversion or impact provided the applicant demonstrates that overall greater resource benefits would result. In these limited exceptions, a quantitative analysis similar to that described in Attachment F must demonstrate overall greater resource benefits as measured by distance (in river miles) of watercourse affected, quantity of flow benefit and impact (in cfs) relative to baseline habitat conditions, water quality and salmon recovery reach tiering, in both the impacted and benefiting reaches.

A determination will be made as to whether the flow-related mitigation proposed has similar attributes to the water depleted, or significant differences. This step will compare the depleted water body and the water body identified for mitigation, using attributes such as length of stream affected; physical relationship (mainstem/tributary); seasonality of effects; water quality; and importance to listed species.

If there are significant differences between the depletion effect and the mitigation action, then a "weighting" process will be performed on the mitigation action. The weighting process determines how much "credit" will be awarded for the flow-related mitigation action, in comparison with the flow depletion (see Attachments D and F).

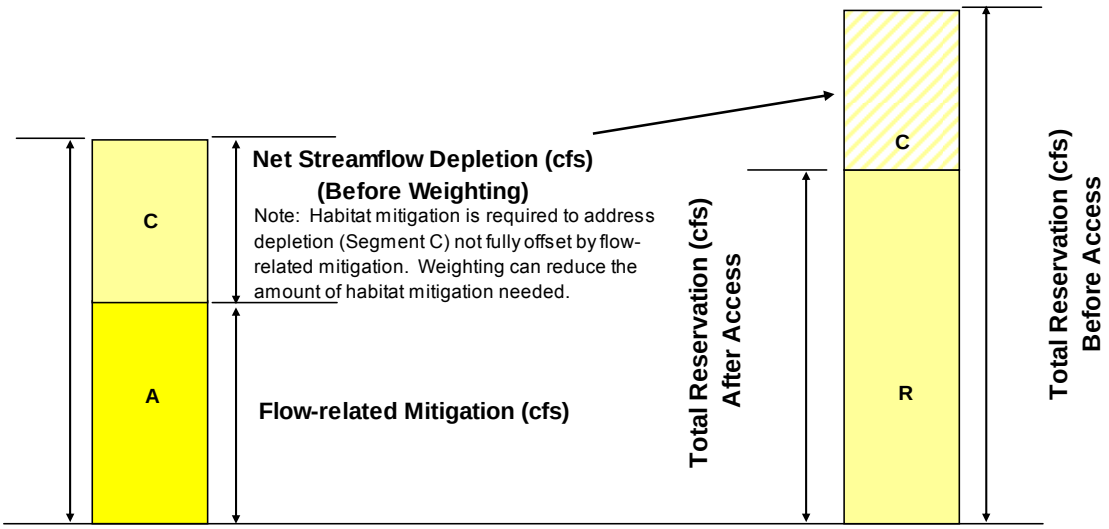
Based on the results of this weighting process, a determination will be made as to whether the flow depletion is fully offset; partially offset; or more than offset. The results will be used to determine:

- Whether further mitigation is required using habitat/watershed mitigation actions; and
- Whether excess mitigation credit is awarded that can be banked for the future (see Section 9).

Further details on evaluation of flow-related mitigation actions are presented in Attachment D. Attachment F contains an example of the evaluation of flow-related mitigation, including a spreadsheet tool to assist with the weighting and scoring procedure.

The quantity of flow-related mitigation achieved affects how a water user's reservation will be "debited." The quantity of flow restored through flow-related mitigation actions does not count as use of the reservation (for this calculation, the absolute quantity of flow, prior to any weighting, will be used). Therefore, the more flow-related mitigation a user can include in its mitigation plan, the more reserved water will remain available for additional uses in the future. This is depicted in Figure 4.

Figure 4: Relationship of Flow -Related Mitigation to Reservation Accounting



If streamflow depletion is fully mitigated through flow-related actions, the reservation would not be debited and would remain fully available for future access. However, if impacts are only partially offset through flow-related actions (Figure 4, Segment A), the remaining streamflow depletion (Figure 4, Segment C) is "debited" from the reserve.

Habitat/watershed mitigation actions will also be required to offset net streamflow depletion impacts, but will not be used to reduce the amount of "debit" from the reservation. Additional instream flow benefits that result in "up-weighting" of the flow-related mitigation credits under the procedures outlined in Section 4 can be used to reduce the amount of habitat mitigation required to address net stream flow depletion as represented by Segment C. The type, scope and scale of habitat mitigation will be determined using the guidance outlined in Section 4.2 of this document. Attachment F contains a spreadsheet tool that helps to illustrate how weighting of flow-related mitigation actions may reduce the amount of habitat mitigation required.

4.2 Box 14: Evaluation of Habitat/Watershed Mitigation

After the applicant's flow-related mitigation actions have been evaluated, further actions may still be needed to mitigate the remaining flow depletion. Evaluation of habitat/watershed mitigation actions is more challenging, because these actions do not directly offset stream flow and results are much harder to quantify. Furthermore, it is expected that habitat/watershed mitigation actions will be highly diverse from one application to another.

The Subcommittee devoted considerable attention to developing a scoring system that could accommodate a wide array of habitat/watershed mitigation actions. The initial basis for a scoring system of this nature was review of similar procedures developed by other agencies. For example consulting staff reviewed and summarized the Regional General Permit impact and mitigation point system used by the U.S. Army Corps of Engineers for dredge and fill projects under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Consulting staff also reviewed the Ohio Environmental Protection Agency guidance for Section 401 certification; and the procedures used by the Deschutes River (Oregon) Groundwater Mitigation Bank. Features that seemed most applicable to the mitigation program for WRIAs 25/26 and 27/28 were based primarily on the Corps of Engineers example.

The Subcommittee recommends use of a "ledger system" for scoring proposed mitigation actions. On the "debit" side of the ledger is the remaining stream flow depletion that was not mitigated through flow-related. The debit is scored based on four factors:

- Quantity of remaining flow depletion measured in cubic feet per second (cfs);
- Length of stream affected by the flow depletion, measured in tenths of a mile (0.1 mi.);
- Whether instream flow is considered limiting to fish production at the reach-scale relative to other habitat factors; and
- Importance of the affected stream reaches as fish habitat (based on reach tiers from the LCFRB Habitat Work Schedule).

A matrix was developed to enable any stream depletion to be "scored" using these four factors. This debit score then becomes the basis for comparison of habitat/watershed mitigation actions for a given water right application.

On the "credit" side of the ledger, the applicant's habitat/watershed mitigation actions are also scored. The Subcommittee identified five standard categories of habitat/watershed mitigation that are expected to be encountered most frequently. For each of these five categories, a simple scoring system was developed. The value of mitigation within each category is generally defined by a) the importance of the mitigation reach to fish recovery, and b) the specific kind of mitigation action proposed. The value of mitigation between each category and flow depletion was determined using different rationale and methods.

Table 2 lists the five standard categories of habitat/watershed mitigation. Further details are provided in Attachment E.

In the ledger system process, the points on the "credit" side are compared with points on the "debit" side to determine how fully the applicant's proposal mitigates for the remaining stream depletion.

As indicated in Section 2 (Reservation Accounting), scoring of habitat/watershed mitigation does not affect the quantity of water deducted from the applicant's reservation. Instead, it is used to determine whether the applicant has fully met the mitigation requirements of the Watershed Management Plans.

It should also be noted that fully mitigating the remaining flow depletion (after accounting for flow-related mitigation) may not be required in all cases. For further information, see Section 7 (Cost Considerations).

Some additional elements of the mitigation procedure are listed below. For further requirements, see Attachment E.

- The mitigation actions must be for actions that are not already mandated to occur (e.g. culverts, critical areas protection, etc.);
- Mitigation should occur in the same sub-basin as the flow depletion. Mitigation may be completed in another sub-basin if the applicant can demonstrate a greater resource benefit;
- Mitigation projects and actions should be developed and implemented using best available science and have a high long-term likelihood of success. Specific performance goals and measures (e.g. success rates, temporal, desired future conditions, etc.) will be associated with each mitigation action and mutually agreed upon by the applicant and Ecology; and
- In cases where multiple parties contribute to a project, the water right applicant only receives credit proportional to their contribution.

Table 2
Rationale for Scoring Different Types of Habitat/Watershed Mitigation Actions

	Mitigation Actions	Rationale	Processes and Functions Associated with Mitigation Actions	Mitigates Reduction in Aquatic Habitat	Mitigates Hydrologic Impacts	Method for Determining Value Relative to Flow Reduction
1	Side Channel/ Off-Channel Habitat Restoration (per acre)	Increase the quantity of aquatic habitat	Refugia; spawning habitat; invertebrate production; over-wintering habitat	X		IFIM modeled relationship between streamflow and WUA
2	In-Channel Improvements (per 100 sq. ft)	Increase utilization of "downstream" aquatic habitat by increasing habitat quality	Refugia; wood and gravel recruitment; sediment sorting; bedform diversity; bed material retention	X		IFIM modeled relationship between streamflow and WUA
3	Wetland Restoration (per acre)	Some wetlands can attenuate transport of upslope stormwater to streams; store water from high-flow events; and / or contribute to baseflows	Maintenance of stream low-flow ; Attenuation of stormwater impacts; wetland water quality function; wetland habitat function		X	Best Professional Judgment
4	Floodplain Reconnection (per acre)	Levee removal or setback allows for increased utilization of floodplain and increased water storage for low flow maintenance	Channel stability; sediment sorting; floodplain connectivity /storage; bedform diversity; hydraulic diversity; nutrient input; refugia		X	Best Professional Judgment
5	Riparian Preservation and Restoration (per acre)	Riparian vegetation attenuates transport of water from watershed to channel and improves habitat conditions in WUA	Shading; Bank stability; width/ depth; pollutant filtering; flow retention; erosion control; LWD input; refugia; channel roughness; allochthonous material input; floodplain roughness		X	Best Professional Judgment
6	Other Mitigation Actions	Applicants may propose other types of habitat / watershed mitigation. Those proposals will be evaluated on a case-by-case basis	Variable	Variable	Variable	Best Professional Judgment

5.0 Proposed Documentation of Mitigation Actions

In order to ensure that the habitat mitigation is successful, and therefore meets the obligation required to access reserved water, a mitigation plan must be developed to fully document the mitigation action approved through the scoring procedure. If applicable, the mitigation plan elements in Table 3 will be required. Justification must be provided for omitting any of these elements from a mitigation plan.

Table 3
Documentation Required for Approved Mitigation Actions

Required Elements
Estimate of impacts and mitigation requirements[1]
Description of mitigation actions[1]
Goals and objectives of actions
Detailed implementation plan
Performance standards
Maps and drawings of mitigation proposal
Additional Elements (if applicable)
As-built drawings
Protecting the site (e.g. conservation covenant, deed restriction, etc.)
Operation and maintenance plan
Monitoring and evaluation plan
Adaptive management and contingency plan
Agreements or performance bonds or other guarantees that applicant will fulfill mitigation

[1] Applicants will prepare these two items as part of the routine evaluation of mitigation proposals submitted to Ecology. See Attachment E.

General requirements for mitigation plans should be consistent with commonly used mitigation and restoration guidance. The following table relates the "standard" water rights mitigation actions identified in Attachment E to available guidance from other sources.

Table 4
Mitigation Actions and Existing Guidance on Mitigation/Restoration Plan Elements

	Mitigation Action	Army Corps Ecology Wetland Mitigation Guidance	WDFW Hydraulic Project Approval Mitigation Guidance	Stream Habitat Restoration Guidelines Guidance
1	Side Channel/ Off-Channel Habitat Restoration		x	x
2	In-channel Improvements		x	x
3	Wetland Restoration	x		
4	Floodplain Reconnection	x	x	x
5	Riparian Preservation and Restoration		x	x
6	Other	TBD	TBD	TBD

It is expected that, during pre-application discussions with Ecology and WDFW, a conceptual plan will be discussed and agreements will be made on the feasibility of the mitigation project, the value of the mitigation actions, and fulfillment of the mitigation requirements. At the time the water rights application is to be processed, the technical aspects of the mitigation actions must be developed to the 30% level. During formal application review, the prior agreements will be vetted and finalized. The new water right permit will be the contract that directs the mitigation plan to go forth as proposed or with conditions. A time requirement for completion of mitigation will be part of the permit. A final 100% design must be drafted and submitted prior to the mitigation project being performed.

6.0 Monitoring and Maintenance of Mitigation Actions

Where mitigation actions depart from simply acquiring offsetting water rights, they may need to involve monitoring and/or maintenance components. This is important because some mitigation actions may not perform as planned; may deteriorate over time; or may be affected by floods or other changes in watershed conditions. It would be desirable for flow-related mitigation accompanying the issuance of reserved waters to be effective throughout the "lifetime" of the authorized water use. However, this must be balanced against the intent that mitigation actions should be feasible and economical for water users accessing their reserved supplies.

The Mitigation Subcommittee discussed different concepts for how long-term monitoring and maintenance needs of habitat mitigation actions could be addressed. The Subcommittee recommends that the applicant be responsible for monitoring and maintenance for only a fixed period of time. The intent is to ensure that the mitigation action is successful as initially conceived, but not to require an open-ended obligation to maintain it permanently. Performance standards should be developed for different types of mitigation actions, similar to those used in comparable local, state and federal programs. Where an action has uncertain effects over the long-term, this should be reflected in the mitigation scoring procedure.

The Mitigation Subcommittee discussed mitigation monitoring and maintenance requirements associated with several different types of environmental permits at the local, state and federal levels (details are documented in the briefing paper prepared on this topic – see References). These included U.S. Army Corps of Engineers Dredge and Fill Permits and Water Quality Certifications; Washington State Department of Fish and Wildlife Hydraulic Project Approvals; and local critical areas permits in southwest Washington, with a focus on Clark County's required procedures. The protocol described here was based on these examples, adapted for purposes of the water reservations policy.

6.1 Monitoring and Maintenance Guidelines for New Water Right Permits

Some of the proposed mitigation plan elements are related to monitoring and maintenance. These elements are discussed in this section. The goals and objectives, performance standards, and monitoring guidelines should be developed in table format and related to the six mitigation actions that are specified in the current water right guidance document and Table 4. Attachment G provides examples of what these tables

could look like. Attachment G also provides an example of the specificity at which the performance standards could be written.

Goals and Objectives

The mitigation goals and objectives will be defined in project-specific terms and with measurable performance standards. The goals and objectives will depend on the specific kind of project that is proposed. However, for any given project, the relevant objectives and performance standards can be selected from a list and applied in a mitigation plan.

Performance Standards

Performance standards describe measurable attributes that can be used to evaluate success in meeting the goals and objectives of a compensatory mitigation project. A direct connection must be evident between these performance standards and the goals and objectives of the mitigation project. Furthermore, the performance standards define when the attributes must be measured to evaluate project success.

The mitigation sub-committee recommends "up-front" performance standards for high-certainty projects. "Up-front" performance standards would minimize the amount of case-by-case technical review required by Ecology and WDFW. Attachment G contains performance standard guidance for water right applicants. The applicant may propose changes to these performance standards. The wetland standards are adapted from WSDOT guidance (2008). The wetland performance standards allow for case-specific customization because of the variable nature of site limitations. The standards for all other mitigation actions have been adapted from the Washington Salmon Recovery Funding Board action effectiveness monitoring protocols (2008).

Monitoring and Evaluation Plan

Monitoring requirements are directly related to one or more performance standards. The monitoring frequency, the parameters monitored, and success criteria are all interrelated and should be constructed together in a performance standard table (Performance Standard Guidance, Attachment G). The Monitoring duration is the total number of years that encompass the monitoring period. After the final year of monitoring, a determination can be made on the success of the project. The monitoring duration will not exceed ten years.

Submitting "As-Built" Reports

As-Built reports will be required to verify compliance with the agreed-upon mitigation actions and specifications. For some mitigation actions, such as "In-Channel Improvement" projects, review and acceptance of the as-built report may be the only environmental performance standard and would be sufficient to confirm mitigation success and close out a mitigation agreement.

Maintenance, Contingency, and Adaptive Management

Maintenance, contingency, and adaptive management plans will be defined by applicant but must meet intermediate and final performance standards and would be subject to conditions during permit review. Contingency and adaptive management plans would come into play if performance standards were not met.

Completion of Compensatory Mitigation Requirements (on-site inspection confirming mitigation success and written confirmation closing out mitigation agreement).

Mitigation success will be verified with monitoring reports submitted by the applicant and/or on-site inspections by Ecology and/ or WDFW staff. The content of the monitoring reports are based on the performance standards.

6.2 Compliance and Financial Assurances

Financial assurances in the form of a bond or other security acceptable may be required by the administering agency, in an amount sufficient to re-establish the mitigation in the event of failure or subsequent disturbance. The financial assurances shall remain in place for the length of time specified for monitoring and will be released after a request by the applicant and a final review and/or on-site inspections by the administering agency. In the event of failure of the mitigation, the financial assurances will be used to re-establish the mitigation. The quantity of the financial assurance is proposed by the applicant and is based on the costs anticipated for mitigation construction, monitoring, and maintenance. Staff from the administering agency will review and approve the assurance. Forms will support these legal agreements. The following types of financial assurances may be used:

- Bonds: A bond can be established between the water right applicant and a bonding institution. The applicant will pay a fee for the bond. If the applicant does not successfully complete their mitigation project, the bonding institution pays the bond amount to the agency administering the mitigation agreement.
- Deposit Account Agreements: The applicant puts their own money into a bank account. The agency administering the mitigation agreement will have access to the account in the event that the mitigation is not successful.
- Escrow Agreements: The applicant puts their own money into an escrow account. The agency administering the mitigation agreement will have access to the account in the event that the mitigation is not successful.
- Letters of Credit: A line of credit is established by the applicant at a bank. The applicant allows the administering agency has access to this line of credit if the mitigation project is not successfully completed.
- Letters of Commitment: A legal agreement from an applicant that is a public agency to the agency administering the mitigation agreement. The commitment is to pay the administering agency the agreed upon amount of money in the event that the mitigation is not successful.

7.0 Cost Considerations

The policy on water right reservations in the Watershed Management Plans for WRIAs 25/26 and 27/28 indicates that cost should be a valid consideration in evaluating the adequacy of mitigation proposals (Attachments A and B). There are several steps where cost considerations may apply:

- In determining whether water supply alternatives are available that would avoid depletion of a closed stream;
- In determining whether an applicant can mitigate more than 50% of stream flow depletion using actions that are not flow-related;
- In determining whether flow-related actions will be used "to the maximum extent practicable;" and
- Where habitat/watershed mitigation is proposed to supplement the required flow-related mitigation, determining whether the habitat/watershed mitigation actions meet the mitigation program requirements.

The intent of using cost as a consideration is to prevent situations where water users having a designated reservation cannot reasonably access the reservation because mitigation requirements are too burdensome. The reservations were set aside with the understanding that water users may need to deplete stream flow, within limits, as new supplies are needed. The barriers to accessing this supply should not be so high that it makes the reservations unavailable in practical terms.

However, the reservation was not intended as a "free pass" either. A balance must be struck so that at least a minimum level of mitigation will be achieved. Therefore in cases where mitigation costs exceed the defined threshold, this does not mean that mitigation will not be done. Instead, it should drive the applicant to consider other mitigation alternatives. Even if no suitable alternatives can be found, the applicant would need to mitigate up to the cost threshold.

To make this policy operational, the Mitigation Subcommittee defined a "cost ceiling" for mitigation actions used to access reserved water. The cost ceiling applies to all mitigation actions undertaken, whether they be flow-related actions or habitat/watershed actions.

Further discussion is provided below. The Subcommittee considered the principles discussed below, and reviewed four alternative approaches to setting the dollar value of the cost ceiling. A single approach was then selected.

7.1 Principles

The following principles were used in comparing alternative approaches to cost considerations:

- Cost considerations should support mitigation objectives of the plan; yet should not prevent access to reservations by designated users;

- Methods of defining cost considerations should be based on standard economic practices in the water resources field and should reflect both immediate and long-term economic factors;
- Cost considerations should be simple in application. Cost thresholds should be easy to define for a specific water right application and should not require extensive research or analysis by the applicant or Ecology; and
- The approach should yield consistent outcomes from project to project and among different applicants.

7.2 Approaches Considered

Several methods were considered for defining a cost threshold for the reservation program. These include:

1. Percentage of total cost for a water development project;
2. Market value of equivalent water rights (as a surrogate to assess the value of water to municipal users);
3. Economic value of water for in-stream purposes; and
4. Representative costs of similar mitigation actions.

The Subcommittee reviewed a discussion paper prepared by the consultant staff comparing these four alternatives. Information from the discussion paper is included in Attachment F.

7.3 Recommended Approach

Based on review of these four approaches, the Subcommittee recommends that a representative market value of water rights be defined for the WRIA 25 – 28 planning area (Approach #2). This value will serve as ceiling on "reasonable cost" in order for communities to gain access to their designated water reservations. It should be noted that this is not a limitation on water rights pricing. Instead, it uses data from actual water rights sales for equivalent water rights as a surrogate for the value of water to municipal water systems.

Water rights are routinely bought and sold, or leased, in the State of Washington, other areas of the Pacific Northwest, and throughout the western states. Considerable data has been accumulated on the range of prices paid by municipal water suppliers for water rights. These prices are independent of project infrastructure needs for water projects, and reflect a cost solely to obtain access to a water resource.

Conceptually, use of comparable costs for water rights appears to provide an appropriate basis for comparison with mitigation costs, because mitigation costs also represent a cost to obtain access to the reserved water resource. As long as comparable transactions are used as the basis, prices paid for water rights represent the "willingness-to-pay" of municipal water systems, and thus should yield a threshold that is not excessively burdensome.

This line of thought is the basis for the procedure that will be used in WRIAs 25 – 28 to define a cost ceiling for mitigation required to access reserved water supplies. For the mitigation evaluation procedure, a standard "access cost" of water supply will be defined, through review of prices paid in actual water rights purchases for municipal supplies plus consideration of related legal and engineering costs. If mitigation costs per unit do not exceed this value, then the cost of mitigation will be considered "reasonable" under the evaluation procedure. The cost ceiling will be adjusted periodically to reflect changes in market conditions (which reflect changes in willingness-to-pay).

This approach is consistent with the principles defined above. Prices paid for water rights combine immediate and long-term economic factors and can be readily analyzed using standard economic methods. If a "standard" value for access to water is defined, this approach can be relatively simple to apply to individual applications, and will also yield consistent results from user to user. Finally, an appropriate cost ceiling can be set to support mitigation objectives of the Watershed Management Plans while enabling access to reserved water supplies by designated users.

The Mitigation Subcommittee reviewed data compiled from Washington, Oregon and California for water rights transactions (Attachment I). In gathering this information, the following criteria were used:

- Only transactions where the purchaser was a public, municipal water system were considered;
- Only transactions from the past four years (2004-08) were used.
- With some exceptions, only outright purchases were considered. Short-term leases were not included. (however, a few long-term leases with characteristics similar to purchases are included in order to expand the data set).
- Transactions involving large federal projects or the California State Water Project (CWP) were not included. (Federal and CWP transactions tend to have very low prices compared with transactions involving other water supplies).
- To allow for consistent comparisons, "transaction costs" such as legal fees and engineering studies were not included in these data. However, transaction costs are a part of the access cost, so will need to be considered as part of this analysis.

The Mitigation Subcommittee also reviewed examples of how different unit costs per AFY would affect the total cost ceiling (Attachment J). Based on the data and examples reviewed, the Subcommittee recommends the cost ceiling for mitigation be initially set at $2,000 per AFY of new water supply. Water suppliers seeking use of reserved water supplies in WRIAs 25-28 will not be required to spend more than this for mitigation actions. This includes costs for flow-related mitigation used to achieve the 50% flow requirement under the Planning Unit's policy for accessing reserved water; plus the cost of any habitat/watershed mitigation that is performed.

The Mitigation Subcommittee believes that this cost limit will protect water suppliers from unreasonable mitigation costs; but will still enable the mitigation program to

achieve the needed level of mitigation on average. In addition, setting the cost at this level will provide water suppliers with an economic incentive to avoid and minimize flow impacts to the greatest extent feasible (reducing mitigation requirements and costs under the cost ceiling).

At this time, the cost listed above will be applied throughout WRIAs 25 – 28. If additional water right transactions occur in the region to allow differentiation of access costs from WRIA to WRIA, the cost ceiling may be adjusted in the future to have a different levels in each of the four individual WRIAs.

Adjusting the Cost Ceiling Over Time

Water rights prices (access costs) will change over time in response to water supply conditions, economic development; land development and other factors. This reflects changes in willingness to pay by communities seeking new water supplies. Therefore the dollar value established as a cost ceiling for the mitigation procedure should also change. The Mitigation Subcommittee recommends this be accomplished as follows:

- The cost ceiling should be adjusted through a review of water right transaction data at least once every five years.
- In the intervening years the cost should be adjusted for inflation annually, using the Construction Cost Index (CCI) issued by the construction industry publication *ENR*.

8.0 Alternate Procedure for Small Flow Depletions

The Watershed Planning Units in both WRIAs 25/26 and 27/28 recognize that the mitigation procedures outlined in this report may be overly burdensome for water systems whose supply projects create relatively small flow depletions. The Planning Units intend that an "off-ramp" be provided in these cases, with an alternate means of satisfying the overall goals of the Watershed Management Plans. The Mitigation Subcommittee recommends a process for small flow depletions in which a payment can be made to a mitigation fund for the WRIA, rather than preparing a specific mitigation plan. This would enable funds from a number of small water supply projects to be "pooled." In addition to making the procedure more simple for these cases, this offers the potential advantage of enabling larger and more valuable mitigation projects to be performed, instead of many small projects scattered throughout the watersheds.

The Subcommittee recommends that any proposed water rights that impact flows by 0.2 cfs or less in the water bodies having identified reservations, be considered a "small" withdrawal eligible for a payment into the mitigation pool.

For uses of a water reservation that would have small impacts, this section further develops the concept of a payment into a fund for targeted mitigation, in lieu of having the water right applicant developing and implementing an individual mitigation proposal. Selection of this option in lieu of carrying out mitigation directly would be at the discretion of the applicant.

(Note: The magnitude of stream flow impacts does not affect the requirement for an alternatives analysis prior to issuance of a water right for reserved supply. Applicants must document the

alternatives analysis for any water right application that would deplete flow in a closed water body, even if the depletion is 0.2 cfs or less.)

In-Lieu Payment Amount

The subcommittee recommends that a value of *$54,000 per 0.1 cfs* be paid by the applicant for each river mile affected by the flow depletion. The depletion should be measured based on the greatest expected seven-day depletion during the lowest flow month of the year for the affected water body (e.g. August or September). The basis for this value is given in Attachment K. This amount can be pro-rated in increments of 0.01 cfs-mile (e.g. the in-lieu payment for an impact of 0.05 cfs-mile would be $27,000). The payment is capped by the cost ceiling discussed above.

(Note: a "cfs-mile" is a measure of flow and distance along the river channel. It is calculated by multiplying flow [measured in cfs], by distance [measured in miles]. It is anticipated that fractional values will be used, such as hundredths of a cfs, and tenths of a mile.)

Adjusting the In-Lieu Payment Over Time

Mitigation costs will change over time in response to the cost of materials, land acquisition, and other factors. Therefore, the dollar value established as a in-lieu fee payment amount should also change. The Mitigation Subcommittee recommends this be accomplished as follows:

- The in-lieu fee payment amount should be adjusted through a review of restoration/ mitigation cost data at least once every five years.
- In the intervening years the cost should be adjusted for inflation annually, using the construction cost index (CCI) issued by the construction industry publication *ENR*.

Administration of Pooled Funds

The Mitigation Subcommittee considered several options for the organization that should receive and use in-lieu payments for mitigation. Options included:

1. One of the State natural resource agencies with jurisdiction over water resources or habitat restoration such as the Washington State Department of Ecology, Department of Fish and Wildlife or Salmon Recovery Funding Office;
2. The various County governments with lands in WRIAs 25-28 (or a single county designated by other counties to carry this out); or
3. The Lower Columbia Fish Recovery Board (LCFRB).

The Subcommittee recommends that LCFRB be given this responsibility. This is due to its focus on the same geographic area as the two watershed plans; its cross-jurisdictional capabilities aligned with watersheds; the close match of the habitat mitigation activity with LCFRB's overall mission; and the organization's demonstrated ability to manage funding for natural resource

management purposes. However, in the event LCFRB's charter under State law terminates and the organization is decommissioned, then the Subcommittee recommends this function be transferred to one of the State natural resource agencies listed above.

The Subcommittee recommends that funds collected from applicants in lieu of mitigation projects be held within a designated account, shown as a line item in LCFRB's annual budget. Expenditures from this fund should be allocated by individual WRIA (dollars collected from a WRIA should be spent in the same WRIA, with a strong preference towards projects in the same subbasin as the depletion caused by the water right involved). Accounting procedures should support reporting by WRIA. Money deposited should be used for actual mitigation within five years of deposit.

At least 85% of these funds should be used directly for mitigation purposes (the Subcommittee recommends no more than 15 percent maximum be available for program administration). The funds should be used to restore habitat or watershed resources that have been impacted by reduced flows. In keeping with the Planning Units' overall policy on mitigation for use of reserved waters, funding may be used for flow enhancement (preferred if available) or non-flow, habitat/watershed restoration actions. It is acceptable that funds may be used in combination with funds obtained from other sources, to leverage the value of the projects funded.

Finally, the Subcommittee recommends that LCFRB staff prepare an annual biennial report to the LCFRB Board detailing funds received and funds expended, by WRIA and subbasin. The report should be sent to each affected County and the Department of Ecology and should be made available to the public on LCFRB's web site. Past annual reports should be retained in LCFRB files and should be made available to the counties, Ecology and the public upon request.

9.0 Mitigation Banking

The Mitigation Subcommittee discussed possible banking of mitigation credits in the context of accessing reserved water supplies. Banking of mitigation credits is the means by which a party can accumulate and hold credit for habitat restoration work done so that it may be applied to a water right application in the future. This may be identified as advanced mitigation for a known water supply project; or may be held as credit for any suitable project in the future. In addition, the person or organization carrying out mitigation actions could sell or otherwise transfer their credits to another party in support of that party's water right application.

The ability to bank habitat restoration credits offers the following possible advantages:

- Parties may undertake habitat restoration actions to meet current and/or anticipated mitigation needs in a manner, time, scope, nature, and cost that are most advantageous to them;
- Parties with limited or no habitat restoration expertise and experience may be able to acquire needed mitigation credits without having to directly identify, design, and undertake restoration work;
- Provides an incentive to undertake earlier, larger, and more effective restoration efforts; and

- Provides the potential to help leverage non-mitigation habitat restoration efforts addressing high priority needs.

- Mitigation actions carried out in advance of a water supply project provide environmental benefits for a period of time before project impacts occur (temporal benefit).

Banking does not mean that applicants can identify any habitat projects done in the past and get credit for them. Generally, the applicant must obtain approval in advance of carrying out the mitigation action (however see exceptions below). Other limitations are described below. Other provisions of the "standard" mitigation procedure for reserved water also apply.

9.1 Procedures for Accumulating Credits for Future Use

Eligible Projects

In order for a water rights applicant to "bank" credit under the mitigation system, the following requirements must be met:

- The mitigation action is eligible for credit only if it was carried out on or after July 1, 2006.
- The mitigation action(s) must meet any other requirements for mitigation credit established in the Integrated Strategy for Implementing Water Right Reservations.
- The applicant must document the source(s) of funding used for the project, and certify that the project was not funded through habitat restoration or habitat enhancement programs administered by the State of Washington or federal agencies. (However if the project also included funding sources besides those listed here, a portion of the project may qualify for credit).
- The applicant must certify that the project has not, and will not be used to meet the requirements of any other permits (or show that the action goes above and beyond other permit requirements, in which case only the extra work will be credited);

Mitigation credits accumulated through other environmental mitigation programs active in WRIAs 25-28 may be used to access water reservations under this program, as long as the conditions listed above are met. For example this could include separate wetland mitigation banking programs; or Clark County's proposed "Mitigation Marketplace" program.

Administering Agency

The Mitigation Subcommittee recommends that the Department of Ecology administer the system for banking mitigation credits. However, Ecology may designate another state or local agency to assist in this activity. In either case, Ecology should retain responsibility for proper functioning of the mitigation banking system. This is appropriate because Ecology has the responsibility and authority to issue water rights, including water rights where applicants perform mitigation actions as a condition of the right. Therefore Ecology ultimately has the responsibility to evaluate such actions.

The Subcommittee anticipates that administration of this program will primarily consist of record-keeping. Credits accumulated need to be recorded, and the owner of those credits needs to be identified. Credits also need to be associated with particular subbasins or WRIAs. When new water rights are awarded, applicable mitigation credits need to be deducted from the applicable party's "account."

The administering agency should issue periodic "statements" to parties holding mitigation credits. It is suggested these statements be issued annually and document the name and address of the party, the project that was used to generate credits, the purpose of mitigation credits with respect to reserved water supplies; the amount of credit, and the subbasins or WRIAs where credits can be applied. The statement should also inform parties holding credits that they have 90 days to inform the administering agency if they believe the information in the statement is incorrect.

(Note: The Subcommittee has discussed the possibility that LCFRB could be designated by Ecology to assist with administration).

Use of Mitigation Credits

Mitigation credits are intended solely for use in accessing water supplies reserved in specific subbasins under the State Rules adopted pursuant to the Watershed Management Plans. The procedures outlined in the Integrated Strategy for Implementing Water Right Reservations apply to banked mitigation credits.

In the event that mitigation credits are accumulated but the applicable reservation is used up before the credits are put to use, there is no guarantee the party that accumulated credits will be able to put them to use. However, in this event the administering agency may consider transferring the mitigation credits, in whole or in part, to another subbasin for use in accessing another water reservation in the same WRIA. In this case the degree of credit transferred should be determined by the administering agency by evaluating the relative value of the mitigation that was accomplished and the expected stream flow impacts from accessing the reservation.

Scoring Procedure

The scoring procedure presented in Attachments D and E of the Integrated Strategy document will be used to determine the amount of credit received for mitigation actions.

This scoring procedure presents a fundamental challenge to banking of mitigation credits. For "flow-related" mitigation actions (water for water), the scoring procedure requires that both the mitigation proposal and the proposed water source development project be well defined. Points are awarded on a relative basis, by comparing the characteristics of flow depletion (location, timing, water quality, etc.) against the characteristics of the mitigation action. However for banking purposes the future source project may not be defined at all. Hence, for flow-related mitigation actions the points (credits) cannot be calculated initially. (Note: This problem does not apply to habitat/watershed actions. In

those cases, the mitigation credits are calculated independently of the source development project).

In order to resolve this challenge, the administering agency will need to retain documentation on the scoring system in place at the time the mitigation credits are banked. The characteristics of the mitigation action will need to be fully documented, to permit subsequent scoring at such time as an application is made for a water right to support a specific water source development project.

Dispute Resolution

An administrative dispute resolution procedure needs to be defined, with Ecology's involvement. This may involve use of a local "Advisory Committee" that has been suggested to represent the Watershed Planning Units (the exact makeup, roles and responsibilities of the Advisory Committee have not yet been defined). The Subcommittee suggests the following steps be taken to resolve disputes mitigation credits administered under this program.

1. The water right applicant or party holding credits should prepare a written statement of their position and submit it to Ecology. Ecology's Water Resources Program staff should then prepare a written response. The Water Resources Program Manager (Section Manager) for Ecology's Southwest Region office should review both of these documents and determine how the dispute should be resolved.
2. If this determination is not acceptable to the applicant or party holding credit, then the Advisory Committee should be requested to review the facts of the situation and the documentation described above. The Advisory Committee should make a recommendation to the Section Manager. The Section Manager should then issue a new determination in writing, either upholding the initial determination or modifying it.
3. If this second determination is not acceptable to the applicant or party holding credit, then the Director of the Department of Ecology, or his/her designee, should make a final determination. (As with any other agency action, this administrative determination can be challenged through legal action in the appropriate venue.)

(Note: Time limits should be put on each of these steps, following discussion with Ecology.)

9.2 Procedures for Transferring Banked Credits

Providing avenues for parties who carry out mitigation actions to transfer credits to others offers additional advantages to the system outlined above. Advantages include:

- Opportunities to acquire credits from others can provide additional flexibility for water rights applicants seeking to comply with the mitigation requirements associated with their reserved water supplies.

- The ability to transfer credits can create a market for mitigation actions, giving rise to economic incentives for habitat restoration activity. This also expands the field of funding opportunities for habitat restoration projects.
- One party may have access to funds at the right time to move on a habitat restoration activity that another party may be able to reimburse at a later date. For example, swaps of this nature increasingly occur in the conservation field between non-profit organizations and government agencies.

In principle there is nothing terribly complex about expanding the banking concept to allow for transfer of mitigation credits. Parties seeking to either acquire or provide credits can negotiate terms for these transactions between themselves. At this time the Subcommittee does not envision a need for a "banker" to hold credits.

However it will be important that Ecology have procedures in place to document transfers of credits from the original party to the party acquiring them. Therefore, the following procedures are suggested:

Under Ecology's mitigation credit accounting system, discussed above the "owner" of mitigation credits would be identified. If the owner wishes to transfer credits to another party, Ecology will need a procedure to authorize this transfer. The procedure needs to be set up in a fashion that prevents fraud and insulates Ecology from liability in the event of disputes.

Upon receiving suitable authorization, the accounting system discussed above should document the transfer of mitigation credits to the new owner. From that point forward, the system can operate just as though the new owner had always held the mitigation credits. That owner could put them to use as part of an application for reserved water, or could again transfer the credits to another party.

10.0 Application and Evaluation Procedures

The evaluation procedure for proposed mitigation actions will require considerable effort on the part of both the applicant and the State agencies with responsibility for reviewing water rights and habitat mitigation actions. The Subcommittee envisions that the procedure for preparing and reviewing the necessary information could be performed as follows:

- An applicant for a new water right should have an opportunity to meet with Ecology and DFW prior to submitting an application, to discuss the proposed water use, mitigation scoring, and mitigation alternatives;
- A questionnaire should be developed to accompany the water right application. The questionnaire should be designed to assemble the information that will be needed in the evaluation procedure. Guidance materials should be developed for applicants to support the process. An applicant will then be required to submit the application form/questionnaire in order to trigger the scoring procedure;
- Ecology and DFW will share responsibility for initial scoring of the application, using a standard scoring sheet (most of the scoring items will be specifically assigned either to

Ecology or to DFW; some items may truly be done jointly). In doing so, they may request additional information from the applicant;

- Results will be provided back to the applicant; and the applicant should have an opportunity to discuss the results with agency reviewers. At this point, an applicant should have an opportunity to submit further information if needed. If this yields new information, the application may be re-evaluated;
- Final results will then be provided to the applicant. The applicant may choose to move forward; withdraw; or submit to Advisory Committee review;
- A standing Advisory Committee (AC) should be convened representing the planning units (however the AC will not include Ecology or DFW. For any particular application, the AC also will not include the applicant). The role will be to review disputed scores through some kind of structured process that includes hearing from both Ecology and the applicant;
- After reviewing an application submitted for review, the AC will provide written recommendations and findings to Ecology and the applicant regarding the proposal's consistency with the purpose, intent and requirements of the Watershed Plan and adopted guidelines;
- Upon receipt of review comments from the AC, Ecology will have the final word on how to proceed. Ecology may choose to re-score the application; or leave the scoring intact. Ecology is not required to follow the AC recommendation. At that point, Ecology will issue the decision on:
  - whether to approve or deny the application, including the mitigation program. This should be accompanied by documentation of the rationale for the decision, with reference to the scoring system;
  - if approved, Ecology's Report of Examination will detail the conditions to be associated with the water right, including mitigation requirements; and
  - how much the reservation will be debited.
- As with any other water right decision, the decision is appealable through the Pollution Control Hearings Board.

The steps above will require materials to be developed that would be used in the application process. These include: a) an application form/questionnaire designed to obtain the information needed for evaluation and scoring; b) a fact sheet or guidance document explaining in summary form how the scoring process works and what kind of mitigation features will earn higher credit; and c) a scoring sheet that allows staff to score applications efficiently and consistently (the scoring sheet will presumably be electronic, so it performs the scoring automatically as staff input information).

In addition, the Subcommittee believes Ecology and DFW, in coordination with LCFRB, should develop a simple training program for staff charged with reviewing applications from WRIAs 25-28.

References

The Mitigation Subcommittee and LCFRB were assisted by HDR Engineering, Inc. in developing the Mitigation Strategy. After the initial Mitigation Strategy (February 2008) had been prepared, the Committee had HDR prepare briefing papers on selected topics for further discussion. These papers are on file at LCFRB and provide additional details on selected topics. They are listed as follows:

- Alternatives Analysis for New Water Supply, June 23, 2008.
- Cost Considerations for Mitigation Actions, October 2, 2008.
- Downscaling for Small Streams, August 15, 2008.
- Monitoring and Maintenance of Habitat Mitigation Actions, September 15, 2008.
- Pooling and Banking of Mitigation Credits, September 24, 2008.

Attachment A
WRIA 25/26 Grays-Elochoman and Cowlitz Watershed Management Plan Reserved Water Strategy Implementation

Policy Background

The reserved water strategy outlined in the WRIA 25/26 Grays-Elochoman and Cowlitz Watershed Management Plan (hereafter Plan) is based upon the following policies and goals that are designed to balance the objectives of water supply and stream flow protection:

> "Public and private water users throughout WRIAs 25 and 26 should have access to water resources to meet new or expanded needs for water supply consistent with adopted land use plans. To facilitate coordinated planning and ensure consistency with adopted land use plans, decisions regarding water use and allocation should be coordinated between Department of Ecology and affected jurisdictions." (Policy WSP-1, Pg 3-9)

> "Water resource development to meet new or expanded needs should avoid or minimize effects on stream flows or aquatic habitat, in stream reaches where flow conditions are an important factor for sustaining aquatic life, including fish populations in their various life stages." (Policy WSP-2, Pg 3-19)

> "Manage stream flows to effectively support fish recovery and habitat enhancement plans." (Goal, Section 4.1, Pg 4-1)

Much of the policy discussion that provides the foundation and rationale for the reserved water concept is found in Section 4.1.1 of the Plan. This discussion emphasizes the need to identify water sources that will not cause significant effects on stream flow or aquatic habitat. As part of the instream flow protection strategy, the Planning Unit recommended Policy SFP-2 (Pg 4-6), which would restrict issuance of new water rights that would reduce low flows, except under certain pre-defined circumstances. This policy "recognizes that total closure of streams to all new water right applications would conflict with the goal of ensuring adequate water supplies are available for the region (Pg 4-3)". Therefore the policy has conditions for:

- Domestic wells, served by septic systems;
- Specific communities that may not have access to alternative supplies. In these cases a pre-defined quantity of water will be "reserved" for possible allocation to that community. The reserved quantity will be defined in terms of the unmitigated stream flow depletion that will result from development of new supply capacity; and
- Other communities and industries that may need supplies in the future, but whose needs cannot be well-defined at this time. Again, a pre-defined quantity will be reserved to meet these needs.

The reserved supplies discussed above (except for domestic wells) can be tapped only if the community first demonstrates there is no other practicable alternative, commits to effective stewardship through conservation and/or production of reclaimed water; and commits to offsetting actions and mitigating actions that minimize the effects on stream flow or aquatic habitat. Actions will be evaluated within the context of other supply alternatives, water supply total project cost, and the cost of the off-setting and mitigating actions. The procedure for municipalities to follow when requesting new or expanded water rights is found in Section 3.3.1 (Pg 3-10). Additional discussion and guidance relating to reservations and related mitigation is found in Appendix I (Pg I-6).

Determination of Reservation Quantities

Reservation quantities were established by the Planning Unit based primarily upon the following:

- Anticipated needs for municipalities and other user groups through 2020 (Policy SFP-2, Pg 4-18 through Pg 4-20); and

- Recommendations presented by the Washington Departments of Fish and Wildlife (WDFW) and Ecology for protection of instream flows (Appendix I, Pg I-28).

Anticipated needs were determined based upon growth projections and estimates associated with the various categories of water users, including large and small public water systems, domestic wells, and other beneficial uses. The forecasts were obtained from purveyor water system plans or other planning documents and were described in terms of average day demand (ADD) and maximum day demands (MDD) expressed in millions of gallons per day. Projected demands were compared to existing water right availability and capacity to determine projected future supply needs.

WDFW and Ecology provided the Planning Unit with recommendations for establishing water right reservations. The rationale for their recommendations is described in an October 4, 2004 memo from WDFW (Pgs I-28 through I-30). To determine acceptable flow reserves, the agencies identified flow quantities that equate to 1-2% reduction in wetted usable area for species of concern during the 90% exceedence flows in September and October. For watersheds where instream flow studies were not conduced, a 1-2% reduction in flow from the 90% exceedence flow during the low flow season was used as a surrogate. Thus the recommendations were based on very low-flow conditions (9 out of 10 days are as wet or wetter for that date). Because of their sensitivity to flow reduction, small streams were not recommended for establishment of reserves.

The final water right reservations reflected in the Plan represent a balance of the above considerations. Section 3.3.1 (Pg 3-12) describes water reservations as follows:

> "In order to satisfy the goals associated with the establishment of closures and/or instream flows, and the goals associated with providing a secure source of water for future public water supply, it is recommended that in each basin a block of water be reserved for future

uses that would not be subject to the closures and/or instream flows established by rules for WRIAs 25 and 26."

In many cases reservation quantities were consistent with WDFW and Ecology recommendations for instream flow protection. In other cases reservations to meet growth needs were established in areas where none were recommended by state agencies. Several reservations were also negotiated during the final plan development and adoption phases based on revised supply need considerations.

Reservation quantities were established and agreed upon based on the understanding that implementing the long-term water supply (e.g., regional source development) and stream flow strategies (e.g., regional source development) should result in improved instream flow conditions. Reservations should thus be viewed as negotiated quantities that are intended to represent an overall balance between instream flow and supply needs, within the context of the long-term strategies for water management and mitigation to offset stream impacts.

Definition of Water Reservation:

During the final stages of the 2006 remand process in WRIA 25/26, county concerns were raised regarding adequacy of reservations for several entities, as well as whether the table headings accurately reflected the reservation strategy. Concerns included whether identifying the previously defined "net streamflow depletion allowance" as the reservation amount in rule would create situations where only 50% of calculated water needs (Maximum Streamflow Depletion Allowance, 2004 Plan Table I-2a) could be secured because of the following limitation:

> "Even in these limited cases, the amount of stream flow depletion from new water rights issued under this policy shall be no greater than the quantity shown in Table I-2a, under the column heading Net Stream Flow Depletion Allowance." (December 2004 Plan, Pg I-6).

Under the above original Plan language, if the "net stream flow depletion after mitigation" quantity was calculated assuming that a 50% flow offset was possible, but in practice it was not, an applicant would only be entitled to 50% of their needed water supply and could not secure the remainder through mitigation. This was viewed as contrary to Plan guidance that allowed for mitigation of streamflow depletion through flow-related and/or habitat actions. As a result of this concern, the Planning Unit revised the Plan language and tables relating to water reservations.

The adopted Plan included changes to the quantity of water identified as the reservation. The discussion of reservations in Section 4.1.1 (Pg 4-3) states that the pre-defined quantity of water reserved for allocation will be defined in terms of the "unmitigated stream flow depletion that will result from development of new supply capacity". Policy SFP-2 (Pg 4-6 and 4-18) also states that the reserved quantity for domestic wells, community systems, municipal systems and other beneficial uses represents the "unmitigated stream flow depletion" in each subbbasin. The relationship between stream flow depletion and water reservations was further clarified in revisions to Sections 3.3.1 (Pg 3-11) and Appendix I (Pg I-6). These sections state the following:

> "In no case shall the amount of stream flow depletion from new water rights issued under this policy exceed the quantity shown in Table I-2, under the column heading "unmitigated streamflow depletion allowance", or the 2% recommended flow reserves (column 4, "recommendation for flow reserve") outlined in the October 4, 2004 memo from WDFW (see page I-29), **whichever is less**, subject to the following exceptions: for the Grays River, Skamokawa Creek, Elochoman River, and Abernathy/Germany Creek Subbasins, the amount of stream flow depletion under this policy shall not exceed the quantity shown in Table I-2, under the "unmitigated streamflow depletion allowance" column."

The above wording further establishes the reservation as the "unmitigated stream flow depletion", but also references use of the 2% recommend flow reserve, with specific exceptions, if that quantity is less.

The above changes highlighted the need to ensure that the reservation tables accurately reflect the sequential relationship between unmitigated stream flow, offset requirements, and the resulting target depletion allowance. Tables ES-3 (Pg ES-12), 4-4 (Pg 4-20 through 4-22), I-2 (Pgs I-17 through 19 – attached), and I-2a (Pgs H-19 through H-24 - attached), were modified to include the following three columns:

- "Unmitigated Streamflow Depletion Allowance" – this column represents the water reservation based on supply need through 2020;
- "Water Right Acquisition/Flow Augmentation Offset (Maximum Extent Practicable)" – this column refers to the requirement of water users to offset at least 50 percent of their future water uses through acquisition of water rights or flow augmentation, to the maximum practicable. This column does not apply to domestic wells; and
- "Target Streamflow Depletion Allowance" – this column is calculated as the unmitigated streamflow depletion minus the Water Right Acquisition/Flow Augmentation Offset requirement.

These table revisions were intended to more clearly describe the sequential relationship between reservations and mitigation and the intent of each column heading, and to ensure that an applicant's ability to secure use of the reservation through mitigation is not precluded.

Implementation Roles and Responsibilities:

The Plan recognizes that the Department of Ecology is the entity responsible for making water right permit decisions and applying the reservation strategy, and also acknowledges the role of WDFW in evaluating requests for reservation use. In addition, the Plan calls for coordination with affected entities. Sections 3.3.1 (Pg 3-10 through 3-12) and Appendix I (Pg I-6 and I-7) describe the following roles and responsibilities:

> "The Department of Ecology has the responsibility for reviewing water right applications. Under its current process, Ecology issues water right permits only if the proposed use meets the following requirements, in accordance with RCW 90.03.290…"

"The Planning Unit recommends that Ecology (in conjunction with Fish & Wildlife) evaluate requests for reservation use by reviewing the applicant's analysis of other alternatives and by evaluating the applicant's proposal in terms of off-setting and mitigating actions." (Section 3.3.1, Pg 3-11; Appendix I, Pg I-6)

"Application for the reservation will be reviewed, analyzed, and processed by Ecology in consultation by Fish & Wildlife"… (Appendix I, Pg I-5)

"The Planning Unit recommends that decisions regarding the use of water right reservations be coordinated between the affected County, local governmental entities, Department of Ecology, and the Planning Unit." (Section 3.3.1, Pg 3-12; Appendix I, Pg I-7)

These Plan sections re-affirm the regulatory and decision-making role of Ecology and WDFW, and also establish coordination roles for Counties, local governmental entities, and the Planning Unit. Specific coordination functions and roles are not described in the Plan, but will be defined in Section 3 (Roles and Responsibilities) of the Detailed Implementation Plan (DIP).

Water Reservation Accounting

The Plan does not outline a formal accounting process for tracking "debits" and "credits" associated with implementation of the reserved water strategy and mitigation banking. However, successful implementation of the reserved water strategy will require that Ecology, as the primary regulatory entity, establish an accounting system that addresses the various Plan elements.

The Plan identifies several categories of mitigation actions related to the decision making process outlined in Section 3.3.1 and Appendix I. These mitigation actions will be used to determine mitigation "credits" and "debits" related to use of the reservation. In some cases mitigation actions relate to specific steps in the decision-making process (e.g., determination of 50% flow requirement), but in other cases the intended application is broader and not associated with a single step in the evaluation process. The following is a summary of the mitigation action types recognized in the Plan, along with a description of their relationship to the evaluation process:

- "…where an applicant applies for a water right under a reservation, they be required to mitigate the predicted stream flow depletion to the maximum extent practicable through flow-related actions…" (Appendix I, Pg I-6; Section 3.3.1, Pg 3-11).

  This language is not specific to any particular step in the decision making process and establishes that in developing an overall mitigation package for evaluation, applicants must rely upon flow-related actions to the maximum extent practicable.

- "No less than half of the unmitigated stream flow depletion (see Table I-2) must be offset through the acquisition of active upstream water rights or other flow augmenting actions in the same subbasin upstream of the new proposed water right." (Appendix I, Pg I-6; Section 3.3.1, Pg 3-11).

  This language establishes the minimum 50% flow mitigation requirement, and establishes that active water right acquisition and other flow augmenting actions can be used to

satisfy this requirement. This language refers specifically to the "Water Right Acquisition/Flow Augmentation Offset" columns in Tables I-2 and I-2a.

- "In these limited cases, acquisition of offsetting active water rights or flow augmentation actions shall be implemented to the extent feasible. Any remaining streamflow depletion shall be mitigated through other habitat actions designed to mitigate the effects of the stream flow depletion not being directly offset." (Appendix I, Pg I-6; Section 3.3.1, Pg 3-11 and 3-12*)*

  This language refers to situations when achieving the 50% flow mitigation through acquisition of active water rights and flow augmenting actions is not feasible or is cost-prohibitive. This wording establishes that under the specified circumstances habitat actions can be used to mitigate flow impacts. This language refers specifically to the "Water Right Acquisition/Flow Augmentation Offset" columns in Tables I-2 and I-2a.

- "The Planning Unit recommends that Ecology consider other mitigating actions to address impacts that cannot be practicably off-set (no more than half) through water-for-water actions. This includes actions such as the restoration of wetlands and side-channels that increase stream storage capacity. The Planning Unit supports consideration of mitigation credits for stream flow augmentation actions." (Appendix I, Pg I-7; Section 3.3.1, Pg 3-11 and 3-12)

  The above language is **distinct and separate from** the previous provisions relating to situations where providing the 50% flow mitigation is not practicable. Given the separation of this discussion from the previous bullet, and the reference to actions that cannot be practicably off-set through water-for-water actions, this establishes that habitat actions such as wetland and side-channel restoration can be used to address residual impacts associated with the "Target Streamflow Depletion Allowance" columns.

- "The Planning Unit recommends that Ecology consider habitat restoration actions other than the restoration of wetlands and side-channels using the following criteria:

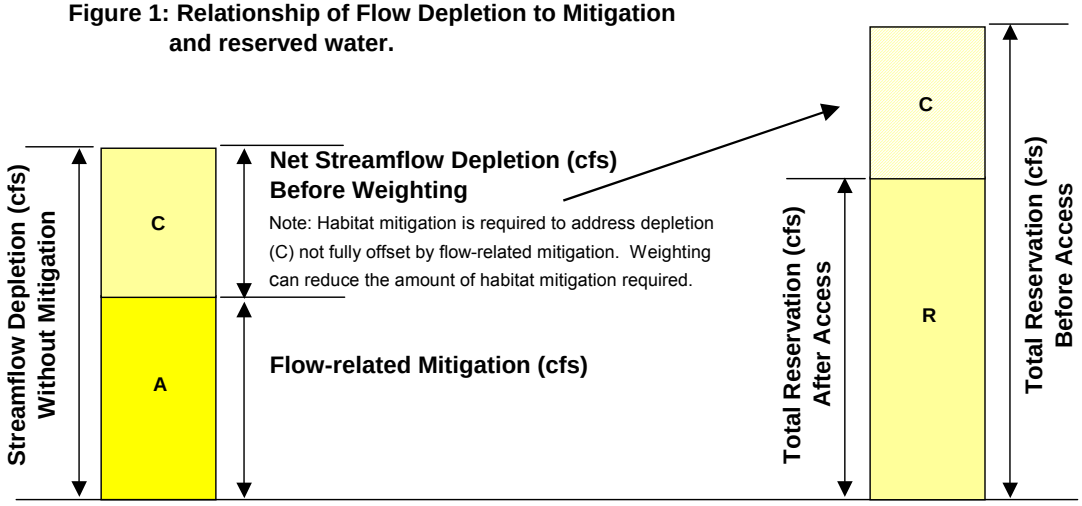
  - habitat actions should focus upon projects that improve stream conditions impaired by flow (e.g., projects that improve width to depth relationships or improve landscape-level hydrologic processes, etc.);
  - habitat actions should address threats and limiting factors through priority actions identified in the Lower Columbia Salmon Recovery Plan;
  - habitat actions should be evaluated within the context of when baseflow impacts will occur and the expected timeframe of habitat project benefits. (Section 3.3.1, Pg 3-11 and 3-12);

  This language is also separate from the previous two bullets, is not associated with a specific step in the mitigation process, and establishes that habitat actions focusing on improving conditions impaired by flow or addressing priority habitat limiting factors can be used to off-set stream impacts. This category can therefore also be used to address impacts associated with the "Target Streamflow Depletion Allowance".

The following (Figure 1) is a graphic representation of the relationship between mitigation actions, flow depletion and reservation accounting. The primary approach for mitigating streamflow depletion impacts is through flow-related actions. As described above, the Plan guidance and requirements emphasize that flow related actions must be used to the maximum

extent practicable in developing an overall mitigation package. The Plan calls for use of direct water right acquisition or other flow augmenting actions as the primary means to address the "Water Right Acquisition/Flow Augmentation Offset" (Segment A), with use of habitat actions where this is not feasible. If streamflow depletion is fully mitigated through flow-related actions, the reservation would not be debited and would remain available for future access. However, if impacts are only partially offset or not offset at all through flow-related actions (Figure 1, Segment A), the remaining streamflow depletion (Figure 1, Segment C) is "debited" from the reserve. As depicted in Segment C, habitat actions will also be required to offset net streamflow depletion impacts, but will not be used to reduce the amount of "debit" from the reservation. However, additional instream flow benefits that result in up-weighting of the flow-related mitigation credits can be used to reduce the amount of habitat mitigation required to address net stream flow depletion as represented by Segment C.[5]

Figure 1: Relationship of Flow Depletion to Mitigation and reserved water.



Addressing Water Reservations in Rule:

The WRIA Plan calls for incorporation of water right reservations into State Rules. Specifically, Policy SFP-2 (Pgs 4-6 and 4-18) states the following:

> "The Department of Ecology should adopt State Rules (WACs) under its Instream Resources Protection Program to restrict issuance of new water rights in WRIAs 25 and 26. In all affected streams reaches a closure should be established, but with certain exceptions as indicated below."

In addition, the discussion of water reservations in Section 3.3.1 includes the following recommendation:

> "In order to satisfy the goals associated with the establishment of closures and/or instream flows, and the goals associated with providing a secure source of water for

[5] See Integrated Strategy for Implementing Water Right Reservations, Section 2.0 (Reservation Accounting), for a description of flow-related mitigation up-weighting.

future public water supply, it is recommended that in each basin a block of water be reserved for future uses that would not be subject to the closures and/or instream flows established by rules for WRIAs 25 and 26". (Recommendation, Page 3-12)

Pages 3-12 and 3-13 provides further guidance regarding incorporation of water reservations into state rule:

> "The amount of water, the entity, and the source(s) of the water to be reserved for public supply is recommended by the Planning Unit in Appendix I (Table I-2) and is intended to be stated in the proposed stream flow protection rules to be adopted by the Department of Ecology for WRIAs 25 and 26"

The WRIA 25/26 Plan clearly calls for providing water reservations in rule, and refers to Table I-2 for further defining the content of this rule. Table I-2 includes the three columns described above, including the "unmitigated stream flow depletion" quantity. Because Section 4.1.1 (Pg 4-3) and Policy SFP-2 (Pg 4-6 and 4-18) define the "unmitigated stream flow depletion" as the water reservation amount, this quantity should be identified as such in rule. Application of the reservation strategy must also be within the context of the additional guidance and procedures found in Sections 3.3.1 (Pg 3-11) and Appendix I (Pg I-6), discussed above. The following should therefore be incorporated as part of the rule language:

- Sections 3.3.1 (Pg 3-11 through 3- 13) and Appendix I - Section IV (Pgs I-6 and I-7); and
- Tables ES-3 (Pg ES-12), 4-4 (Pg 4-20 through 4-22), I-2 (Pgs I-17 through 19 – attached), and I-2a (Pgs H-19 through H-24)

Attachments: Table I
Table I-2a

Table I-2 Water Right Reservation Summary for WRIAs 25/26			
Water User [1]	**Unmitigated Streamflow Depletion Allowance (cfs)**[2]	**Water Right Acquisition/Flow Augmentation Offset (Maximum Extent Practicable**[7]**)(cfs)**[3]	**Target Streamflow Depletion Allowance (cfs)**[4]
Grays River Subbasin			
Wahkiakum PUD	0.30	0.15	0.15
Small Community Water Systems- Wahkiakum Co.	0.75	0.37	0.37
Domestic Wells – Wahkiakum Co.	0.20	0.00	0.20
Subbasin Total	**1.25**		**0.72**
Skamokawa Creek Subbasin			
Domestic Wells	0.20	0.00	0.20
Subbasin Total	**0.20**		**0.20**
Elochoman River Subbasin			
Cathlamet	0.00	0.00	0.00[5]
Small Community Water Systems –Wahkiakum Co.	0.37	0.19	0.19
Domestic Wells – Wahkiakum Co.	0.20	0.00	0.20
Subbasin Total	**0.57**		**0.39**
Abernathy/Germany Creek Subbasin			
Wahkiakum Co. Portion			
Domestic Wells	0.07	0.00	0.07
Cowlitz Co. Portion			
Domestic Wells	0.36	0.00	0.36
Subbasin Total	**0.43**		**0.43**
Coal Creek/Longview Slough Subbasin			
Not Applicable (restrictions on new water rights not proposed)	N/A		
Upper Cowlitz River Subbasin			
Randle – Other Beneficial Uses	0.24	0.12	0.12
Packwood	0.00	0.00	0.00[5]
Small Community Water Systems – Lewis Co.	0.37	0.19	0.19
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	0.75	0.37	0.37
Subbasin Total	**1.37**		**0.69**
Cispus River Subbasin			
Lewis Co. Portion			
Small Community Water Systems – Lewis Co.	0.37	0.19	0.19
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	0.37	0.19	0.19
Skamania Co. Portion			
Small Community Water Systems – Skamania Co.	0.37	0.19	0.19
Domestic Wells Skamania Co.	0.01	0.00	0.01
Other Beneficial Uses – Skamania Co.	0.37	0.19	0.19
Subbasin Total	**1.5**		**0.78**
Tilton River Subbasin			
Morton			0.00[5]
Small Community Water Systems – Lewis Co.	0.37	0.19	0.19
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	0.37	0.19	0.19
Subbasin Total	**0.75**		**0.39**

Table I-2 Water Right Reservation Summary for WRIAs 25/26			
Water User [(1)]	**Unmitigated Streamflow Depletion Allowance (cfs)**[(2)]	**Water Right Acquisition/Flow Augmentation Offset (Maximum Extent Practi-cable**[(7)]**)(cfs)**[(3)]	**Target Streamflow Depletion Allowance (cfs)**[(4)]
Mayfield Dam Subbasin			
Mossyrock	0.20	0.10	0.10
Small Community Water Systems – Lewis Co.	0.37	0.19	0.19
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	0.37	0.19	0.19
Subbasin Total	**0.95**		**0.49**
Toutle River Subbasin			
Lewis Co. Portion			
Small Community Water Systems – Lewis Co.	0.37	0.19	0.19
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	0.37	0.19	0.19
Cowlitz Co. Portion			
Small Community Water Systems – Cowlitz Co.	0.37	0.19	0.19
Domestic Wells – Cowlitz Co.	0.01	0.00	0.01
Other Beneficial Uses – Cowlitz Co.	0.37	0.19	0.19
Skamania Co. Portion			
Small Community Water Systems – Skamania Co.	0.37	0.19	0.19
Domestic Wells – Skamania Co.	0.00	0.00	0.00
Other Beneficial Uses – Skamania Co.	0.37	0.19	0.19
Subbasin Total	**2.24**		**1.14**
Coweeman River Subbasin			
Small Community Water Systems – Cowlitz Co.	0.37	0.19	0.19
Domestic Wells – Cowlitz Co.	0.01	0.00	0.01
Subbasin Total	**0.38**		**0.20**
Lower Cowlitz River Subbasin			
Lewis Co. Portion			
Winlock	.33	0.165	0.165
Toledo	0.47	0.24	0.24
Vader	0.00	0.00	0.00[(5)]
Small Community Water Systems – Lewis Co.	0.75	0.37	0.37
Domestic Wells – Lewis Co.	0.01	0.00	0.01
Other Beneficial Uses – Lewis Co.	6.6	3.3	3.3
Cowlitz Co. Portion			
Longview			NA[(6)]
Kelso			NA[(6)]
Cowlitz PUD			NA[(6)]
Castle Rock	2.6	1.3	1.3
Small Community Water Systems – Cowlitz Co.	0.75	0.37	0.37
Domestic Wells – Cowlitz Co.	0.01	0.00	0.01
Other Beneficial Uses – Cowlitz County	0.75	0.37	0.37
Subbasin Total	**12.27**		**6.135**

Notes:

(1) Categories of water users include:

Large Public Water Systems, which are listed individually.

Small Community Water Systems.

Domestic Wells, including those serving multiple homes but exempt from the requirement to apply for a water right permit.

Other Beneficial Uses, such as self-supplied industrial uses.

(2) Calculated based upon an estimate of additional water rights needed to meet water demands through 2020. The Unmitigated Streamflow Depletion refers to the total amount of streamflow reduction allowed within the subbasin as a result of pumping or diversion. In some cases, the amount is equal to the anticipated need (Qi). In other cases, the amount is lower, recognizing that a portion or all of the need may be met using groundwater supplies. In these cases, the impacts to streams may be lower than the amount of water withdrawn from the aquifer. For domestic wells, the depletion amount (or potential streamflow impact) is calculated as 30% of the anticipated need, taking into account that an estimated 70% of water pumped from such wells is returned to streamflows via septic system returns.

(3) Refers to the requirement of water users to offset 50 percent of their future water uses through acquisition of water rights or flow augmentation. Does not apply to Domestic Wells.

(4) Calculated as the Unmitigated Streamflow Depletion minus the Water Right Acquisition/Flow Augmentation Offset requirement. This allowance applies only to impacts upon mainstem flows; it is not intended to allow for extensive dewatering of smaller water bodies. Water right applicants must provide further evidence regarding potential impacts to smaller tributary creeks resulting from new or expanded water resource development.

(5) Current water rights are sufficient to meet needs through year 2020. Therefore no reservation is established.

(6) Not applicable, due to location in tidally influenced area.

(7) See pages I-6 and I-7 for a description of off-setting and mitigation actions.

Table I-2a
Water Right Reservation Calculations for WRIAs 25/26

	Anticipated Needs [1]			Unmitigated Streamflow Depletion Allowance (cfs)[3]	Water Right Acquisition/ Flow Augmentation Offset (Maximum Extent Practicable[10]) (cfs) [4]	Target Streamflow Depletion Allowance (cfs)[5]	
	No. of "Blocks"[2]	Qa (afy)	Qi (cfs)				
Grays River Subbasin							
Wahkiakum PUD	NA	0	0.30	0.30	0.15	**0.15**	
Small Community Water Systems - Wahkiakum Co	2	200	0.75	0.75	0.37	**0.37**	
Domestic Wells - Wahkiakum Co	NA	177	0.65	0.20	0.00	**0.20**	
Subbasin Total						**0.72**	
Skamokawa Creek Subbasin							
Domestic Wells - Wahkiakum Co	NA	177	0.65	0.20	0.00	**0.20**	
Subbasin Total						**0.20**	
Elochoman River Subbasin							
Cathlamet	NA	0	0.00	0.00	0.00	**0.00**	(6)
Small Community Water Systems - Wahkiakum Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Wahkiakum Co	NA	177	0.65	0.20	0.00	**0.20**	
Subbasin Total						**0.38**	
Abernathy/Germany Creek Subbasin							
Domestic Wells - Wahkiakum Co	NA	59	0.22	0.07	0.00	**0.07**	
Domestic Wells - Cowlitz Co	NA	330	1.21	0.36	0.00	**0.36**	
Subbasin Total						**0.43**	
Coal Creek/Longview Slough Subbasin							
Not Applicable (restrictions on new water rights not proposed)						**NA**	
Upper Cowlitz River Subbasin							
Randle [7]	NA	NA	0.24	0.24	0.12	**0.12**	
Packwood	NA	0	0.00	0.00	0.00	**0.00**	(6)
Small Community Water Systems - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells -	NA	2	0.01	0.01	0.00	**0.01**	

Table I-2a
Water Right Reservation Calculations for WRIAs 25/26

	Anticipated Needs [1]			Unmitigated Streamflow Depletion Allowance (cfs)[3]	Water Right Acquisition/ Flow Augmentation Offset (Maximum Extent Practicable[10]) (cfs) [4]	Target Streamflow Depletion Allowance (cfs)[5]	
	No. of "Blocks"[2]	Qa (afy)	Qi (cfs)				
Lewis Co Other Beneficial Uses - Lewis Co	2	200	0.75	0.75	0.37	**0.37**	
Subbasin Total						**0.69**	(8)
Cispus River Subbasin							
Small Community Water Systems - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Small Community Water Systems - Skamania Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Lewis Co	NA	2	0.01	0.01	0.00	**0.01**	
Domestic Wells - Skamania Co	NA	2	0.01	0.01	0.00	**0.01**	
Other Beneficial Uses - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Other Beneficial Uses - Skamania Co	1	100	0.37	0.37	0.19	**0.19**	
Subbasin Total						**0.78**	
Tilton River Subbasin							
Morton	NA	0	0.00	0.00	0.00	**0.00**	**(6)**
Small Community Water Systems - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Lewis Co	NA	4	0.01	0.01	0.00	**0.01**	
Other Beneficial Uses - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Subbasin Total						**0.39**	
Mayfield Dam Subbasin							
Mossyrock	NA	28	0.20	0.20	0.10	**0.10**	
Small Community Water Systems - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Lewis Co	NA	5	0.02	0.01	0.00	**0.01**	
Other Beneficial Uses - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Subbasin Total						**0.48**	(8)
Toutle River Subbasin							

Table I-2a
Water Right Reservation Calculations for WRIAs 25/26

	Anticipated Needs [1]			Unmitigated Streamflow Depletion Allowance (cfs)[3]	Water Right Acquisition/ Flow Augmentation Offset (Maximum Extent Practicable[10]) (cfs) [4]	Target Streamflow Depletion Allowance (cfs)[5]	
	No. of "Blocks"[2]	Qa (afy)	Qi (cfs)				
Small Community Water Systems - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Small Community Water Systems - Cowlitz Co	1	100	0.37	0.37	0.19	**0.19**	
Small Community Water Systems - Skamania Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Lewis Co	NA	2	0.01	0.01	0.00	**0.01**	
Domestic Wells - Cowlitz Co	NA	6	0.02	0.01	0.00	**0.01**	
Domestic Wells - Skamania Co	NA	0	0.00	0.00	0.00	**0.00**	
Other Beneficial Uses - Lewis Co	1	100	0.37	0.37	0.19	**0.19**	
Other Beneficial Uses - Cowlitz Co	1	100	0.37	0.37	0.19	**0.19**	
Other Beneficial Uses - Skamania Co	1	100	0.37	0.37	0.19	**0.19**	
Subbasin Total						**1.14**	
Coweeman River Subbasin							
Small Community Water Systems - Cowlitz Co	1	100	0.37	0.37	0.19	**0.19**	
Domestic Wells - Cowlitz Co	NA	8	0.03	0.01	0.00	**0.01**	
Subbasin Total				0.38	0.19	**0.20**	
Lower Cowlitz River Subbasin							
Longview	*(Not applicable, due to location in tidally influenced area.[9])*						
Kelso	*(Not applicable, due to location in tidally influenced area.[9])*						
Cowlitz PUD	*(Not applicable, due to location in tidally influenced area.[9])*						
Castle Rock [7]	NA	NA	2.60	2.60	1.30	**1.30**	
Winlock [7]	NA	NA	0.33	0.33	0.165	**0.165**	
Toledo [7]	NA	NA	0.47	0.47	0.24	**0.24**	
Vader	NA	0	0.00	0.00	0.00	**0.00**	[6]
Small Community	2	200	0.75	0.75	0.37	**0.37**	

Table I-2a
Water Right Reservation Calculations for WRIAs 25/26

	Anticipated Needs [1]			Unmitigated Streamflow Depletion Allowance (cfs)[3]	Water Right Acquisition/ Flow Augmentation Offset (Maximum Extent Practicable[10]) (cfs) [4]	Target Streamflow Depletion Allowance (cfs)[5]	
	No. of "Blocks"[2]	Qa (afy)	Qi (cfs)				
Water Systems - Cowlitz Co							
Small Community Water Systems - Lewis Co	2	200	0.75	0.75	0.37	**0.37**	
Domestic Wells - Cowlitz Co	NA	6	0.01	0.01	0.00	**0.01**	
Domestic Wells - Lewis Co	NA	5	0.01	0.01	0.00	**0.01**	
Other Beneficial Uses - Cowlitz Co	2	200	0.75	0.75	0.37	**0.37**	
Other Beneficial Uses - Lewis Co	NA	NA	6.60	6.60	3.30	**3.30**	
Subbasin Total				**12.27**		**6.135**	[8]

Notes:
Qa = Annual Allotment; Qi = Instantaneous Quantity; afy = acre-feet per year; cfs = cubic feet per second

(1) Anticipated needs are calculated in the following ways for four different types of water users:
Large Public Water Systems - Needs are based upon deficiencies in existing water rights to meet water demand growth projected to 2020.
Small Community Water Systems - Needs are noted in terms of "blocks" or quantities of water. The number of blocks assigned to each subbasin is based upon the general likelihood of future water demand growth by these types of consumers in that area (e.g., there will likely be more such growth in the Lower Cowlitz River Subbasin, than in the Upper Cowlitz River Subbasin, due to the land use differences in these two subbasins.)
Domestic Wells - Needs are based upon estimated growth in the number of domestic wells by 2020. Domestic wells include those serving multiple homes but are exempt from the requirement to apply for a water right permit.
Other Beneficial Uses - Needs are noted in terms of "blocks" or quantities of water, using a similar rationale as applied to Small Community Water Systems, needed to meet water demand growth to 2020.

(2) 1 "block" = 100 afy water right on a Qa basis (or approx. 90,000 gallons per day on an average day basis) = 0.37 cfs water right, on a Qi basis (assuming a maximum day:average day peaking factor of 2.0, and an instantaneous:maximum day peaking factor of 1.33)

(3) Calculated based upon an estimate of additional water rights needed to meet water demands through 2020. The Unmitigated Streamflow Depletion refers to the total amount of streamflow reduction allowed within the subbasin as a result of pumping or diversion. In some cases, the amount is equal to the anticipated need (Qi). In other cases, the amount is lower, recognizing that a portion or all of the need may be met using groundwater supplies. In these cases, the impacts to streams may be lower than the amount of water withdrawn from the aquifer. For domestic wells, the depletion amount (or potential streamflow impact) is calculated as 30% of the anticipated need, taking into account that an estimated 70% of water pumped from such wells is returned to streamflows via septic system returns.

(4) Refers to the requirement of water users to offset 50 percent of their future water uses through acquisition of water rights or flow augmentation. Does not apply to Domestic Wells.

(5) Calculated as the Unmitigated Streamflow Depletion minus the Water Right Acquisition/Flow Augmentation Offset requirement. This allowance applies only to impacts upon mainstem flows; it is not intended to allow for extensive dewatering of smaller water bodies. Water right applicants must provide further evidence

regarding potential impacts to smaller tributary creeks resulting from new or expanded water resource development.

Allowances are to be considered available only for the category to which they are assigned. However, every 5 years, Ecology and local parties should review the status and use of the allowances and may shift allowance quantities between categories to better address needs, so long as the subbasin total allowance does not change.

(6) Current water rights are sufficient to meet needs through year 2020. Therefore no reservation is established.

(7) Revised water demand projections were determined during the 2005/2006 watershed plan remand process, and are not reflected in previous assessments and growth management projections.

(8) The size of reservations in the Upper Cowlitz, Mayfield Dam, and Lower Cowlitz Subbasins are under review by the Planning Unit. These reservations may be increased, recognizing that flows on the mainstem Cowlitz River greatly exceed minimum flows needed for aquatic habitat. For the same reason, mitigation requirements may be reduced to some extent for any new withdrawals affecting the mainstem Cowlitz River.

(9) The sources of water supply used by this purveyor are located within the tidally-influenced portion of the Lower Cowlitz River, which will remain open for new appropriations. Therefore, no water right reservations are required.

(10) See pages I-6 and I-7 for a description of off-setting and mitigation actions.

Attachment B

WRIA 27/28 Salmon/Washougal and Lewis Watershed Management Plan Reserved Water Strategy Implementation

Policy Background

The reserved water strategy outlined in the WRIA 27/28 Salmon/Washougal and Lewis Watershed Management Plan (hereafter Plan) is based upon the following policies and goals that are designed to balance the objectives of water supply and stream flow protection:

> "Public and private water users throughout WRIAs 27 and 28 should have access to water resources to meet new or expanded needs for water supply consistent with adopted land use plans." (Policy WSP-1, Pg 3-10)
>
> "Water resource development to meet new or expanded needs should avoid or minimize effects on stream flows or aquatic habitat in stream reaches where flow conditions are an important factor for sustaining aquatic life, including fish populations in their various life stages." (Policy WSP-2, Pg 3-10)
>
> "Manage stream flows effectively to sustain aquatic biota, including fish populations in their various life stages." (Objective, Section 1.3, Pg 1-4)

Much of the policy discussion that provides the foundation and rationale for the reserved water concept is found in Section 4.1.1 of the Plan. This discussion emphasizes the need to identify water sources that will not cause significant effects on stream flow or aquatic habitat. As part of the instream flow protection strategy, the Planning Unit recommended Policy SFP-2 (Pg 4-6), which would prohibit issuance of new water rights that would reduce low flows, except under certain pre-defined circumstances. This policy "recognizes that a total closure of streams to all new water right applications would conflict with the goal of ensuring adequate water supplies are available for the region" (Pg 4-3). Therefore the policy has exceptions for the following selected purposes:

- Domestic wells, served by septic systems;
- Specific communities that may not have access to alternative supplies. In these cases a pre-defined quantity of water will be "reserved" for possible allocation to that community. **The reserved quantity will be defined in terms of the net effect on stream flow from development of new supply capacity (emphasis added)**.
- Other communities and industries that may need supplies in the future, but whose needs cannot be well-defined at this time. Again, a pre-defined quantity will be reserved to meet these needs. (Pg 4-3)

The reserved supplies discussed above (except for domestic wells) can be tapped only if the community first demonstrates there is no other practicable alternative, commits to effective stewardship through conservation and/or production of reclaimed water; and commits to offsetting actions and mitigating actions that minimize the effects on stream flow or aquatic habitat. Actions will be evaluated within the context of other supply alternatives, water supply total project cost, and the cost of the off-setting and mitigating actions. The procedure for municipalities to follow when requesting new or expanded water rights is found in Section 3.3.1 (Pg 3-11). Additional discussion and guidance relating to reservations and related mitigation is found in Appendix H (Pg H-2).

Determination of Reservation Quantities

Reservation quantities were established by the Planning Unit based primarily upon the following:

- Anticipated needs for municipalities and other user groups through 2020 (Policy SFP-2, Pg 4-19; Pg 4-20); and

- Recommendations presented by Washington Departments of Fish and Wildlife (WDFW) and Ecology for protection of instream flows (Appendix H, Pg H-25);

Anticipated needs were determined based upon growth projections and estimates associated with the various categories of water users, including large and small public water systems, domestic wells, and other beneficial uses. The forecasts were obtained from purveyor water system plans and other planning documents and were described in terms of average day demand (ADD) and maximum day demands (MDD) expressed in millions of gallons per day. Projected demands were compared to existing water right availability and capacity to determine projected future supply needs.

WDFW and Ecology provided the Planning Unit with recommendations for establishing water right reservations. The rationale for their recommendations is described in an October 4, 2004 memo from WDFW (Pgs H-25 and H-26). To determine acceptable flow reserves, the agencies identified flow quantities that equate to 1-2% reduction in wetted usable area for species of concern during the 90% exceedence flows in September and October. For watersheds where instream flow studies were not conduced, a 1-2% reduction in flow from the 90% exceedence flow during the low flow season was used as a surrogate. Thus the recommendations were based on very low-flow conditions (9 out of 10 days are as wet or wetter for that date). Because of their sensitivity to flow reduction, small streams were not recommended for establishment of reserves.

The final water right reservations reflected in the Plan represent a balance of the above considerations. Section 3.3.1 (Pg 3-13) describes water reservations as follows:

> "In order to satisfy the goals associated with the establishment of closures and/or instream flows, and the goals associated with providing a secure source of water for future public water supply, it is recommended that in each basin a block of water be reserved for future

public water supply that would not be subject to the closures and/or instream flows established by rules for WRIAs 27 and 28."

In many cases reservation quantities were consistent with WDFW and Ecology recommendations for instream flow protection. In other cases reservations to meet growth needs were established in areas where none were recommended by state agencies. Several reservations were negotiated during the final plan development and adoption phases based on revised supply need considerations.

Reservation quantities were established and agreed upon based on the understanding that implementing the long-term water supply (e.g., regional source development) and stream flow strategies (e.g., regional source development) should result in improved instream flow conditions. Reservations should thus be viewed as negotiated quantities that are intended to represent an overall balance between instream flow and supply needs, within the context of the long-term strategies for water management and mitigation to offset stream impacts.

Definition of Water Reservation:

Numeric reservations are presented in water right reservation summary tables found in several areas of the Plan:

- Table ES-3 (Pg ES-12)
- Table 4-4 (Pg 4-21)
- Table H-2 (Pgs H-17 and H-18) (attached)
- Table H-2a (Pgs H-19 and H-20) (attached)

Tables ES-3, 4-4 and H-2 all identify the amount of water, the entity, and the sources of water to be reserved for public supply. These tables all refer to the "net stream flow depletion allowance after mitigation (cfs)". Table H-2a includes a "net stream flow depletion after mitigation" column as well, and also includes columns for anticipated needs, stream flow depletion without mitigation, and offset/mitigation requirements, all expressed numerically in cfs. These tables suggest that the "net streamflow depletion allowance after mitigation" column is intended to represent stream flow "reservations".

Policy SFP-2 states that the "rules adopted shall not prevent issuance of water rights for selected purposes and uses" (Pg 4-6 and 4-19). With regard to domestic wells, small community systems, other beneficial uses, and municipal water systems, this policy states that these quantities "represent the net depletion of stream flow in each subbasin…". The discussion of reservations in Section 4.1.1 (Pg 4-3) also states that "the reserved quantity will be defined in terms of the net effect on stream flow from development of new supply capacity." These references and the tables discussed above all confirm that the numeric quantity that constitutes the water right "reservation" is the "net stream flow depletion allowance after mitigation".

Implementation Roles and Responsibilities:

The Plan recognizes that the Department of Ecology is the entity responsible for making water right permit decisions and applying the reservation strategy, and also acknowledges the role of WDFW in evaluating requests for reservation use. Sections 3.3.1 (Pg 3-11 through 3-13) and Appendix H (Pg H-6 and H-7) describe the following roles and responsibilities:

> "The Department of Ecology has the responsibility for reviewing water right applications. Under its current process, Ecology issues water right permits only if the proposed use meets the following requirements, in accordance with RCW 90.03.290…" (Section 3.3.1, Pg 3-11)
>
> "The Planning Unit recommends that Ecology (in conjunction with Fish & Wildlife) evaluate requests for reservation use by reviewing the applicant's analysis of other alternatives and by evaluating the applicant's proposal in terms of off-setting and mitigating actions." (Section 3.3.1, Pg 3-12; Appendix H, Pg H-6)
>
> "Application for the reservation will be reviewed, analyzed, and processed by Ecology in consultation by Fish & Wildlife"… (Appendix H, Pg H-6)

These Plan sections affirm the regulatory and decision-making role of Ecology and WDFW in evaluating and processing water right applications under the reserved water strategy, and making determinations regarding adequacy of mitigation.

Water Reservation Accounting

The Plan does not outline a formal accounting process for tracking "debits" and "credits" associated with implementation of the reserved water strategy and mitigation banking. However, successful implementation of the reserved water strategy will require that Ecology, as the primary regulatory entity, establish an accounting system that addresses the various Plan elements.

The Plan identifies several categories of mitigation actions related to the decision making process outlined in Section 3.3.1 and Appendix H. These mitigation actions will be used to determine mitigation "credits" and "debits" related to use of the reservation. In some cases mitigation actions relate to specific steps in the decision-making process (e.g., determination of 50% flow requirement), but in other cases the intended application is broader and not associated with a single step in the evaluation process. The following is a summary of the mitigation action types recognized in the Plan, along with a description of their relationship to the evaluation process:

- "…where an applicant applies for a water right under a reservation, they be required to mitigate the predicted stream flow depletion to the maximum extent practicable through flow-related actions…" (Appendix H, Pg H-6; Section 3.3.1 Pg 3-12)

This language is not specific to any particular step in the decision making process and establishes that in developing an overall mitigation package for evaluation, applicants must rely upon flow-related actions to the maximum extent practicable.

- "No less than half of the predicted stream flow depletion (see Table H-2a) must be offset through the acquisition of active upstream water rights or other flow augmenting actions in the same subbasin upstream of the new proposed water right." (Appendix H, Pg H-6; Section 3.3.1 Pg 3-12)

  This language establishes the minimum 50% flow mitigation requirement, and establishes that active water right acquisition and other flow augmenting actions can be used to satisfy this requirement. This language refers specifically to the "Offset/Mitigation Requirement" column in Tables H-2a (Appendix H, Pg H-19)

- "In these limited cases, acquisition of offsetting active water rights or flow augmentation actions shall be implemented to the extent feasible. Any remaining offset requirement shall be mitigated through other habitat actions designed to offset the effects of the stream flow depletion not being offset." (Appendix H, Pg H-7; Section 3.3.1, Pg 3 -12)

  This language refers to situations when achieving the 50% flow mitigation through acquisition of active water rights and flow augmenting actions is not feasible or is cost-prohibitive. This wording establishes that under the specified circumstances habitat actions can be used to mitigate flow impacts. This language refers specifically to the "Offset/Mitigation Requirement" column in Table H-2a.

- "The Planning Unit recommends that Ecology consider other mitigating actions to address impacts that cannot be practicably off-set (no more than half) through water-for-water actions. This includes actions such as the restoration of wetlands and side-channels that increase stream storage capacity." (Appendix H, Pg H-7; Section 3.3.1, Pg 3-12 and 3-13)

  The above language is **distinct and separate from** the previous provisions relating to situations where providing the 50% flow mitigation is not practicable. Given the separation of this discussion from the previous bullet, and the reference to actions that cannot be practicably offset through water-for-water actions, this establishes that habitat actions such as wetland and side-channel restoration can be used to address residual impacts associated with the "Net Stream Flow Depletion Allowance After Mitigation" column in Table H-2 and H-2a.

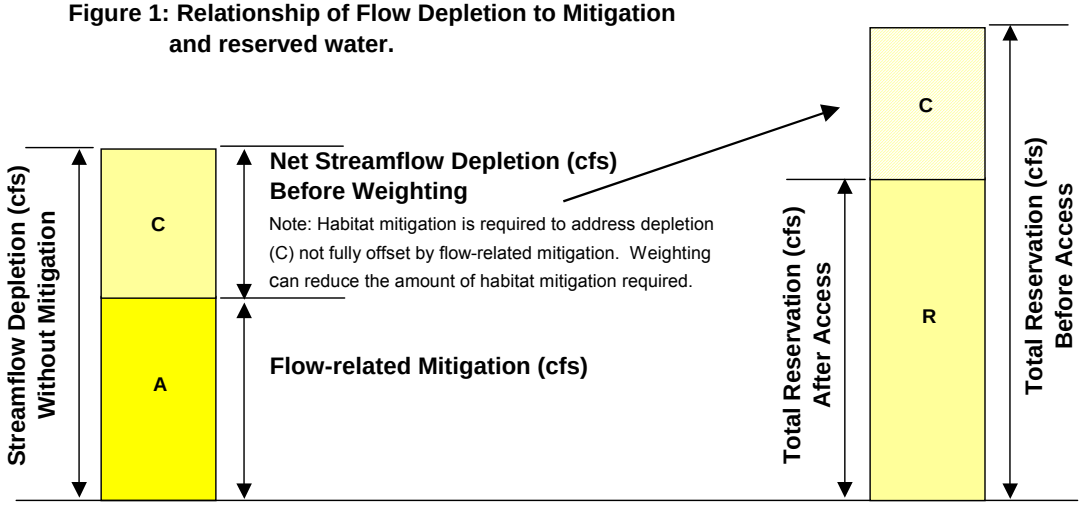
- "The Planning Unit recommends that Ecology consider habitat restoration actions other than the restoration of wetlands and side-channels using the following criteria:

  - habitat actions should focus upon projects that improve stream conditions impaired by flow (e.g., projects that improve width to depth relationships or improve landscape-level hydrologic processes, etc.);
  - habitat actions should address threats and limiting factors through priority actions identified in the Lower Columbia Salmon Recovery Plan;

- habitat actions should be evaluated within the context of when baseflow impacts will occur and the expected timeframe of habitat project benefits. (Section 3.3.1, Pg 3-1; Appendix H, Pg H-7);

This language is also separate and distinct from the previous two bullets, is not associated with a specific step in the mitigation process, and establishes that habitat actions focusing on improving conditions impaired by flow or addressing priority habitat limiting factors can be used to off-set stream impacts. This category can therefore also be used to address impacts associated with the "Net Stream Flow Depletion Allowance After Mitigation" column.

Figure 1: Relationship of Flow Depletion to Mitigation and reserved water.



The above graphic represents the relationship between mitigation actions, flow depletion and reservation accounting. The primary approach for mitigating streamflow depletion impacts is through flow-related actions. As described above, the Plan guidance and requirements emphasize that flow related actions must be used to the maximum extent practicable in developing an overall mitigation package. The Plan calls for use of direct water right acquisition or other flow augmenting actions as the primary means to address the "Offset/Mitigation Requirement" (Segment A), with use of habitat actions where this is not feasible. If streamflow depletion is fully mitigated through flow-related actions, the reservation would not be debited and would remain available for future access. However, if impacts are only partially offset or not offset at all through flow-related actions (Figure 1, Segment A), the remaining streamflow depletion (Figure 1, Segment C) is "debited" from the reserve. As depicted in Segment C, habitat actions will also be required to offset net streamflow depletion impacts, but will not be used to reduce the amount of "debit" from the reservation. However, additional instream flow benefits that result in up-weighting of the flow-related mitigation credits can be used to reduce the amount of habitat mitigation required to address net stream flow depletion as represented by Segment C.[6]

[6] See Integrated Strategy for Implementing Water Right Reservations, Section 2.0 (Reservation Accounting), for a description of flow-related mitigation up-weighting.

Addressing Water Reservations in Rule:

The WRIA Plan calls for incorporation of water right reservations into State Rules. Specifically, Policy SFP-2 (Pgs 4-6 and 4-19) states the following:

> "The Department of Ecology should adopt State Rules (WACs) under its Instream Resources Protection Program to restrict issuance of new water rights in WRIAs 27 and 28. In all affected streams reaches a closure should be established, but with certain exceptions as indicated below".

In addition, the discussion of water reservations in Section 3.3.1 includes the following recommendation:

> "In order to satisfy the goals associated with the establishment of closures and/or instream flows, and the goals associated with providing a secure source of water for future public water supply, it is recommended that in each basin a block of water be reserved for future public water supply that would not be subject to the closures and/or instream flows established by rules for WRIAs 27 and 28." (Recommendation, Page 3-13)

Page 3-13 provides further guidance regarding incorporation of water reservations into state rule:

> "The amount of water, the entity, and the source(s) of the water to be reserved for public supply is recommended in Appendix H (Table H-2) and should be identified in the proposed rules to be adopted by the Department of Ecology for WRIAs 27 and 28..."

The WRIA 27/28 Plan clearly calls for providing water reservations in rule, and refers to Table H-2 for further defining the content of this rule. As described above, Table H-2 defines the water reservation as "net stream flow depletion allowance after mitigation" (Pg H-17). Based on this, it is clear that the "net streamflow depletion allowance after mitigation" should be included as the "reservation" in rule. **However, there are explicit Plan provisions discussed below that will necessitate including in rule exceptions to this definition.**

The procedure described in Section 3.3.1 and Appendix H recognizes that "…there may be occasional exceptions where offsetting one half of the predicted stream flow depletion fully or in part may be infeasible or cost-prohibitive". The Kalama River and Upper North Fork Lewis River subbasins were called out as examples of where this situation is thought to exist. The Plan further states:

> "In these limited cases, acquisition of offsetting active water rights or flow augmentation actions shall be implemented to the extent feasible. Any remaining offset requirement shall be mitigated through other habitat actions designed to offset the effects of the stream flow depletion not being offset. In no case shall the amount of stream flow depletion from new water rights issued under this policy exceed the quantity shown in Table H-2a, under the column heading "Net Stream flow Depletion Allowance." (Section

3.3.1, Pg 3-12; Appendix H, Section IV, Pg H-6))

Where these exceptions were thought to exist, the "net stream flow depletion allowance after mitigation" column in Tables ES-3, 4-4, H-2 and H-2a, identify the same quantity as the "stream depletion without mitigation" column in Table H-2a. However, the Plan recognizes that other situations may exist, and the intent is to allow mitigation of impacts through a combination of flow actions (to extent feasible), and other habitat actions. If the "net stream flow depletion after mitigation" quantity was calculated assuming a 50% flow offset was possible, but in practice it was not, an applicant would only be entitled to secure 50% of their needed water supply and would not be allowed secure the remainder through mitigation because of the following limitation:

> "In no case shall the amount of stream flow depletion from new water rights issued under this policy exceed the quantity shown in Table H-2a, under the column heading "Net Stream flow Depletion Allowance".

The potential result would be inequitable treatment of entities under the Plan and inconsistent application of mitigation provisions. Given that water reservations are defined in the Plan as "the net stream flow depletion after mitigation" as concluded above, it will be important to clearly address the exception in rule. This could be accomplished by including the following in the rule language:

- Footnoting the water reservation tables to refer to the discussion regarding exceptions (Sections 3.3.1 and Appendix H);
- Including Sections 3.3.1 (Pg 3-11 through 3- 13) and Appendix H - Section IV (Pgs H-6 through H-8); and
- Including both Tables H-2 and H-2a as part of the "reservation strategy", to explicitly describe the sequential relationship between reservations and mitigation and the intent of each column heading, and to ensure that an applicant's ability to secure use of the reservation through mitigation is not precluded.

Attachments: Table H
Table H-2a

Table H-2 Water Right Reservation Summary for WRIAs 27/28	
Water User [1]	**Net Stream flow Depletion Allowance After Mitigation (cfs)** [2]
Kalama River Subbasin[5]	
Kalama	1.92
Small Systems and Domestic Wells	0.35
Subbasin Total	**2.26**
North Fork Lewis Subbasin	
Cowlitz County Portion	
Small Systems and Domestic Wells	0.26
Clark County Portion	
Small Systems and Domestic Wells	0.49
Skamania County Portion	
Domestic Wells	0.40
Small Systems	0.40
Commercial	0.21[6]
Subbasin Total	**1.76**
East Fork Lewis Subbasin[5]	
Clark County Portion	
CPU, Battle Ground, and Ridgefield [4]	2.20
Small Systems and Domestic Wells	0.66
Skamania County Portion	
Small Systems and Domestic Wells	0.00
Subbasin Total	**2.85**
Salmon Creek Subbasin	
CPU, Battle Ground, and Ridgefield [4]	0.13
Small Systems and Domestic Wells	0.12
Subbasin Total	**0.24**
Burnt Bridge Creek Subbasin	
Vancouver	0.02
Small Systems and Domestic Wells	0.00
Subbasin Total	**0.02**
Lacamas Creek Subbasin	
Camas	0.50
CPU	0.30
Small Systems and Domestic Wells	0.36
Subbasin Total	**1.16**
Washougal River Subbasin[5]	
Clark County Portion	
Washougal	0.00 [3]
Small Systems and Domestic Wells	0.36
Skamania County Portion	
Small Systems and Domestic Wells	0.74[7]
Subbasin Total	**1.10**
Columbia River Tributaries Subbasin	
Clark County Portion	
Small Systems and Domestic Wells	0.22
Skamania County Portion	
Small Systems and Domestic Wells	0.22
Subbasin Total	**0.44**

Notes:

(1) Categories of water users include:
Large Public Water Systems, which are listed individually.
Small Systems, which refers to Public Water Systems not listed individually and required to apply for a water rights permit.
Domestic Wells, including those serving multiple homes but exempt from the requirement to apply for a water right permit.
Other Beneficial Uses, such as self-supplied industrial uses.

(2) Calculated based upon an estimate of additional water rights needed to meet water demands through 2020. Incorporates the effects of offsetting and mitigation activities. The allowance applies only to mainstem flows; it is not intended to allow for extensive dewatering of smaller water bodies.

(3) Current water rights are sufficient to meet needs through year 2020. Therefore no reservation is established.

(4) Wells serving CPU, Battle Ground, and Ridgefield may draw partly from the East Fork Lewis River Subbasin and partly from the Salmon Creek Subbasin. Therefore, the stream flow depletion is split between these subbasins, based on information provided by CPU.

(5) In the lower reaches of this subbasin, there may be opportunity to increase reservation amounts, pending further study to refine understanding of flow impacts.

(6) Withdrawal impacts shall be limited to the mainstem North Fork Lewis River above Swift Reservoir only.

(7) During future plan review, the size of this reservation will be reconsidered in light of Skamania County's request for 1.15 cfs needed to accommodate approximately 3109 homes.

Table H-2a Water Right Reservation Calculations for WRIAs 27/28						
	Anticipated Needs [1]			Stream flow Depletion Without Mitigation (cfs) [3]	Offset/ Mitigation Requirement (cfs) [4]	Net Stream flow Depletion After Mitigation (cfs) [5]
	No. of "Blocks" [2]	Qa (afy)	Qi (cfs)			
Kalama River Subbasin [9]						
Kalama	NA	290	3.83	1.92	0.00	**1.92**
Small Community Water Systems - Cowlitz Co.	1	100	0.37	0.37	0.19	**0.19**
Domestic Wells - Cowlitz Co.	NA	141	0.52	0.16	0.00	**0.16**
Subbasin Total						**2.26**
North Fork Lewis River Subbasin						
Small Community Water Systems - Cowlitz Co.	1	100	0.37	0.37	0.19	**0.19**
Small Community Water Systems - Clark Co.	2	200	0.75	0.75	0.37	**0.37**
Small Community Water Systems - Skamania Co. [10]	NA	NA	NA	0.40	0.00	**0.40**
Domestic Wells - Cowlitz Co.	NA	61	0.22	0.07	0.00	**0.07**
Domestic Wells - Clark Co.	NA	105	0.39	0.12	0.00	**0.12**
Domestic Wells - Skamania Co. [10]	NA	NA	NA	0.40	0.00	**0.40**
Commercial - Skamania County [10] [12]	NA	NA	NA	0.21	0.00	**0.21**
Ridgefield	(Not applicable, due to location in tidally influenced area. [8]					
Subbasin Total						**1.76**
East Fork Lewis River Subbasin [9]						
CPU, Battle Ground and Ridgefield [6]	NA	5,000	15.00	4.40	2.20	**2.20**
Small Community Water Systems - Clark Co.	1	100	0.37	0.37	0.19	**0.19**
Small Community Water Systems - Skamania Co.	0	0	0.00	0.00	0.00	**0.00**
Domestic Wells - Clark Co.	NA	421	1.55	0.47	0.00	**0.47**
Domestic Wells - Skamania Co.	NA	15	0.05	0.02	0.00	**TBD**
Subbasin Total						**2.85**
Salmon Creek Subbasin						
CPU, Battle Ground and Ridgefield [6]	NA	1,050	2.45	0.25	0.13	**0.13**
Small Community Water Systems - Clark Co.	0	0	0.00	0.00	0.00	**0.00**
Domestic Wells - Clark Co.	NA	105	0.39	0.12	0.00	**0.12**
Subbasin Total						**0.24**

Table H-2a (cont.) Water Right Reservation Calculations for WRIAs 27/28						
	Anticipated Needs [1]			Stream flow Depletion Without Mitigation (cfs) [3]	Offset/ Mitigation Requirement (cfs) [4]	Net Stream flow Depletion After Mitigation (cfs) [5]
	No. of "Blocks" [2]	Qa (afy)	Qi (cfs)			
Burnt Bridge Creek Subbasin						
Vancouver						**0.02**
Small Community Water Systems - Clark Co.	0	0	0.00	0.00	0.00	**0.00**
Domestic Wells - Clark Co.	NA	NA	NA	0.00	0.00	**0.00**
Subbasin Total						**0.02**
Lacamas Creek Subbasin						
Camas[7]	NA	3,240	6.01	1.00	0.50	**0.50**
Clark Public Utilities (CPU)	NA	1,973	3.63	0.60	0.30	**0.30**
Small Community Water Systems - Clark Co.	1	100	0.37	0.37	0.19	**0.19**
Domestic Wells - Clark Co.	NA	158	0.58	0.17	0.00	**0.17**
Subbasin Total						**1.16**
***Washougal River Subbasin*[9]**						
Washougal	NA	0	0.00	0.00	0.00	**0.00**
Small Community Water Systems - Clark Co.	1	100	0.37	0.37	0.19	**0.19**
Small Community Water Systems - Skamania Co.[10][11]	NA	NA	NA	0.20	0.10	**0.10**
Domestic Wells - Clark Co.	NA	158	0.58	0.17	0.00	**0.17**
Domestic Wells - Skamania Co. [10][11]	NA	NA	NA	0.64	0.00	**0.64**
Subbasin Total						**1.10**
Columbia River Tributaries Subbasin						
Small Community Water Systems - Clark Co.	0.55	55	0.21	0.21	0.10	**0.10**
Small Community Water Systems - Skamania Co.	0.55	55	0.21	0.21	0.10	**0.10**
Domestic Wells - Clark Co.	NA	105	0.39	0.12	0.00	**0.12**
Domestic Wells - Skamania Co.	NA	25	0.08	0.12	0.00	**0.12**
Subbasin Total						**0.44**

Table H-2a (cont.) Water Right Reservation Calculations for WRIAs 27/28						
	Anticipated Needs [1]			Stream flow Depletion Without Mitigation (cfs) [3]	Offset/ Mitigation Requirement (cfs) [4]	Net Stream flow Depletion After Mitigation (cfs) [5]
	No. of "Blocks" [2]	Qa (afy)	Qi (cfs)			
Burnt Bridge Creek Subbasin						
Vancouver						**0.02**
Small Community Water Systems - Clark Co.	0	0	0.00	0.00	0.00	**0.00**
Domestic Wells - Clark Co.	NA	NA	NA	0.00	0.00	**0.00**
Subbasin Total						**0.02**
Lacamas Creek Subbasin						
Camas[7]	NA	3,240	6.01	1.00	0.50	**0.50**
Clark Public Utilities (CPU)	NA	1,973	3.63	0.60	0.30	**0.30**
Small Community Water Systems - Clark Co.	1	100	0.37	0.37	0.19	**0.19**
Domestic Wells - Clark Co.	NA	158	0.58	0.17	0.00	**0.17**
Subbasin Total						**1.16**
***Washougal River Subbasin*[9]**						
Washougal	NA	0	0.00	0.00	0.00	**0.00**
Small Community Water Systems - Clark Co.	1	100	0.37	0.37	0.19	**0.19**
Small Community Water Systems - Skamania Co.[10][11]	NA	NA	NA	0.20	0.10	**0.10**
Domestic Wells - Clark Co.	NA	158	0.58	0.17	0.00	**0.17**
Domestic Wells - Skamania Co. [10][11]	NA	NA	NA	0.64	0.00	**0.64**
Subbasin Total						**1.10**
Columbia River Tributaries Subbasin						
Small Community Water Systems - Clark Co.	0.55	55	0.21	0.21	0.10	**0.10**
Small Community Water Systems - Skamania Co.	0.55	55	0.21	0.21	0.10	**0.10**
Domestic Wells - Clark Co.	NA	105	0.39	0.12	0.00	**0.12**
Domestic Wells - Skamania Co.	NA	25	0.08	0.12	0.00	**0.12**
Subbasin Total						**0.44**

Notes:

Qa = Annual Allotment; Qi = Instantaneous Quantity; afy = acre-feet per year; cfs = cubic feet per second; NA = Not Applicable

(1) Anticipated needs are calculated in the following ways for three different types of water users:
Large Public Water Systems - Needs are based upon deficiencies in existing water rights to meet water demand growth projected to 2020 (except Kalama - 50 year need was used).
Small Community Water Systems - Needs are noted in terms of "blocks" of water. The number of blocks assigned to each subbasin is based upon the general likelihood of future water demand growth by these types of consumers in that area (e.g., there will likely be more such growth in the Washougal River Subbasin than in the Burnt Bridge Creek Subbasin, due to the ability of larger purveyors to meet future needs in the latter.)
Domestic Wells - Needs are based upon estimated growth in the number of domestic wells by 2020.

(2) "1 ""block"" = 100 afy water right on a Qa basis (or approx. 90,000 gallons per day on an average day basis)
= 0.37 cfs water right, on a Qi basis (assuming a maximum day:average day peaking factor of 2.0, and an instantaneous:maximum day peaking factor of 1.33)"

(3) The Stream flow Depletion without Mitigation refers to the total amount of stream flow reduction that would occur within the subbasin as a result of pumping or diversion, if there were no mitigation offset. In some cases, this quantity is equal to the anticipated need (Qi). In other cases, this quantity is lower, recognizing that a portion or all of the need may be met using groundwater supplies. In these cases, the impacts to streams may be lower than the amount of water withdrawn from the aquifer. For domestic wells, the depletion amount is calculated as 30% of the anticipated need, taking into account that an estimated 70% of water pumped from such wells is returned to stream flows via septic system returns.

(4) Refers to the requirement of water users to offset 50 percent of their future water uses that are guaranteed within the context of this reservation. Does not apply to Domestic Wells.

(5) Calculated as the Stream flow Depletion minus the Offset/Mitigation Requirement. This allowance applies only to impacts upon mainstem flows; it is not intended to allow for extensive dewatering of smaller water bodies. Water right applicants must provide further evidence regarding potential impacts to smaller tributary creeks resulting from new or expanded water resource development. Allowances are to be considered available only for the category to which they are assigned. However, every 10 years, Ecology and local parties should review the status and use of the allowances and may shift allowance quantities between categories to better address needs, so long as the subbasin total allowance does not change.

(6) Wells serving CPU, Battle Ground and Ridgefield may draw partly from the East Fork Lewis River Subbasin, and partly from the Salmon Creek Subbasin. Therefore the stream flow depletion is split between these subbasins, based on information provided by CPU.

(7) The majority of the City of Camas is located within the Lacamas Creek Subbasin, though portions are also located within the Burnt Bridge Creek and Washougal River Subbasins. The City's water sources are located within both the Lacamas Creek and Washougal River Subbasins. Therefore, the stream flow depletion for Camas applies to both subbasins (i.e., total stream flows in both subbasins collectively are not to be reduced by more than the amount indicated for the City).

(8) Not applicable, due to location in tidally influenced area.

(9) In the lower reaches of this subbasin, there may be opportunity to increase reservation amounts, pending further study to refine understanding of flow impacts.

(10) Revised water demand projections were determined during the 2005/2006 watershed plan remand process based on projected build-out in relation to current minimum lot sizes and anticipated growth needs, and are not reflected in previous assessments and growth projections.

(11) During future plan review, the size of this reservation will be reconsidered in light of Skamania County's request for 1.15 cfs needed to accommodate approximately 3109 homes.

(12) Withdrawal impacts shall be limited to the mainstem North Fork Lewis River above Swift Reservoir only.

Attachment C
Alternatives Analysis for New Water Supply

Briefing Material – Water Rights Mitigation Subcommittee

Subject: Alternatives Analysis for New Water Supply

Prepared: March 20, 2008
Revised: May 13, 2008
May 27, 2008
June 23, 2008
August 11, 2008

Under the WRIA 25/26 and 27/28 Watershed Management Plans, reservations of water are set aside in streams that are otherwise closed to further appropriations. There are several requirements that must be met in order for a water rights applicant to access reserved water from a closed reach of a stream, or to develop a new groundwater source that may deplete a closed reach. One of these requirements is that the applicant must demonstrate to the Department of Ecology that it has considered alternative supplies that would have less impact on the closed stream(s). The reasons for selecting the proposed source of supply should be explained as part of the application for use of reserved waters.

Additional background on this requirement is provided in Section 3 of the Integrated Strategy for Implementing Water Right Reservations. This briefing paper was prepared for use by the Planning Units' Water Rights Mitigation Subcommittee, to further develop guidance for this requirement.

Note: The procedures outlined in this paper do not apply to individual domestic wells, or to applications that do not involve a water reservation defined under State law (Chapters 173-525 through 173-528, Washington Administrative Code – adoption pending).

Background Information from Watershed Management Plans

Section 3.3.1 of the Watershed Management Plans includes the following recommended procedure:

> Where…evaluation [of proposed supply projects] indicates that development of the source of supply will impact the flow regime, the Planning Unit recommends that the municipal water supplier analyze alternative options for water supplies. In such cases, supply alternatives include use of a different (most likely deeper) aquifer, purchase of water from a neighboring community, development of a tidally-influenced source…or [for WRIA 27/28 only] purchase of water from a regional water system....
>
> If the supply alternatives analysis indicates that no practicable alternative is available, the water right applicant may petition Ecology to utilize a "reservation" of water….The Planning Unit recommends that Ecology (in conjunction with Fish and Wildlife) evaluate requests for

> reservation use by reviewing the applicant's analysis of other alternatives and by evaluating the applicant's proposal in terms of off-setting and mitigating actions.

Following this text, in the Plan's discussion of mitigation actions it states that

> Practicable is meant to include both economic and logistic considerations.

The Watershed Management Plans also state that:

> Communities receiving new and additional water rights will be required to optimize the use of their new rights, through existing and future conservation requirements….

The purpose of these requirements is to ensure that stream flows in closed reaches are protected from depletion when alternative supplies are available that would meet the same need and result in a smaller flow depletion or no flow depletion. However, water users designated for access to reserved supply should not be denied access if the need can be demonstrated and other sources are not feasible or cost-effective. These provisions balance the objective of providing access to reserved water with the objective of protecting stream flow.

In addition to the procedure outlined in the Watershed Management Plans, the adopted plans also express specific source preferences that were developed by the two Planning Units for their respective areas. These are summarized in Table 1 and should be considered as part of any source alternatives analysis (for specific language, see the Plan documents). Additional information is included at the end of this attachment. Where a source is specifically "endorsed" in the Watershed Management Plans, this indicates it has already been adequately compared with available alternatives. For those sources, further analysis of alternatives is not required under the reservation procedure.

Table 1
Source Preferences from Watershed Management Plans

Both Planning Areas

- Ground water is preferred over surface water; and ground water alternatives that avoid impacts to surface water are preferred over ground water sources that have such impacts.
- Surface water from the Columbia River; ground water in hydraulic continuity with the Columbia River; or supplies impacting only adjacent, lowland reaches of tributaries subject to tidal effects are preferred over supplies impacting flow-limited reaches of tributary streams.
- New urban or suburban developments or industrial facilities requiring new or expanded water supplies should generally look first to existing municipal or other water suppliers instead of developing separate sources of supply (the WRIA 27/28 plan states this is not currently applicable to Skamania County because there are no large municipal systems available). This does not apply to agricultural uses.

WRIA 25/26 ▪ The Cowlitz River is a significant regional resource, and is preferred over other water resources tributary to the Columbia River. However use of the Cowlitz River should be consistent with the reservation quantity established in the Plan. ▪ The Planning Unit endorsed supply alternatives presented in the Longview-Kelso Urban Area Comprehensive Water Plan (1999). These involve expanded use of the Regional Water Treatment Plant on the Cowlitz River; and/or local groundwater supplies hydraulically connected to the Cowlitz River. Affected systems include the Cities of Longview and Kelso and the Cowlitz County PUD.
WRIA 27/28 ▪ The Pleistocene Alluvial Aquifer should be developed as a regional source (regional initiatives under way by Vancouver and CPU at Vancouver Lake lowlands; and Camas and Washougal at Steigerwald Lake). ▪ The tidal reach of the North Fork Lewis River below Woodland was cited as an example of a lowland tributary to the Columbia River that offers a viable source of supply. ▪ Development of additional wells in the Pioneer area for public water supply were endorsed by the Planning Unit. ▪ The Planning Unit recommended Ridgefield consider purchasing water from CPU to aid in meeting future demands. ▪ The Planning Unit supports expansion of withdrawals from a Ranney well on the North Fork Lewis River to meet Woodland's growing needs. Flow in this reach is affected by tidal influence. ▪ The Planning Unit recommended that Battle Ground purchase water from CPU. ▪ Increased withdrawals by the City of Kalama from its existing Ranney Well adjacent to the Kalama River were endorsed, up to a limit of 1.92 cfs in additional supply.

Information drawn from WRIA 25/26 Plan, pp. 3-9 to 3-16; and WRIA 27/28 Plan, pp. 3-11 to 3-23. These sections are reproduced at the end of this attachment.

Use of Alternatives Analysis in Other Contexts

In order to support development of the Alternatives Analysis procedure, the Subcommittee reviewed existing procedures used by various agencies or other organizations. This information served as background only. Other procedures were designed for specific needs that differ from the Watershed Management Plan.

Alternatives analyses are widely used for decision-making on public projects. Some examples are:

- Identification and analysis of alternatives is required in preparation of Environmental Impact Statements under the State and National Environmental Policy Acts (SEPA and NEPA). This analysis focuses on environmental effects of different project alternatives.

- The U.S. Army Corps of Engineers "404" permits for filling and dredging include a requirement for analysis of practicable alternatives to minimize environmental damage.

- Washington State Department of Health requires municipal water systems to conduct a "source of supply analysis" if their water system plan indicates a need for new water rights within 20 years. Alternatives that must be considered include enhanced conservation, water right transfers, artificial recharge of groundwater, and use of reclaimed water or other non-potable supplies (for details, see Water System Planning Handbook, DOH, 1997, available online).

- The Oregon Water Resources Department requires alternatives analysis for new municipal water rights (OAR 690-086-0170), focusing on opportunities to meet needs through conservation or interconnections with other suppliers.

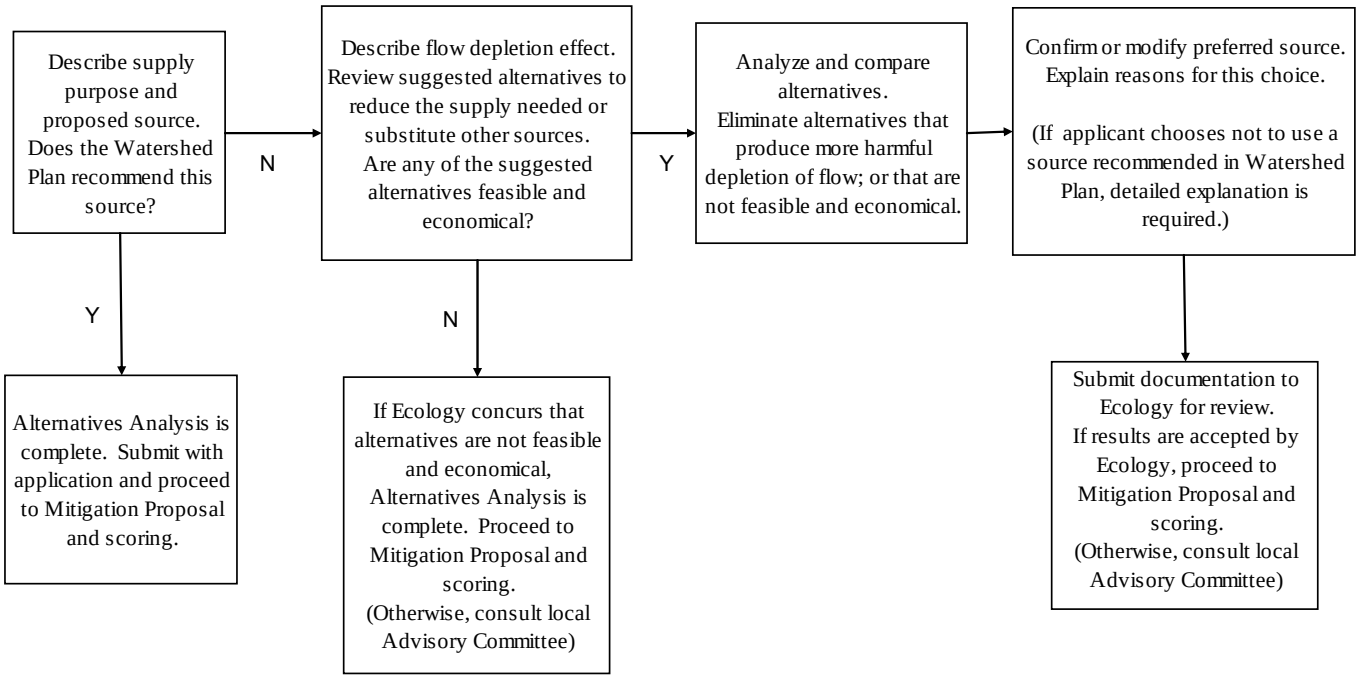
- Alternatives analyses and related cost-benefit analyses are also used by public agencies and private companies in decision-making for large project decisions such as major transportation improvements; hydro-electric projects; and flood-control projects.

Standards for the adequacy of alternatives analysis vary widely under these different contexts. Some of the examples listed above have very brief, general requirements; while others have considerable detail required under law.

Proposed Guidelines

All applications for water rights under a water reservation shall be accompanied by answers to the questions on the following pages. The procedure is summarized in Figure 1.

Figure 1
Alternatives Analysis Procedure for Reserved Water Supplies
(Expansion of Box 4 from Pre-Screening Procedure)



Questionnaire
Alternatives Analysis for New Water Supply

(Applicants must provide written responses to the questions listed below. Applicants can attach materials from adopted water system plan or other existing reports if these provide the information requested. If materials are attached, please reference specific pages, for each question below.)

(Note: this review of alternatives is not designed to meet requirements of the State Environmental Policy Act [SEPA]. However some of the information requested may be useful for SEPA compliance, and vice versa.)

1. Describe the purpose of this water supply project. Who will be supplied and for what type(s) of water uses? What quantity of water is requested and how was the quantity determined? Indicate when the applicant expects to fully utilize the new supply (e.g. immediately? Ten years from now? Twenty years?).
2. List the source of supply requested and provide a map showing the location where water will be diverted or withdrawn. For ground water sources give the approximate depth of the well or wells.
3. What surface waters are expected to experience flow depletion as a result of developing this supply? Where would the depletion be expected to occur? What quantity of depletion is expected, in cubic feet per second? How is this expected to vary seasonally? (note habitat restoration needs indicate special emphasis on the low-flow period in late summer and early fall). What methods were used to determine the expected depletion?
4. Would it be feasible and economical to either reduce the need or fully meet the need through any of the following? What quantity could be met through these options? (including combining options, if feasible and economical). If these options are not feasible or economical, please explain why.
    a. Demand management. Demand management includes metering and analysis of water use patterns; water conservation actions; control of leakage or other water losses; rate structures that provide incentives to manage water use; or other practices to improve efficiency of water uses.
    b. Reclaimed water. Reclaimed water is wastewater that has been treated to State standards for reuse.
    c. Water purchased from a water supplier that has excess supply, including a regional supply source.
    d. Acquisition of an existing supply source and water right from another party.
    e. Increased storage capacity. (Note: storage may include constructed facilities or storage in natural aquifers underground.)
    f. Increased treatment capacity for an existing source; or rehabilitation of an existing, but contaminated water source.

g. Other opportunities to optimize existing, developed sources? (either under existing water rights or with new water rights)

Based on these options, explain whether the applicant wishes to proceed with the original quantity of water identified, or a lower quantity.

5. Has the WRIA Planning Unit already formally and specifically endorsed this source of supply for use by this applicant?

   (if yes, provide documentation from the appropriate Watershed Management Plan, adopted provisions of State law, Ecology order, or other official designation pursuant to recommendations by the Planning Unit. Further source analysis not required).

6. For the remaining need not met by methods listed above, are there any alternative sources of supply that could reasonably substitute for the requested supply source? Consider each of the source categories below.

   a. Ground water aquifers other than the requested source. (the Watershed Plans especially suggest use of ground water in continuity with the Columbia River or tidally influenced tributaries).

   b. Surface waters from the Columbia River.

   c. Surface waters from tidally-influenced reaches of tributaries to the Columbia River.

   d. Other sources, if applicable.

   For each category, if there is no reasonable alternative to the preferred source, explain why. ***(In this case, no further analysis is required.)***

   If there are one or more reasonable alternatives, identify the specific source (name of surface water; description of aquifer; or similar information). Proceed to the next question.

7. For each alternative deemed reasonable for further consideration under Questions 4 and 6 above, provide a brief narrative comparison with the requested source of supply. Consider the following elements:

   a. Quantity of supply available from the alternative source (or quantity of need reduced through demand management actions).

   b. Quantity and timing of stream flow depletion in surface waters that have reservations established, and other surface waters that are "closed" to new appropriations.

      (For each alternative under consideration, if the stream flow depletion is <u>more</u> harmful to affected waters than that caused by the requested supply, provide documentation. Further analysis of that alternative is not required in order to demonstrate that it should not be implemented.)

c. Other environmental considerations, such as the status and importance of affected species; potential impacts to wetlands; disturbance of intact upland habitat, etc.

d. Cost and complexity to develop the source. (Considerations of cost should include both capital cost and long-term operational cost).

e. Cost and complexity of transmission facilities to deliver water to the place of use.

f. Cost and complexity to treat the source to meet required water quality standards. (If water cannot meet desired quality even with treatment, explain why.)

g. Reliability of the supply.

h. Other factors the applicant considers relevant to selecting the appropriate supply.

(The table on the following page can be used to summarize this information, but does not substitute for a more complete, narrative explanation.)

8. As shown in Table 1, the adopted Watershed Management Plans list certain preferred sources of supply. In cases where one of these recommended sources could be used to meet the applicant's needs: if the applicant is applying for a different source instead, provide a detailed explanation of why the applicant prefers that source instead of the one recommended in the Watershed Management Plan. (Note: consider recommended sources from the most recent amendment to the plans, and/or other official designations pursuant to recommendations by the Planning Unit, as applicable).

Comparison of Source Alternatives (insert brief narrative statements to compare alternatives)								
Requested source (name or describe)	**Water Quantity Available**	**Stream Depletion** (water body and quantity)	**Other Environmental Considerations**	**Cost & Complexity (consider capital cost and operational cost)**			**Reliability**	**Other Factors, if Applicable**
				Source	**Treatment**	**Transmission**		
Source Alternative 1								
Source Alternative 2								
Source Alternative 3								
Etc. (list all reasonable alternatives)								

Source Preferences from WRIA 25/26 Watershed Management Plan (As Adopted 2006)

Excerpts from Section 3.3 "Water Supply Policy for WRIAs 25 and 26"

pp. 3-9 to 3-10:

Inherent in this strategy is the concept that, apart from tidal reaches and potential limited uses of the Lower Cowlitz River, no new surface water diversions are recommended by the Planning Unit as a form of water provision. In those cases where additional water supplies are needed, ground water development is recommended. [emphasis added]. However, as discussed in Section 3.1.2, ground water has been shown to likely be in communication with surface water in some parts of the basin. This is especially true for withdrawals from shallow wells in proximity to tributary streams. Therefore, priority should be given to ground water supply alternatives that avoid surface water impacts.

Recommendation:

The Planning Unit views the Columbia River and ground water in hydraulic continuity with the Columbia River as a major water resource to meet water supply needs. As new water supplies are needed, it is preferable they be withdrawn from the Columbia River, adjacent lowland reaches of tributaries subject to tidal effects, and associated ground waters, rather than from flow-limited reaches of streams tributary to the Columbia. This approach can meet regional supply needs, while protecting important aquatic habitat in the region.

Recommendation:

The Planning Unit views the Cowlitz River as a significant regional resource. Due to the abundant supply in the mainstem Cowlitz River, the Planning Unit recommends that it be considered over other water resources tributary to the Columbia River in meeting future water supply needs. Use of the Cowlitz River should be consistent with the reservation quantity established for the river (See Section 4.4.1)

p. 3-13

Recommendation:

In general, the Planning Unit recommends that new urban or suburban developments or industrial facilities that require new or expanded water supplies shall seek to obtain water from existing municipal or other water suppliers rather than developing separate sources of supply. (Note: this would not apply to agricultural uses). If an existing municipal supplier or other water supplier is not available, then the new development or industrial facility should follow the procedure described in Section 3.3.1. Options to provide financial incentives and/or technical assistance to large industries for water conservation and water reuse will be explored, where this can be linked directly to protection of stream flows.

Excerpts from Section 3.4: "Water Supply Strategies for Major Municipal Water Providers"

(pp. 3-14 to 3-17)

3.4.1 City of Longview

The City of Longview supplied water to a population of approximately 39,000 people in 2000. The City anticipates serving approximately 47,000 people in 2020, with an average day demand of 10.23 mgd. The City's system serves primarily residential, commercial and industrial customers, including the Port of Longview and Weyerhaeuser Company.

The City diverts water from the Cowlitz River east of the City and provides treatment at the Longview-Kelso Regional Water Treatment Plant (RWTP), which is co-owned with Cowlitz PUD. This source is in the Lower Cowlitz Subbasin. The intake is located in the tidally influenced area of the Cowlitz River (refer to Section 2.4.3). Recent upgrades to the RWTP bring its capacity to 16 mgd. This plant capacity is considered adequate to meet short-term future demands, but would need to be expanded to meet long-term demands. The City also maintains a series of emergency interties with adjoining agencies, including four interties with the Cowlitz PUD and other interties with the City of Kelso. The interties with the Cowlitz PUD only benefit distribution of water; they do not provide additional supply since both utilities obtain water from the same source. The interties with Kelso provide for limited, emergency service and are not utilized as part of regular supply service to City customers.

The City of Longview, on behalf of itself and Cowlitz PUD, was granted additional annual water rights under their existing permit. Currently water rights amount to 50 cfs (32.2 mgd) instantaneous rights and 14,629 acre-feet per year (13.06 mgd), which increased from 8,904 acre-feet per year. The action came as a result of the planned construction of a gas-fired electric generation facility. Here, the planned industrial owner sought to expedite the state's review of its pending water right application. In order to do so, it agreed to pay the Department of Ecology for the necessary review services to examine its own application(s) and all prior pending applications, including those of the City of Longview (for the RWTP) and the City of Kelso. In this process, the three major water suppliers were granted access to additional water. The resulting rights authorized to the City of Longview (for the RWTP), along with its previous rights, are considered adequate to meet its (and Cowlitz PUD's) 20-year planning period demands.

Based on the Comprehensive Water Plan (1999), future upgrades will be required to bring the facility's capacity up to 28.5 mgd in order to meet year 2020 demands. The City's water rights are adequate to meet the future demands and necessary upgrades to the RWTP. The City through the Comprehensive Plan has identified three major modifications (upgrades) for the RWTP. The schedule for the remaining upgrades depends on the selected regional treatment alternative. These alternatives include:

1. New Kelso Ground Water Source: (i) all future water demand for both Longview and the Cowlitz PUD would be through expansion of the RWTP, which would provide water only to Longview and Cowlitz PUD; (ii) existing Kelso WTP would convert to a surface water treatment plant and would maintain its current capacity; and (iii) new ground water wells would be installed in South Kelso along with associated treatment plant(s) as necessary.
2. Kelso Participates in Longview RWTP: (i) existing Kelso WTP would convert to a surface water treatment plant and would maintain its current capacity; and (ii) All future demand for Longview, Cowlitz PUD, and Kelso would be met through expansion of the RWTP.

Recommendation:

Expansion of the Regional Water Treatment Plant. The Planning Unit endorses the two alternatives presented in the Longview-Kelso Urban Area Comprehensive Water Plan (1999) to meet the area's future water demands. Both alternatives involve expansion of the RWTP to meet the future demands of Longview and the Cowlitz PUD. The future demands of Kelso would also be met by the RWTP under one alternative, while such demands would be met by new ground water wells under the other alternative. The City of Longview currently has the necessary water rights to meet its demand and RWTP expansion. Furthermore, the RWTP intake is low in the Cowlitz River basin and is within the zone of tidal influence. The additional diversions planned by the City are not expected to negatively impact habitat and other instream needs, as long as plans are consistent with the approach described in Section 3.3.1.

3.4.2 City of Kelso

The City of Kelso supplied water to a population of approximately 13,000 people in 2000. Kelso anticipates serving 18,500 people in 2020, with an average day demand of 5.54 mgd.

The existing supply for the City of Kelso is derived from a Ranney well, which is hydraulically connected to the Cowlitz River. This source is in the Lower Cowlitz Subbasin. The City's current treatment facility has a capacity of 3.6 mgd and is being upgraded to meet state requirements for pH and iron control. The resulting modifications will likely result in a minor increase in capacity. The City's system is also connected to the City of Longview via emergency interties.

As described in Section 3.4.1, the City of Kelso is investigating options for expanding its long-term access to water through installation of new ground water wells and potential construction of ground water treatment facility. Kelso has installed a test well near SR 4 and the Cowlitz River. Analysis results indicate that sufficient groundwater of good quality is available at that location (Robinson and Noble 1998).

The decision on whether to develop the ground water wells will be made in conjunction with the City of Longview and Cowlitz PUD. However, in either alternative, the existing

Kelso WTP would convert to a surface water treatment plant that will comply with new federal requirements. The plant capacity would stay the same.

Recommendations:

Development of Ground Water Wells. The Planning Unit endorses the alternatives presented in the Longview-Kelso Urban Area Comprehensive Water Plan (1999) to meet the area's future water demands. Both alternatives involve expansion of the RWTP to meet the future demands of Longview and the Cowlitz PUD. The future demands of Kelso would also be met by the RWTP under one alternative, while such demands would be met by new ground water wells under the other alternative. Should new wells be developed, they may be hydraulically connected to the Cowlitz River like the existing Ranney well. However, they would be located low in the Cowlitz River basin and within the zone of tidal influence. The additional ground water wells planned by the City are not expected to negatively impact habitat and other instream needs, as long as plans are consistent with the policies developed in this watershed plan.

Expansion of Regional Water Treatment Plant. The Planning Unit also supports the City of Kelso's second alternative to participate in the expansion of the RWTP. See Section 3.4.1.

3.4.3 Cowlitz PUD

Cowlitz PUD supplied water to a population of approximately 9,000 people in the Longview-Kelso area in 2000. The PUD anticipates serving approximately 15,000 people in 2020, with an average day demand of 1.52 mgd. The service area of the PUD includes some customers within the City of Longview. The PUD primarily provides water to both residential and commercial customers – the largest of which is a portion of a local golf course where the primary end use is for irrigation. No industrial facilities are supplied by the Cowlitz PUD.

As discussed above, the PUD has joint ownership in the RWTP, which takes its water from the Cowlitz River. This source is in the Lower Cowlitz Subbasin. The PUD also maintains a series of interties with the City of Longview that benefit the distribution of water but do not provide additional supply since both utilities obtain water from the same source. The PUD also maintains its own standby well for backup and redundancy at Woodbrook in the Ostrander area for use in case of a failure of the underground river crossing to Ostrander. Use of the well is very infrequent.

The same recommendations for the Cowlitz PUD are applied as those for the City of Longview, since the two entities share the same source of supply and coordinate planning.

Excerpts from Section 3.5: "Water Supply Strategies for Other Types of Water Users"

Note: the plan provides discussion of smaller water systems, including several specific systems, on pp. 3-17 to 3-20. However the Planning Unit did not provide specific

recommendations on new sources of supply for these communities, other than to follow the general procedure outlined for all systems in Section 3.3.

p. 3-21 Domestic Wells

Recommendations:

County and city policies provide an adequate means to help off-set impacts caused by exempt wells.

In areas where exempt well use densities may adversely affect local flows, suburban and rural developments should utilize municipal or existing water sources over individual well sources, to the extent permissible by State law. If this is not possible, sources should be developed from deep aquifers.

Land use densities in flow sensitive areas, such as small tributaries, should not be increased.

p. 3-23 Self-Supplied Industrial Water Users

Recommendations:

Conservation and reuse. The Planning Unit places an emphasis upon water conservation and reuse with respect to industries with large water demands. Ecology should develop technical assistance and funding opportunities focused specifically upon the needs of self-supplied industries, to aid in reducing current water demands.

Future water demands. Where feasible, industries requiring additional sources of supply in the future should connect to existing municipal water supplies. Where not feasible due to technical issues or cost, then it is recommended that the industry evaluate alternative sources as described in Section 3.3.1.

Consider the feasibility of non-potable supply. The Planning Unit recommends that large self-supplied industrial water users evaluate development of Columbia River non-potable supplies. The Planning Unit commits to aiding industries in identifying and obtaining funding sources for implementation of such a project, most likely through programs administered by Ecology and DOH (see recommendation in Section 7.3).

p. 3-24 Agricultural Water Users

Recommendations:

New surface water supplies. In those cases where surface water supplies are requested for agricultural purposes, it is recommended that a review of alternative sources of supply be conducted (see Section 3.3.1) to address potential impacts on stream flow.

New ground water supplies. The Planning Unit recommends that Ecology grant water right requests pertaining to future agricultural ground water demand, subject to consistency with the Planning Unit's water supply policy and successful completion of Ecology's water right application review process.

Source Preferences from Chapter 3 of WRIA 27/28 Watershed Management Plan (As Adopted 2006)

Excerpts from Section 3.3 "Water Supply Policy for WRIAs 27 and 28"

p. 3-11

Inherent in this strategy is the concept that ground water is preferred over surface water as a source of new water supplies [emphasis added]**.** The Planning Unit recommends new or expanded surface water diversions be discouraged, except in limited cases where there is no feasible or cost-effective alternative. In those cases where additional water supplies are needed, ground water development is recommended. However, as discussed in Section 3.1.2, ground water has been shown to be in communication with surface water in some parts of the basin. This is especially true for withdrawals from shallow wells in proximity to tributary streams. Therefore, priority should be given to ground water supply alternatives for which surface water impacts are avoided.

p. 3-14 **Regional Water Supply Options**

WRIAs 27 and 28 residents are blessed by an opportunity that simply is not available in most regions of the Northwest—the presence of a significant source of water in the Pleistocene Alluvial Aquifer in the Vancouver Lake lowlands. While there are outstanding issues associated with the source development, these issues seem relatively minor compared to the benefit of having a water source of this magnitude located precisely in one of the fastest growing areas of the state. In real terms, this source can be substituted for new and current water supplies that impact stream flows in the East Fork Lewis and Salmon Creek. It could also service emerging needs as far east as the Washougal basin.

Clark Public Utilities (CPU) and the City of Vancouver (Vancouver) are both researching the feasibility of new ground water sources in the Pleistocene Alluvial aquifer in the Vancouver Lake area. Based upon preliminary evaluations, these supplies appear to be sufficient to meet both suppliers' long-term needs, as well as other needs in adjacent areas of WRIAs 27 and 28, without impacting stream flows.

p. 3-15

CPU has a well-established transmission and distribution network throughout a significant portion of Clark County, including interties with some communities (e.g., Battle Ground, Ridgefield, and Vancouver). CPU is well poised to provide water to many users. CPU does not have a significant presence, however, in southeast Clark County near the Cities of Camas and Washougal. To provide service to this area would require the construction of five to ten miles of transmission mains and new pumping facilities. A more logical choice for a regional supply for that portion of WRIA 28 may be a wellfield located in that area. The Cities of Camas and Washougal are initiating efforts to develop wellfield supplies from the Pleistocene Alluvial Aquifer near the Steigerwald Wildlife Refuge. Test wells are planned for some time in 2005/2006. This area may be capable of meeting the long-term needs of both Camas and Washougal without reliance on a Vancouver Lake lowland source.

Both of these regional supply options are highly recommended for evaluation by some communities, as specifically discussed in Section 3.4. Ultimately, both source areas (Vancouver Lake and Camas/Washougal) could be intertied to provide redundancy and greater flexibility to meet emerging growth needs.

Recommendation:

The Planning Unit views the Columbia River and ground water in hydraulic continuity with the Columbia River as a major water resource to meet water supply needs. As new water supplies are needed, it is preferable they be withdrawn from the Columbia River, adjacent lowland reaches of tributaries subject to tidal effects, and/or associated ground waters, rather than from flow-limited reaches of streams tributary to the Columbia. This approach can meet regional supply needs, while protecting important aquatic habitat in the region.

The tidal reach of the mainstem Lewis River (i.e., the North Fork Lewis River below Woodland) is an example of a source described by the above recommendation.

p. 3-16 New Developments and Industrial Suppliers

Recommendation:

In general, the Planning Unit recommends that new urban or suburban developments or industrial facilities that require new or expanded water supplies shall seek to obtain water from existing municipal or other water suppliers rather than developing separate sources of supply. (Note: this would not apply to agricultural uses). If an existing municipal supplier or other water supplier is not available, then the new development or industrial facility should explore water supply sources that are not in hydraulic continuity with surface water or explore the feasibility of developing tidal and/or Columbia River sources. If none of these options are available, Ecology may consider issuing water rights that entirely off-set the net impact to stream flow.

There are currently no large municipal water systems in Skamania County. Therefore the recommendation above has little applicability in Skamania County at this time. This could change in the future, if growth leads to creation of larger public water systems in Skamania County.

Options to provide financial incentives and/or technical assistance to large industries for water conservation and water reuse will be explored, where this can be linked directly to protection of stream flows.

Excerpts from Section 3.4: "Water Supply Strategies for Major Municipal Water Providers"

(pp. 3-17 to 3-24)

3.4.1 City of Vancouver

The City of Vancouver supplied water to a population of approximately 194,000 people in 2000, or roughly 60 percent of the total Clark County population. The City anticipates serving approximately 261,000 people in 2020, with an average day demand of 33.50 mgd.

The City's sources of supply are comprised of 41 wells located at 11 water stations throughout the City. These water stations are located in the Burnt Bridge Creek subbasin. Some water stations are in the drainage area of Burnt Bridge Creek itself, while others are located in other portions of the subbasin that drain to the Columbia River. Based on the City's understanding of local aquifer relationships, most of these water stations draw from aquifers that are not in direct hydraulic continuity with Burnt Bridge Creek.

The City may, from time to time, submit applications for new water rights, transfers, or changes to existing rights for the City's water stations. As described above, such rights apply primarily to sources located outside of the Burnt Bridge Creek drainage in areas not subject to restrictions of water rights issuance according to the policies and recommendations set forth in Section 4.

The City has identified as its primary supply option for meeting future needs the development of a wellfield to the west of Vancouver Lake, in the Columbia River Alluvium. Based upon studies that have shown this aquifer to be quite productive, it is envisioned that this source would be used to supply all demands associated with growth beyond approximately 2010, the time when reliable supplies are anticipated to be fully utilized. This new supply would also provide an additional level of redundancy to the existing system, allowing the use of other sources to be reduced if warranted in the future. Future restrictions to water rights issuance (i.e., closures) are not intended to apply to the Vancouver Lake lowlands area (See Section 4.4.1).

Recommendation:

Development of Vancouver Lake Wellfield. The Planning Unit endorses the City's plan to develop a new wellfield near Vancouver Lake.

Permitting agencies should make every effort to facilitate the development of the Pleistocene Alluvial Aquifer and encourage its use over other sources.

3.4.2 Clark Public Utilities

Clark Public Utilities (CPU) supplied water to a population of approximately 77,000 people in 2000, or roughly 20 percent of the total Clark County population. CPU anticipates serving 113,355 people in 2020, with an average day demand of 14.19 mgd.

CPU's sources of supply consist of 33 ground water wells located throughout CPU's service area. CPU's average daily demand will likely exceed the utility's primary annual water rights by year 2006. Forecast maximum day demands are expected to exceed CPU's total instantaneous water rights by 2020. CPU's water supply strategy for the future involves the development of additional wells in the Pioneer area, adjacent to high-growth areas, and development of a regional wellfield immediately southeast of Vancouver Lake. Based upon studies that have shown this aquifer to be quite productive, the Vancouver Lake wellfield is envisioned to support the majority of CPU's future growth. After the Vancouver Lake lowland wellfield is operational, supply wells in the upland areas will continue to be used to meet peak demands and for emergency backup purposes, as long as mitigation requirements continue to be met.

In addition to focusing upon these new supplies, CPU has also directed substantial resources at the management of existing supplies. Acknowledging the need to manage the water resources of the Salmon Creek Basin, in which many of CPU's sources are located, the utility has entered into a joint agreement with Ecology and Clark County. As a part of this agreement, a Water Resource Plan was developed, outlining a management strategy for this area. CPU is committed to maintaining an effective management strategy for the Salmon Creek Basin.

Recommendations:

Pioneer Area Wells. The Planning Unit endorses the development of additional wells in the Pioneer area to serve as a public water supply. The supply is subject to off-setting and habitat mitigating measures outlined in Section 3.3.1.

Vancouver Lake Wellfield. The Planning Unit endorses the development of the Vancouver Lake wellfield. CPU should consider sale of water from this supply source to other purveyors throughout Clark County, for use in meeting future demands.

Permitting agencies should make every effort to facilitate the development of the Pleistocene Alluvial Aquifer and encourage its use over other sources.

Salmon Creek. The Planning Unit endorses CPU's current efforts regarding management of the Salmon Creek Basin.

3.4.3 City of Camas

The City of Camas supplied water to a population of approximately 12,500 people in Clark County in 2000. The City anticipates serving 30,859 people in 2020, with an average day demand of 8.51 mgd.

The City's sources of supply are comprised of nine ground water wells and two surface water sources. The two surface water sources are Jones and Boulder Creeks, which have

been providing the City with water since the early 1900's. The City relies primarily upon its ground water supplies, with surface water accounting for about one-third of total production. Three emergency interties with the City of Washougal provide additional supply reliability for the City.

The City's average daily demand will likely exceed the City's primary annual water rights by year 2006. This situation may occur sooner, if industrial growth happens at a quicker pace than anticipated. Recognizing its need for additional water supply in the future, the City has identified various supply options, including maximizing the capacities of existing sources and water rights, development of new wells, joint supply development with the City of Washougal, and development of a non-potable Columbia River supply for industrial and irrigation uses.

Recommendations:

Perform a review of alternative sources of supply to replace surface water sources. Due to the impacts upon stream flows in Boulder and Jones Creeks of the City's surface water diversions, Camas should undertake a review of alternative sources of supply, similar to that discussed in Section 3.3.1. The City's existing plans for new ground water development near the Washougal River should be considered in this process, if the new wells are anticipated to not have negative impacts upon the river. If new water rights are secured by the City, the Jones and Boulder Creek sources should be retired, or used during periods of high flow only, as a condition of the new water right. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Further evaluate feasibility of non-potable supply. The Planning Unit recommends that the City re-evaluate development of a non-potable Columbia River supply, considering the substantial amount of water used for industrial purposes in the City. The Planning Unit commits to aiding the City in identifying and obtaining funding sources for implementation of such a project, most likely through programs administered by Ecology and DOH (see Recommendation in Section 8.3). This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Consider regional supply options with other public water systems. The Planning Unit recommends that the City evaluate regional supply options such as those discussed in Section 3.3.3. These include the development of a wellfield supply near the Steigerwald Wildlife Refuge or, if other opportunities prove infeasible, the potential purchase of water from Vancouver. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Assist Georgia Pacific in conservation efforts. The Planning Unit recommends that the City provide technical assistance and financial support to Georgia Pacific in developing water conservation measures that would reduce dependency on surface water from Lacamas Creek and ground water from the lower Washougal River vicinity. Any ground water savings realized through conservation could be available to help meet the City's growth needs. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

3.4.4 City of Battle Ground

The City of Battle Ground supplied water to a population of approximately 9,000 people in Clark County in 2000. The City anticipates serving 29,000 people in 2020, with an average day demand of 3.48 mgd.

The City's sources of supply consist of 8 ground water wells. In addition to these well supplies, the City has three interties with Clark Public Utilities (CPU). These interties are used only in the following situations: 1) for assistance in meeting some peak demands, 2) while the City's wells are out of operation for maintenance, and 3) for emergency purposes.

The City's existing sources of supply and water rights are not adequate to accommodate the significant growth anticipated for its service area. The City has identified the development of additional wells as its primary strategy to meet future needs.

The City has implemented various conservation activities including an increasing block water rate structure and an advertisement campaign.

As part of the watershed planning effort, relationships between surface water and ground water in the East Fork Lewis River subbasin were reviewed (PGG 2003a). This review indicates that Battle Ground's wells in the Upper Troutdale and Sand and Gravel Aquifers likely capture baseflow from both the East Fork and Salmon Creek. Wastewater from the City is conveyed to a treatment plant near the mouth of Salmon Creek. Due to the importance of protecting stream flows in these subbasins, the Planning Unit offers the following recommendations for Battle Ground's water supplies.

Recommendations:

Enhance conservation. Battle Ground should enhance its current conservation efforts, with the goal of reducing the production required of existing wells. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Perform a review of alternative sources of supply. Due to the potential for withdrawal from the City's existing wells to impact stream flows in the East Fork Lewis River and Salmon Creek, Battle Ground should undertake a review of alternative sources of supply, similar to that discussed in Section 3.3.1. The City's plans for a new well should also be subject to Section 3.3.1. Use of reclaimed water may also be of value. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Purchase water from Clark Public Utilities. It is likely that new water supplies available to Battle Ground will have hydraulic continuity with the East Fork Lewis and Salmon Creek. Due to the regional significance of the East Fork Lewis to salmon recovery and foreseeable population growth, purchase of water from a CPU regional water source is critical. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

3.4.5 City of Washougal

The City of Washougal supplied water to a population of approximately 9,000 people in Clark County in 2000. The City anticipates serving 17,222 people in 2020, with an average day demand of 2.80 mgd.

The City receives its water supply from 5 wells that withdraw water from the shallow alluvial aquifer upon which the City is located.

Based on current demand projections, the City requires additional sources of supply to meet future needs. The City's current future supply strategy consists of maximizing the use of its existing wells and water rights, as well as installing a new large capacity well in the center of town.

Recommendations:

Development of new well. The City of Washougal should follow procedures outlined in Section 3.3.1 as it relates to the installation of a new well near the center of town.

Consider regional supply options with other public water systems. The Planning Unit recommends that the City consider use of regional sources. These include the development of a wellfield supply near the Steigerwald Wildlife Refuge or, if other opportunities prove infeasible, the potential purchase of water from Vancouver. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

3.4.6 City of Woodland

The City of Woodland supplied water to a population of approximately 4,000 people in Cowlitz and Clark Counties in 2000. The City anticipates serving 6,933 people in 2020, with an average day demand of 1.28 mgd.

The City's single source of supply is a Ranney Well collector that withdraws water adjacent to the Lewis River. Similar to the City of Kalama, the Ranney Well collector is shallow and considered to be in direct connection to surface water. However, the Ranney Well is at a low point in the Lewis River watershed and is directly under the influence of tidewater. Therefore, the impacts upon stream flow by City diversions are overshadowed by the larger effects of tidal influence.

Since 1999, the City has operated a filtration/disinfection water treatment plant that addresses Surface Water Treatment Rule (SWTR) requirements as well as reducing aesthetic problems associated with dissolved iron concentrations in the raw water supply.

The City's preferred plan to meet the water demands associated with future development is to expand its use of the Lewis River Ranney Well.

Recommendation:

Increase Ranney Well withdrawals. The City of Woodland's Ranney Well is located within the tidal influence of the North Fork Lewis. The Planning Unit is not recommending protective measures in this reach. The Planning Unit supports expansion of the Ranney Well water supply.

3.4.7 City of Kalama

The City of Kalama supplied water to a population of approximately 3,000 people in 2000. These include residents of the City as well as some unincorporated lands in Cowlitz County adjacent to the City. The City anticipates serving 6,847 people in 2020, with an average day demand of 1.47 mgd.

The City's single source of supply is a Ranney Well collector that withdraws water adjacent to the Kalama River. Similar to the City of Woodland, the Ranney Well collector is shallow and considered to be in direct connection to surface water. However, the Ranney Well is near the downstream end of the Kalama River watershed and impacts upon stream flow by City diversions are relatively small in comparison with flows at this location. The diversion location is slightly upstream of the zone of tidal influence on the river.

A diatomaceous earth water filtration plant provides required water quality treatment. Based on current demand projections, additional supplies may be necessary by 2016. To meet this need, the City is planning to expand its treatment plant capacity by an additional 900 gpm. The City has applied for additional water rights of 1.72 cfs on an instantaneous basis. Average flow on the Kalama River is 314 cfs in August.

Recommendation:

Increase Ranney Well withdrawals. The Planning Unit endorses the City's plans to increase water rights for withdrawal from its Ranney Well of up to an additional 1.92 cfs subject to provisions outlined in Section 3.3.1. The Planning Unit recognizes that the purchase of off-setting water rights is not feasible in the Kalama River, and the 1.92 cfs of additional water rights is not subject to this provision; however, habitat mitigation requirements should be implemented commensurate with flow reduction impacts consistent with Section 3.3.1.

3.4.8 City of Ridgefield

The City of Ridgefield supplied water to a population of approximately 2,000 people in Clark County in 2000. The City anticipates serving 15,000 people in 2020, with an average day demand of 3.70 mgd.

The City's water supply consists of 3 active wells and 2 standby wells located in Abrams Park, near Gee Creek. The City has also recently developed an intertie with Clark Public Utilities on the east side of the City's system. In the near term, this intertie is intended

only to support fire flow needs. However, wholesale purchases from CPU via the intertie are a supply option for the future.

The City will require additional sources of supply to meet future needs. The City's current future supply strategy consists of maximizing the use of its existing wells, as well as installing multiple new wells over the course of the next 12 years.

The City supports the work of the Gee Creek Restoration Committee, efforts of which are guided by the Washington State University (WSU) Cooperative Extension Watershed Stewards Program for the purposes of reducing negative impacts to Gee Creek (e.g., high flows and water quality concerns) due to stormwater runoff.

Recommendations:

Enhance conservation. Ridgefield should enhance its current conservation efforts, with the goal of reducing the production required of existing wells. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Continued involvement with Gee Creek restoration. The Planning Unit recommends that the City coordinate with the Watershed Stewards Program to identify any actions it may take to aid in the Gee Creek restoration effort. If low flows are identified as an issue needing to be addressed, the City should undertake a review of alternative sources of supply, similar to that discussed in Section 3.3.1. The City's existing plans for new wells should be considered in this exercise, if the new wells are anticipated to have less of an effect upon stream flows than current sources. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Consider wholesale water purchases from CPU. The Planning Unit recommends that the City consider purchasing water from CPU to aid in meeting future demands, utilizing the recently installed fire flow intertie.

Excerpts from Section 3.5: "Water Supply Strategies for Other Types of Water Users"

pp. 3-24 to 3-27 Small Public Water Systems

Note: *the plan provides discussion of smaller water systems, including several specific systems. However the Planning Unit did not provide specific recommendations on new sources of supply for these communities, other than the general recommendation below.*

Recommendation:

In those cases where new supplies are required for small Group A systems, it is recommended that a review of alternative sources of supply be conducted (see Section 3.3.1), **with an emphasis placed upon evaluating the purchase of water from an existing major water purveyor** [emphasis added] (see Section 3.3.3). If new sources are required and a reserved block of water is not available, then the net impact to surface flows should be off-set by acquiring existing upstream water rights.

p. 3-27 Domestic Wells

Note*: The plan includes discussion of domestic wells on pp. 3-27 to 3-28. However the Alternatives Analysis procedure does not apply to individual domestic wells.*

p. 3-31 Self-supplied Industrial Water Users

Recommendations:

Conservation and reuse. The Planning Unit places an emphasis upon water conservation and reuse with respect to industries with large water demands. Ecology and DOH should develop technical assistance and funding opportunities focused specifically upon the needs of self-supplied industries, to aid in reducing current water demands.

Future water demands. Where feasible, industries requiring additional sources of supply in the future should connect to existing municipal water supplies. Where not feasible due to technical issues, logistics, or cost, then it is recommended that the industry evaluate alternative sources as described in Section 3.3.1.

Consider the feasibility of non-potable supply. The Planning Unit recommends that large, self-supplied industrial water users evaluate development of Columbia River non-potable supplies, similar to that considered by the City of Camas. The Planning Unit commits to aiding industries in identifying and obtaining funding sources for implementation of such a project, most likely through programs administered by Ecology and DOH (see Recommendation in Section 8.3).

p. 3-33 Agricultural Water Users

Recommendations:

New surface water supplies. The Planning Unit does not endorse the use of surface water for meeting additional future agricultural water demand.

Conversion of water rights. The Planning Unit encourages agricultural water right holders to request changes of existing surface water rights to ground water rights not in hydraulic continuity with surface waters. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

New ground water supplies. The Planning Unit recommends that Ecology process water right requests pertaining to future agricultural ground water demand, subject to consistency with the Planning Unit's water supply policy (Section 3.3.1) and successful completion of Ecology's water right application review process.

Attachment D
Evaluation of Flow-Related Mitigation

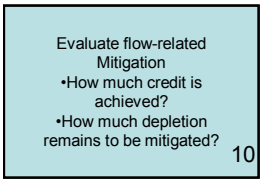


Figure 1: Box 10 from main flowchart

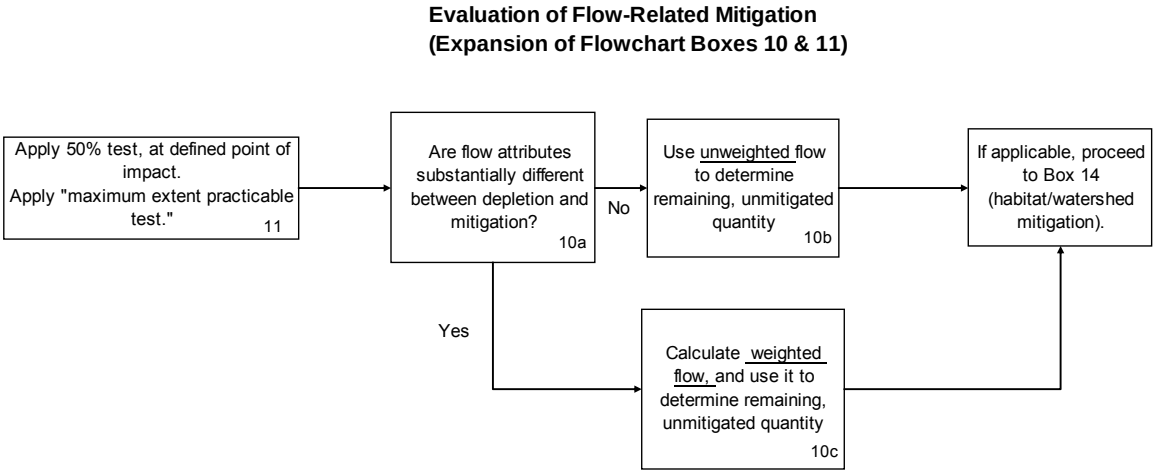


Figure 2: Expanded flowchart for Flow Related Mitigation

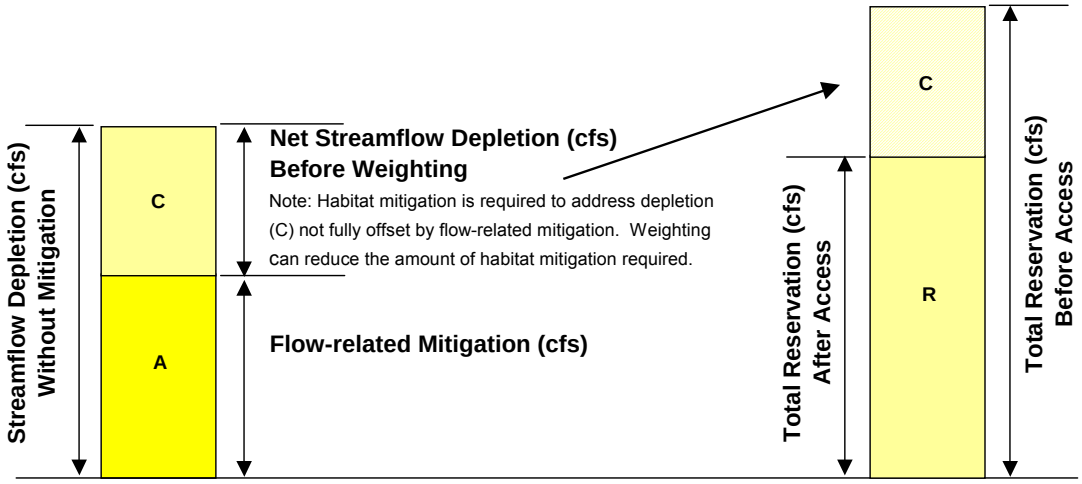
Goal:

- Create a transparent and structured process to evaluate flow-related mitigation proposals
- Enable processing of highly diverse mitigation proposals

Context:

- Applicant must mitigate at least 50% of their flow depletion with flow-related actions (unless this is infeasible or cost-prohibitive)
- Flow-related mitigation must be used "to the maximum extent practicable"
- After mitigation from flow-related actions is credited, applicants must mitigate remaining impacts through habitat/watershed actions (see Figure 3) unless this is infeasible or cost-prohibitive.

Figure 3: Relationship of Flow Depletion to Mitigation Actions



(Note: see separate discussion regarding computation of Habitat/Watershed Mitigation Credit)

Assumptions:

- Flow depletion estimates on a stream are quantified based on standard methods currently accepted by Ecology (cost to applicant is a separate discussion)
- For surface water applications, there will be a well-defined "point of diversion" on a surface water body. For ground water applications, a discrete "point of impact" on an affected water body will need to be defined, to enable the steps discussed below. In cases involving more than one pumping or withdrawal location, or variable stream flow capture along a gradient, multiple points of diversion or impact will be established

- Mitigation ordinarily must occur within the same LCFRB-defined subbasin (or for the larger river systems, a subbasin that is hydrologically part of the same larger basin). Limited exceptions may be permissible, where greater benefits can be demonstrated through mitigation in another subbasin.

Approach:

- The plans require that at least 50% of flow depletion be offset with flow-related mitigation. The 50% requirement for flow-related mitigation must be accomplished at the defined point(s) of impact or diversion. For this test, the quantity of flow will be the only metric. However, seasonality will be considered.

- The required flow-related mitigation may be provided in a location other than at the defined point of diversion or impact provided the applicant demonstrates that overall greater resource benefits would result. In these limited exceptions, a quantitative analysis similar to that described in Appendix E must demonstrate overall greater resource benefits as measured by distance (e.g., miles) of watercourse affected, quantity of flow (cfs) benefit and impact relative to baseline habitat conditions, water quality and salmon recovery reach tiering, in both the impacted and benefiting reaches.

- If an applicant cannot meet the 50% requirement, they are permitted to provide evidence to demonstrate achieving 50% using flow-related mitigation is not feasible or is cost-prohibitive. In this case they must provide habitat/watershed mitigation instead.

- The plans also require that applicants mitigate using flow-related actions "to the maximum extent practicable." This means that 50% is not the "ceiling" for flow-related mitigation. In cases where the depletion is not fully offset by flow-related mitigation actions, the applicant must provide a written description of efforts performed to identify feasible actions for flow restoration, and any challenges or obstacles that prevent further use of flow-related mitigation for the application in question. Consistent with the policy in the watershed plans, this explanation may include both economic and logistic considerations.

- If an applicant's flow-related mitigation satisfies the 50% requirement but does not fully offset the impact of withdrawing water, they will be required to mitigate further, using habitat/watershed actions." In order to determine how much mitigation remains to be accomplished, further assessment of the flow-related mitigation action is required, as described in the following steps.

    - A determination will be made whether the flow-related mitigation proposed has similar attributes to the water depleted; or significant differences. If the depletion and mitigation have similar attributes, then the weighting process does not need to be applied.

    - If the depletion and mitigation have substantially different characteristics that affect habitat or other important stream functions, then a weighting process will be applied. The weighting procedure will not affect how much is debited from the reservation. However, it can reduce the amount of habitat/watershed mitigation required. Therefore, if depletion and mitigation have different characteristics, the next step will be to select which attributes are substantially different and should therefore be used in weighting the mitigation proposal. The following attributes will be used to make this determination:

        - Mainstem/tributary relationship (if mitigation will be applied to a different part of the stream network than depletion)
        - Length of stream reaches affected, measured in river miles (to the nearest tenth of a mile)
        - LCFRB reach tiers (these represent fish presence and priority, as well as habitat importance)
        - Seasonality
        - Water quality

      A spreadsheet tool has been developed to address the first three of these elements. See Attachment F for further information.

    - Once the attributes to be used have been selected from this menu, the approach to weighting is:

- The attributes selected are first weighted in terms of their relative importance. This is done in the "depletion" column. The sum of depletion weights for all attributes selected must equal 100, but the individual weights may be different from each other.
- Next, attention is given to the "mitigation" column. For each attribute, mitigation is scored relative to the depletion effect The mitigation action may receive either a higher weight or a lower weight than the depletion effect. (A mitigation weight higher than the depletion weight means the mitigation action more than offsets the depletion for that attribute; and vice versa). For an example, see Attachment F.
- The "relative value" of the mitigation overall is equal to mitigation weight divided by depletion weight. Credit received for mitigation is the quantity of flow produced by the mitigation action measured in cfs, multiplied by the total relative value of the mitigation action.

o Example : Weighting Factors
(only used if depletion effect has substantially different attributes from mitigation action):

In this example, only three attributes (out of five possible) are identified as being "substantially different" between the depletion and the mitigation

Weighting Factor	**Depletion Weight** (normalized to 100 total)	**Mitigation Weight** (assessed relative to Depletion Weight)
Mainstem/trib relationship	20	40
Length of stream affected	n/a	n/a
LCFRB Tiers	60	80
Seasonality	n/a	n/a
Water Quality	20	10
Total Weight	**100**	**130**
Relative Value of Mitigation:	**130/100 = 1.3**	

Assume depletion quantity = 4.0 cfs and flow-related mitigation quantity = 2.0 cfs. The net depletion is 2.0 cfs and therefore the reservation will be debited by that amount. This is represented by "C" in Figure 3.

However in this example each unit of mitigation is valued higher than each unit of depletion, by a factor of 1.3

So Mitigation Credit is: 1.3 X 2.0 cfs = 2.6 cfs The additional 0.6 cfs of mitigation credit from weighting reduces the amount of habitat mitigation that is required to address the net streamflow depletion, but does not reduce the total amount (2 cfs) deducted from the reservation.

Therefore the remaining portion not mitigated by flow-related actions is: (4.0 cfs) – (2.6 cfs) = 1.4 cfs. This quantity represents the net habitat mitigation obligation.

- Credit awarded for cases where the depletion and mitigation are on the same exact stream may be different than when the depletion and mitigation are on a mainstem and tributary; or on different tributaries within a sub-basin (see Figure 4). This can be handled through the weighting system discussed above. The "tributary/mainstem" attribute is intended to allow weighting based on this consideration.

- Downstream mitigation. The 50% requirement discussed above must be achieved at the point of impact of the withdrawal. However, it is recognized that some mitigation proposals may include multiple mitigation actions, and some of these may also include downstream, flow-related actions. As long as the 50% requirement is met at the point of impact, additional mitigation actions located downstream of the point of impact will also be considered, and weighted as discussed above.

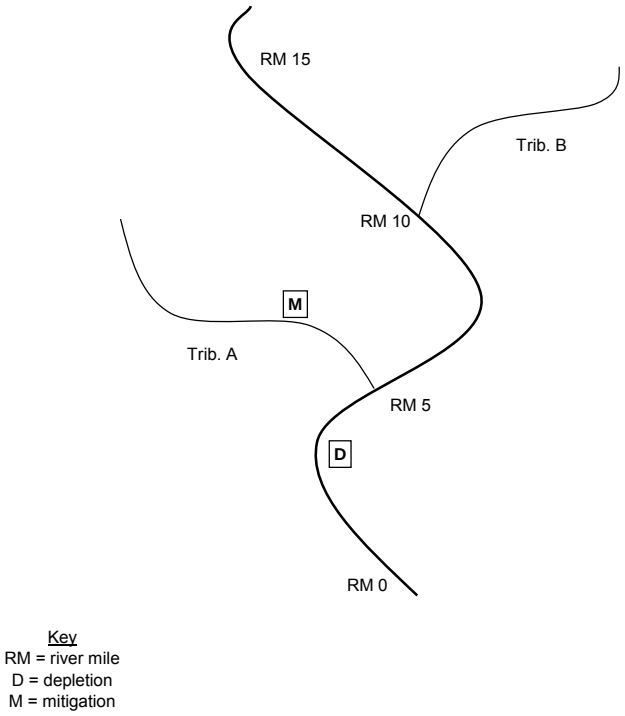


Figure 4: Hypothetical Stream (mainstem & tributaries)

Attachment E
Evaluation of Habitat /Watershed Mitigation

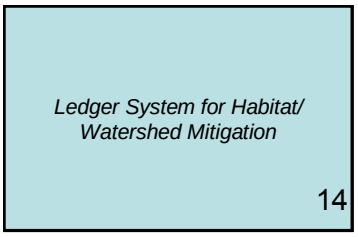


Figure 1: Box 14 from Main Flowchart

Executive Summary:

Habitat / Watershed mitigation is required in order to access an instream flow reservation when full mitigation has not been achieved via flow-related means. The goal of this requirement is to "…mitigate the effects of the stream flow depletion not being directly offset" or "address impacts that cannot be practicably off-set (no more than half) through water-for-water actions" (WRIA 25/26 Watershed Management Plan) The WRIA 25/26 and 27/28 planning units also called for habitat mitigation to address stream and river habitat more broadly, even when not directly mitigating for lost instream flow, using the following criteria.

- "habitat actions should focus upon projects that improve stream conditions impaired by flow (e.g., projects that improve width to depth relationships or improve landscape-level hydrologic processes, etc.)"
- "habitat actions should address threats and limiting factors through priority actions identified in the Lower Columbia Salmon Recovery Plan"

This section defines a transparent and structured process to evaluate watershed / habitat mitigation proposals for comparison with remaining unmitigated stream flow depletion. A point system has been developed that equates highly diverse habitat mitigation actions to a unit of stream flow depletion. In order to access the reservation, habitat "mitigation points" must equal or exceed the amount of "depletion points". This criterion is subject to cost ceilings, as defined in section 6.0.

Depletion points are based on the magnitude of flow depletion and the river miles that will be depleted. Further weighting of depletion points is based on stream reach biological importance and sensitivity to flow depletion. Basic rules are defined in order to receive points for habitat mitigation actions.

Specific types of mitigation actions and corresponding tables of points per unit of mitigation are defined. Some mitigation point tables are based on Instream Flow Incremental Methodology (IFIM) or other estimates of aquatic habitat lost per incremental loss of instream flow. When

mitigation actions did not have a clear relationship with a defined area of aquatic habitat, ranges of points were defined, allowing for best professional judgment.

Habitat mitigation proposals that are not defined in this guidance document can be proposed for evaluation on any given application for reserved water. The amount of points awarded for these actions will be determined on a case-by-case basis.

Context:

- The applicant has met at least 50% of their mitigation with flow-related actions (or to the maximum extent practicable).
- The applicant must satisfy the remaining flow depletion via habitat / watershed mitigation as a threshold requirement in order to access the instream flow reservation.

Goal:

- Create a transparent and structured process to evaluate watershed / habitat mitigation proposals for comparison with remaining depletion.
- Enable processing of highly diverse mitigation proposals

Assumptions:

- A ledger approach with dimensionless points can be used as an accounting system to "credit" mitigation points against depletion "debit" points.
- Streamflow depletion that remains un-mitigated after "flow-related" mitigation can be equated to "depletion points".
- The sum total of "mitigation points" must equal or exceed the "depletion points" in order to access the instream flow reservation.
- A variety of habitat / watershed related mitigation actions can be completed to accrue mitigation points.

I. Ledger System: Scoring Flow Depletion (impacts):

- Convert remaining flow depletion to dimensionless points using the following three factors:
    - Remaining unmitigated flow depletion- a unit of flow depletion is 0.1 cfs per river mile. River miles used in the impact calculation are only those that are 1) projected to be depleted by the water rights application, and 2) closed to conventional water rights applications.
    - If instream flow is considered limiting to fish production at the reach-scale relative to other habitat factors, then additional stream depletion must be accompanied by twice the habitat mitigation. The doubling the mitigation requirements is intended as a disincentive in order to avoid flow depletion impacts in waterbodies that are already limited by flow. Instream flow as a limiting factor is defined in terms of a "high" ranking in the LCFRB Habitat Work Schedule (HWS) Multi-Species Project Benefits matrix (Appendix A).
    - Reach Importance to fish recovery, according to the Habitat Work Schedule "Reach Tier". The interpretation of the reach tiers follows directly from the 2007 LCFRB Habitat Work Schedule Evaluation Criteria (Appendix A). The relative

proportion of depletion points follows from the LCFRB (2007) project evaluation and scoring process (The Habitat Work Schedule Evaluation Criteria are used to prioritize restoration proposals for funding.)

Table 1: Conversion of remaining flow depletion to depletion points

	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
	Depletion Points per 0.1 cfs-mile		
For depletion of surface waters where Instream flows is not an ecological limiting factor (i.e. medium or low project benefit on the Habitat Work Schedule).	5	3	1
For depletion of surface waters where Instream flow is an ecological limiting factor (i.e. high project benefit on the habitat work schedule)	10	6	2

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream (left column) that is flow limited (bottom row). Therefore, every river mile that is depleted by 0.1 cfs will accrue 10 depletion points. Since 3 river miles were affected (x3) and 0.2 cfs were depleted (x2), 60 mitigation points will be required to access the water reservation. This impact scenario will be used in mitigation examples that follow in this document.

II. Ledger System: Scoring Mitigation Actions for Comparison Against Depletion:

A. Background Information on Scoring Habitat/Watershed Mitigation Actions

- Basic rules for habitat / watershed mitigation proposals.
  - The mitigation actions must be for actions that are not already mandated to occur (e.g. culverts, critical areas protection, etc.)
  - Mitigation should normally occur in the same sub-basin as the flow depletion. However, in limited cases mitigation may be completed in another sub-basin if the applicant can demonstrate a substantially greater resource benefit will result.
  - Mitigation actions should be done in reaches where the related Habitat Work Schedule factor (Appendix A) is limiting (i.e. Multi-species Project Benefit = High or Medium)
  - Mitigation projects and actions should be developed and implemented using best available science and have a high long-term likelihood of success. Specific performance goals and measures (e.g. success rates, duration, desired future conditions, etc.) will be associated with each mitigation action and mutually agreed upon by the applicant and Ecology.
  - Mitigation projects may have a maintenance component, but must have a preservation component (e.g. transfer of development rights; public ownership, conservation covenant).

- In cases where multiple parties contribute to a project, the water right applicant only receives credit proportional to their contribution.

- Approaches to scale habitat / watershed mitigation value to streamflow depletion.

  - For each of these five categories, a simple scoring system has been developed. The value of mitigation within each category is generally defined by 1) the importance of the mitigation reach to fish recovery, and 2) the specific kind of mitigation action proposed. Mitigation actions were delineated as separate rows in the table if they had unique value, in terms of fish habitat recovery. If scoring across rows was defined by reach tiers, then the amount of points awarded is proportional to the LCFRB Habitat Work Schedule scoring criteria.
  - Since this framework includes a variety of mitigation actions, the value of mitigation between each category and flow depletion was determined using different rationale and methods.

Table 2: Rationale for Scoring Different Types of Habitat/Watershed Mitigation Actions

	Mitigation Actions	Rationale	Processes and Functions Associated with Mitigation Actions	Mitigates Reduction in Aquatic Habitat	Mitigates Hydrologic Impacts	Method for Determining Value Relative to Flow Reduction
1	Side Channel/ Off-Channel Habitat Restoration (per acre)	Increase the quantity of aquatic habitat	Refugia; spawning habitat; invertebrate production; over-wintering habitat	X		IFIM modeled relationship between streamflow and In-channel Habitat
2	In-Channel Improvements (per 100 sq. ft)	Increase utilization of "downstream" aquatic habitat by increasing habitat quality	Refugia; wood and gravel recruitment; sediment sorting; bedform diversity; bed material retention	X		IFIM modeled relationship between streamflow and In-channel Habitat
3	Wetland Restoration (per acre)	Some wetlands can attenuate transport of upslope stormwater to streams; store water from high-flow events; and / or contribute to baseflows	Maintenance of stream low-flow ; Attenuation of stormwater impacts; wetland water quality function; wetland habitat function		X	Best Professional Judgment
4	Floodplain Re-connection (per acre)	Levee removal or setback allows for increased utilization of floodplain and increased water storage for low flow maintenance	Channel stability; sediment sorting; floodplain connectivity /storage; bedform diversity; hydraulic diversity; nutrient input; refugia		X	Best Professional Judgment
5	Riparian Preservation and Restoration (per acre)	Riparian vegetation attenuates transport of water from watershed to channel and improves habitat conditions in the stream.	Shading; Bank stability; width/ depth; pollutant filtering; flow retention; erosion control; large woody debris input; refugia; channel roughness; leaf litter inputs; floodplain roughness		X	Best Professional Judgement
6	Other Mitigation Actions	Applicants may propose other types of habitat / watershed mitigation. Those proposals will be evaluated on a case-by-case basis	Variable	Variable	Variable	Best Professional Judgement

1. Instream Flow Incremental methodology (IFIM) modeled relationship between streamflow and usable aquatic habitat:

This IFIM approach is being applied to two in-channel mitigation actions 1) side channel/ off-channel habitat restoration and 2) in-channel improvements mitigation.

The value of in-channel mitigation actions can be quantified in terms of the usable aquatic habitat that is created or restored. The usable aquatic habitat created or restored can then be related to incremental flow loss via IFIM modeling results that relate changes to Weighted Usable Area (i.e. In-channel habitat) to In-channel flow. IFIM modeling studies have been completed in the East Fork Lewis, Kalama, and Washougal Rivers. In each study, we examined the modeled relationship between Weighted Usable Area and flow at the same low flows defined to make the water reservations (Appendix A). Based on the IFIM curves within the range of typical low flows, an average of 6.6 sq. feet of Weighted Usable Area per 1000 ft of stream length is predicted to be lost from an incremental loss of 0.1 cfs (Appendix A)

In this point system, streamflow depletion is defined in terms of 0.1 cfs per river mile. Since the depletion points are accrued in terms of river miles, the basis for mitigation scoring must be related to river miles. A loss of 6.6 sq. ft lost per 1000 ft of stream equals 34.85 sq. ft Weighted Usable Area lost per river mile. Therefore, 34.85 sq. ft is the effective "impact" of 0.1 cfs streamflow depletion per river mile. This is the value of one point for both depletion and mitigation.

The mitigation actions involving aquatic habitat creation or restoration are expressed in terms of 100 sq. ft created or restored. Therefore, since 34.85 sq. ft is equal to one point, for each 100 sq. ft of aquatic habitat created or restored, 3 points are awarded.

> 0.1 cfs reduction = 6.6 sq. ft Weighted Usable Area lost per 1000 feet of stream (IFIM studies)
>
> 1 mile = 5280 ft 5280 ft / 1000 ft = 5.28
>
> 6.6 sq. ft * 5.28 = 34.85sq. ft. Weighted Usable Area lost per river mile, per 0.1 cfs reduction in flow

This estimate is a generalization from the IFIM modeling results and not a quantitative extrapolation of the modeling results. Nevertheless, it provides a useful basis for assigning points to mitigation actions that create or improve in-channel habitat (i.e. weighted usable area), relative to loss of in-stream flow in large rivers. This method may be used for mainstem rivers of a size approximating the experience of the IFIM models. Generally, these rivers have a low-flow wetted width greater than 50 feet and are 4th order or larger streams. The following waterbodies meet this requirement and therefore, can be used with this method:

Table 3: Waterbodies where IFIM Data can be Applied

Waterbody
Grays River, Mouth to Confluence with West Fork
Cowlitz River, Mouth to Confluence with Muddy Fork
Toutle River, Mouth to Confluence with North Fork
Coweeman River, Mouth to Mulholland Creek
Kalama River, Mouth to Kalama River Falls (RM 10.4)
North Fork Lewis River, Mouth to Merwin Dam
East Fork Lewis River, Mouth to Confluence with Rock Creek (upstream of Moulton Falls)
Washougal River, Mouth to Confluence with West Fork

2. Downscaling Approach for Smaller Streams

Since the IFIM modeling results were not based on data from smaller streams and rivers, the quantitative relationship between flow and habitat loss do not apply to these waterbodies. Therefore when smaller streams are involved, a different approach is needed for the two in-channel mitigation actions: 1) side channel/ off-channel habitat restoration and 2) in-channel improvements mitigation.

Ecology's biologist recommended using the assumption that the percentage of flow reduction is directly proportional to the percent reduction in Coho, Steelhead, and Cutthroat production and therefore "effective" aquatic habitat area. The causal mechanisms of reduced fish production are assumed to be habitat issues such as increased predation, decreased food supply, fish passage barriers, and less out-migration flushing. A technical white paper supporting this assumption was provided by Ecology's instream flow biologist and is on file at the LCFRB.

Based on this assumption, for smaller streams where side channel/off-channel habitat improvements or in-channel improvements are proposed as mitigation, the following procedure will be used on a case-by-case basis to value the habitat lost and mitigation required:

1) Define the monthly 90% exceedance flow for the low flow month of the affected stream. In order to define the monthly 90% exceedance flow, the following data can be used:

- In waterbodies that have established water reservations, 90% exceedance flows have already been established. These values may be used to define mitigation requirements in this procedure.
- If a waterbody has an established 10-year, 7-day low flow (7Q10), this value may be substituted for the monthly 90% exceedance flow statistic.
- In waterbodies that do not have established reservations or historical data, at least two years of weekly flow data must be taken during the low-flow month (i.e. August or September).

- Modeled or synthesized data may be acceptable, subject to Ecology and WDFW review. In some cases this may substitute for field data; or reduce the need for two years of data. For example, documentation of antecedent precipitation conditions coupled with flow data may be used to reduce the need for two years of data, subject to agency concurrence. Applicants are encouraged to discuss the use of these data early in the application process.
- Water bodies with 90% exceedance flows less than 10 cfs do not apply to this process and will be subject to a case-by-case review. The Committee does not intend that applicants be required to measure flows in these smaller streams.

2) Define the predicted in-stream flow loss.
3) Calculate the percentage of flow lost at the 90% exceedance flow.
4) Estimate the wetted area of the affected reach. The wetted area is the average wetted width multiplied by the linear stream distance of closed waters affected by the withdrawal. The average wetted width must be determined during the same month used to determine the 90% exceedance flow. Orthophotos or GIS may be used as long as the spatial data are from the correct month. Field measurements must be representative of the affected waterbody. The specific methods and level of effort can be established on a case-by-case basis with Ecology and WDFW.
5) Multiply the wetted area times the % flow reduction to yield an estimate of aquatic habitat area lost.
6) Define habitat area lost per 0.1 cfs per river mile (impact scoring units)
7) Increase or decrease depletion points proportionally based on the value of habitat lost per 0.1 cfs per river mile relative to the standard value of 34.85 sq. ft lost per 0.1 cfs per river mile for large rivers. Since the relationship between depletion points on Table 4 and mitigation points in the 1) Side Channel/ Off-Channel Habitat Restoration and 2) In-Channel Improvements mitigation actions are defined for large rivers, the points need to be adjusted based on how much more or less the aquatic habitat is expected to be lost relative to large rivers.
8) Sum the adjusted depletion points based on the criteria in Table 4 (i.e. reach tier and flow as a limiting factor).

Note: The adjustment of depletion points for smaller streams only needs to be applied if the mitigation actions are 1)Side Channel/ Off-Channel Habitat Restoration and 2) In-Channel Improvements

Hypothetical example for the purposes of illustrating the proposed method:

1) Assume Rock Creek has a September 90% exceedance flow of 30.0 cfs. Rock Creek is a Tier 3 stream and instream flow is a limiting factor according to the Habitat Work Schedule. Assume one river mile of Rock Creek is predicted to be affected by the water right (assume uniform flow reduction).
2) The predicted in-stream flow loss from a given water right application is 0.3 cfs
3) This represents a 1% reduction during the low-flow period

4) Assume one river mile (5,280 ft) of uniformly affected stream is found to have an average (low flow) wetted width of 13 feet equaling 68,640 square feet of wetted area (5,280 ft x 13 ft = 68,640 sq. ft).
5) Assuming proportionality, the 1% reduction in flow will cause a 1% reduction in wetted area. This is a reduction of 686 square feet of wetted area.
6) The 1% reduction in flow was based on a 0.3 cfs reduction. So 686/3 = 229 sq. ft of habitat area lost per 0.1 cfs reduction.
7) This is a larger value than the relationship for larger rivers, which was 34.85 sq. ft. of habitat lost per 0.1 cfs reduction. Therefore, the points assigned for impact in the "ledger system" need to be increased proportionally. 229/ 34.85= 6.6 times the depletion points are to be assigned for this particular example. A different result would be obtained in another example.
8) According to the guidance used for large rivers, each 0.1 cfs depletion per river mile of a tier 3 stream for which instream flow is a limiting factor, would yield 2 depletion points (see Table 4). Since the depletion estimate was 0.3 cfs, 6 points would be accrued for the large river method. However, since the small streams method has been applied to Rock Creek, the large river estimate of 6 points must be multiplied by 6.6, equaling 40 points needing to be offset with watershed/ habitat mitigation actions.

Table 4. Convert remaining flow depletion to depletion points

	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
	Depletion Points per 0.1 cfs-mile		
For depletion of surface waters where Instream flows is not an ecological limiting factor (i.e. medium or low project benefit on the Habitat Work Schedule).	5	3	1
For depletion of surface waters where Instream flow is an ecological limiting factor (i.e. high project benefit on the habitat work schedule)	10	6	2

Limitations:

Stream flow depletions were established primarily for specific streams named in the reservations. The reservation allowance applies only to mainstem flows; it is not intended to allow for extensive dewatering of smaller water bodies (WRIA 25-26 Watershed Management Plan Table 4-4 ;WRIA 27-28 Watershed Management Plan, Table 4-4). The Planning Unit recognizes that ground water extraction may also affect these smaller water bodies due to changes in aquifer water levels that support base flows. ***Therefore, ground water extraction that is anticipated to deplete water bodies with 90% exceedance flows less than 10 cfs will be subject to a case-by-case review. Under no circumstances will instream flows capable of supporting current fish stocks be converted to flows not capable of supporting those fish stocks.***

B. Scoring Tables for Habitat/Watershed Mitigation Actions

Side Channel/ Off-Channel Habitat Restoration

- A proposal for off-Channel Habitat Restoration must be justified and deemed appropriate in reach-scale and watershed-scale analyses. The Habitat Work Schedule result is from a watershed analysis.
- A detailed reach and site-scale assessment is required to determine potential benefits and risks (hydrology change could affect upstream or downstream bank stability / erosion). Potential benefits include fish access / refugia and increasing the hydrological connection with the floodplain. Newly created or restored side-channel habitat must be established successfully, but is not necessarily expected to persist into perpetuity, given the dynamic nature of channel-forming processes.
- In-channel Large Woody Debris and riparian restoration must accompany any new habitat reconnected or created.
- Requires permitting, maintenance, and monitoring

Scoring Considerations

- Base scoring is defined by the relationship between streamflow and In-channel habitat from IFIM.
- Scoring across columns reflects reach importance to fish recovery. Proportional increases in points awarded follows proportion of points awarded in LCFRB Habitat Work Schedule Evaluation Criteria.

Scoring matrix for Side Channel / Off-Channel habitat mitigation actions.	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
	Mitigation Points		
Creation or restoration of functional side-channel (100 sq. ft)	15	9	3

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream that is flow limited. Therefore, 60 mitigation points will be required to access the water reservation. In this scenario, the following examples of mitigation actions would meet this requirement:

- Creation or restoration of 400 sq. ft of functional side-channel in a tier 1 reach
- Creation or restoration of 667 sq. ft of functional side-channel in a tier 2 reach
- Creation or restoration of 2000 sq. ft of functional side-channel in a tier 3-4 reach

If the affected waterbody is considered a “small stream” as defined in section A, the small streams method for calculating mitigation requirements must be applied. The method results in a multiplication factor (see example in section A). As an example, if the multiplication factor was 2.0, the mitigation requirements would be doubled. In this scenario, the following examples of mitigation actions would meet this requirement:

- Creation or restoration of 400 sq. ft of functional side-channel in a tier 1 reach
- Creation or restoration of 1334 sq. ft of functional side-channel in a tier 2 reach

- Creation or restoration of 4000 sq. ft of functional side-channel in a tier 3-4 reach

Note: For all scenarios, a change in miles of depleted stream flow would drive mitigation requirements up or down.

In-channel improvements

- Goal is to improve instream conditions (e.g. improved pool habitat, sub-surface [hyporheic] flows, hiding cover, width to depth ratios, temperatures, etc.)
- Methods can be variable (e.g. in-stream structures include engineered large woody debris jams, boulder clusters, drop structures and porous weirs.)
- Commonly done as a means of improving in-channel habitat for fish and are meant to be analogs to otherwise naturally occurring features.
- Correct design and installation is critical to avoiding unintended degradation of stream habitat and processes.
- Needs to address causes of habitat problems, not symptoms
- A proposal for channel restoration using instream structures must be justified and deemed appropriate in site-scale, reach-scale and watershed-scale assessments. A detailed reach and site-scale assessment is required to determine potential benefits and risks. The Habitat Work Schedule limiting factor and reach tier results are from a watershed assessment.
- Requires permitting, maintenance, and monitoring.

Scoring Considerations

- Base scoring is defined by IFIM modeled relationship between streamflow and in-channel habitat.
- Scoring across columns reflects reach importance to fish recovery. Proportional increases in points awarded follows proportion of points awarded in LCFRB Habitat Work Schedule Evaluation Criteria.
- Instream structures are intended to improve existing aquatic habitat, and therefore make it more usable for salmonids. No additional aquatic habitat is being created. The mitigation plan must clearly indicate and justify how much area of salmonid habitat is being made more usable.

Scoring matrix for Instream Condition mitigation. In-channel improvements	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
	Mitigation Points		
Restoration of functional aquatic habitat using Instream Structures; per 100 sq. ft	15	9	3

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream that is flow limited. Therefore, 60 mitigation points will be required to access the water reservation. In this scenario, the following examples of mitigation actions would meet this requirement:

- Restoration of 400 sq. ft. of fish habitat in a tier 1 reach
- Restoration of 667 sq. ft. of fish habitat in a tier 2 reach
- Restoration of 2000 sq. ft. of fish habitat in a tier 3-4 reach

If the affected waterbody is considered a "small stream" as defined in section A, the small streams method for calculating mitigation requirements must be applied. The method results in a multiplication factor (see example in section A). As an example, if the multiplication factor was 2.0, the mitigation requirements would be doubled. In this scenario, the following examples of mitigation actions would meet this requirement:

- Creation or restoration of 400 sq. ft of functional side-channel in a tier 1 reach
- Creation or restoration of 1334 sq. ft of functional side-channel in a tier 2 reach
- Creation or restoration of 4000 sq. ft of functional side-channel in a tier 3-4 reach

Note: For all scenarios, a change in miles of depleted stream flow would drive mitigation requirements up or down.

Wetland Restoration

- Mitigation is subject to Army Corps / Ecology guidance and permitting requirements
- The wetland must have a demonstrated surface or hyporheic (subsurface) connection to a stream.

Scoring Considerations-

- Wetland restoration, creation, and enhancement will improve different ecological functions depending on its position in the watershed, and the hydrological connectivity with rivers and streams.
- In general, restoration gets more credit than creation because restoring wetland functions in a historical wetland has a higher likelihood of success.
- Enhancement of the restored or created wetland is commonly done, and adds some value. An example of enhancement includes noxious weed control and re-vegetation with appropriate native wetland plants.
- The following potential benefits can be used to determine the case-by-case point value:
    - Maintenance of stream hydrology in low-flow conditions
    - Attenuation of stormwater impacts to receiving waters, such as a stream
    - Improvement in water quality function
    - Improvement in habitat function

Scoring matrix for wetland mitigation actions.

Per Acre	Mitigation Points per acre
Restoration (re-establishment or rehabilitation)	15-20
Creation (establishment)	10-15
Enhancement	5-10

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream that is flow limited. Therefore, 60 mitigation points will be required to access the water reservation. In this scenario, the following examples of mitigation actions would meet this requirement:

- 3 to 4 acres of wetland restoration (depending on judgments regarding value)
- 4 to 6 acres of wetland creation
- 6 to 12 acres of wetland enhancement (can be used in combination with restoration and creation).

Floodplain Reconnection

- A proposal for levee\structure removal or modification must be justified and deemed appropriate in reach-scale and watershed-scale analyses. The Habitat Work Schedule result is from a watershed analysis.
- A detailed reach and site-scale assessment is required to determine potential benefits and risks.
- Requires riparian restoration.
- Requires permitting, maintenance, and monitoring.

Scoring Considerations

- Scoring across columns reflects reach importance to fish recovery. Proportional increases in points awarded follow from the LCFRB Habitat Work Schedule Evaluation Criteria.
- The following potential benefits can be used to determine the case-by-case point value:
    - Habitat Restoration
    - Erosion reduction
    - Water quality improvements
    - Groundwater recharge
    - Restoring wildlife migration corridors
    - Reduction of flood-hazard risk

Scoring matrix for Floodplain Re-connection actions. Floodplain Utilization	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
	Mitigation Points		
Reconnection of floodplain via levee setback or removal (per acre)	3-7	2-6	1-3

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream that is flow limited. Therefore, 60 mitigation points will be required to access the water reservation. In this scenario, the following examples of mitigation actions would meet this requirement:

- 9 to20 acres of floodplain reconnection associated with a tier 1 river
- 10 to 30 acres of floodplain reconnection associated with a tier 2 river
- 20 to 60 acres of floodplain reconnection associated with a tier 3 or 4 river

Riparian Restoration

- Preservation can only be done by itself if the riparian habitat is of high quality and is at risk. "At risk" is defined by 1) not protected under a local critical areas or other land use ordinance, and 2) a demonstrated likelihood of future conversion of that habitat to another use.
- Low quality habitat requires restoration and preservation; more points are awarded for restoration and preservation. A "low quality riparian habitat" that has restoration potential must be defined by the applicant and verified by Ecology and / or WDFW.
- More points are awarded for work done in reaches that are of higher priority to fish (defined by Habitat Work Schedule reach tier).
- Riparian zone is defined as land within the Site-Potential Tree Height of the stream bank
- "High Quality" riparian habitat must be verified by WDFW. However, a definition follows from the WDFW "Management Recommendations for Washington's Priority Habitats: Riparian" definition of "intact" riparian vegetation. Some elements of this definition include:
    - a mixture of coniferous and deciduous trees;
    - a high degree of structural diversity (multiple canopy layers, a well-developed shrub layer, and variability in tree age, shape, and species);
    - high density and diversity of wildlife and plant species;
- Headwater streams are generally first or second order streams less than 5-10 feet in bankfull width (Oregon Headwaters Research Cooperative 2001).

Scoring Considerations

- Scoring across columns reflects reach importance to fish recovery. Proportional increases in points awarded follows proportion of points awarded in LCFRB Habitat Work Schedule Evaluation Criteria.
- Overall scoring reflects the expected indirect benefit to in-channel habitat that would mitigate for incremental flow reduction. Restoration and preservation riparian habitat primarily supports in-channel habitat forming processes, but does not directly compensate for loss in hydrological function. Therefore, there is no suitable quantitative relationship between this mitigation action and flow depletion. However, the indirect benefits of riparian function to stream habitat are well defined and accepted. Therefore, it is valid to promote the restoration and preservation of riparian habitat as a mitigation option. Scoring reflects the expected indirect benefit to streams per incremental flow reduction.

Scoring matrix for riparian mitigation actions.

	Reach Importance to Fish Recovery		
	Tier 1	Tier 2	Tier 3-4
Points per acre of riparian habitat	Mitigation Points		
Preservation of high quality riparian habitat	4-6	3-5	1.5-3
Restoration and Preservation of low quality riparian habitat	8-12	4-6	3-5

Example: A water rights application will result in a 0.2 cfs reduction in flow in 3 miles of a tier 1 stream that is flow limited. Therefore, 60 mitigation points will be required to access the water reservation. In this scenario, the following examples of mitigation actions would meet this requirement:

- Preservation of 12-15 acres of riparian habitat associated with a tier 1 stream
- Preservation of 12-20 acres of riparian habitat associated with a tier 2 stream
- Preservation of 20-40 acres of riparian habitat associated with a tier 3-4 stream
- Restoration and preservation of 5-7.5 acres of riparian habitat associated with a tier 1 stream
- Restoration and preservation of 10-15 acres of riparian habitat associated with a tier 2 stream
- Restoration and preservation of 12-20 acres of riparian habitat associated with a tier 3-4 stream

Reference Information

Various reference documents may be useful in applying the scoring system described above. An initial list of documents includes:

Washington State Department of Fish and Wildlife, *Stream Habitat Restoration Guidelines* (SHRG)

Washington State Department of Fish and Wildlife, *Integrated Streambank Protection Guidelines* (ISPG)

Appendix A: Tables supporting table logic and definitions

An example of a Habitat Work Schedule (Habitat Work Schedule) for a portion of the Grays River sub-basin. The Reach Tiers (1-4) are used to determine the importance of the reach to fish recovery. The Multi-Species Project Benefit ratings are used for scoring, in terms of ecological limiting factors.

	Species Presence and Reach Potential							Restoration v. Preservation Value		Multi-Species Project Benefits Note: project benefits are derived from conditions of limiting factors and not from field observation of site-specific project needs									
Stream Reaches	Winter Steelhead	Summer Steelhead	Fall chinook	Spring chinook	Coho	Chum	Reach Tier	Restoration	Preservation	Access to blocked habitats	Stream channel habitat structure & bank stability	Off channel & side channel habitat	Floodplain function and channel migration processes	Riparian conditions & functions	Water quality	Instream flows	Regulated stream mngt for habitat functions	Watershed conditions & hillslope processes	Food[2]
Designation	*P*		*P*		*P*	*P*													
Grays 2	L		H		H	H	1	50%	50%	L	H	H	H	H	H	H	L	H	M
Grays 2B	H		L		H	H	1	49%	51%	L	H	H	H	H	H	H	L	H	M
Grays 2C	M		M		H	H	1	48%	52%	L	H	H	H	H	H	H	L	H	M
Grays 2A	M		M		H	M	1	49%	51%	L	H	H	H	H	H	H	L	H	M
WF Grays 1 Lower	H		L		M	H	1	59%	41%	L	H	H	H	H	H	H	L	H	L
Grays 1G tidal	L		M		H	M	1	51%	49%	L	H	H	H	H	H	H	L	H	M
Fossil Cr Lower	M				M	H	1	78%	22%	L	H	H	H	H	M	H	L	H	L
Grays 2D	L				M	H	1	49%	51%	L	H	H	H	H	M	H	L	H	M
WF Grays 1	H				L	M	1	61%	39%	L	H	H	H	H	M	H	L	H	L
Klints Cr Lower	L				L	H	1	38%	62%	L	H	H	H	H	L	H	L	H	L
WF Grays 2	H				L	L	1	62%	38%	L	H	H	H	H	M	H	L	H	L
WF Grays 3	H				M		1	58%	42%	L	H	H	H	H	L	H	L	H	L
Beaver Cr	H				L		1	54%	46%	L	H	M	M	M	L	M	L	H	L
Crazy Johnson	L					H	1	15%	85%	L	H	H	H	M	L	H	L	M	L
Blaney Cr 1	H						1	66%	34%	L	H	H	M	M	M	H	L	H	L
EF Grays 1	H						1	48%	52%	L	H	H	M	M	L	H	L	H	L
EF Grays 3	H						1	60%	40%	L	M	M	M	M	L	M	L	H	L
Grays 3B[1]	H						1	77%	23%	L	H	H	M	H	M	H	L	H	L
Grays 4A	H						1	77%	23%	L	H	H	M	M	L	H	L	H	L
Grays 4B	H						1	76%	24%	L	H	H	M	M	L	H	L	H	L
SF Grays 1	H						1	73%	27%	L	H	H	H	H	H	H	L	H	L
SF Grays 2	H						1	75%	25%	L	M	M	M	M	L	H	L	M	L

Source: LCFRB (2008)

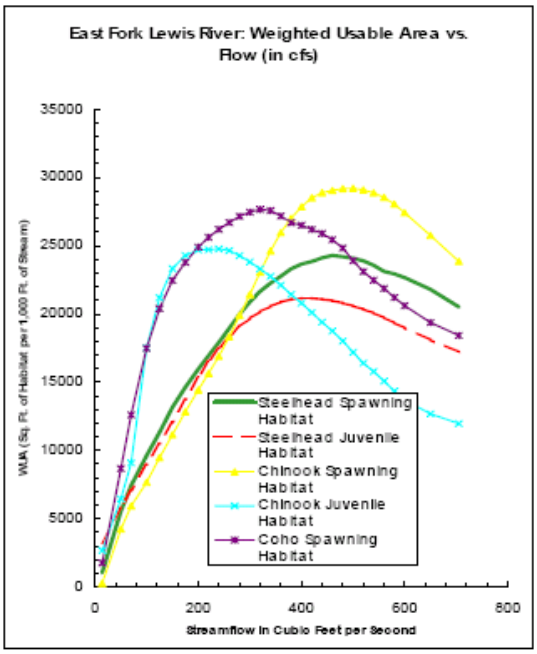
Rules for determining reach importance to fish recovery (reach tiers). The rules are from the LCFRB Habitat Work Schedule Evaluation Criteria (LCFRB 2008).

Designations Rule	
Reaches	Rule
Tier 1	All high priority reaches (based on EDT) for one or more primary populations.
Tier 2	All reaches not included in Tier 1 and which are medium priority reaches for one or more primary population and / or all high priority reahces for one or more contributing populations.
Tier 3	All reaches not included in Tiers 1 and 2 and which are medium priority reaches for contributing populations and/or high priority reaches for stabilizing populations.
Tier 4	Reaches not included in Tiers 1, 2, and 3 and which are medium priority reaches for stabilizing populations and / or low priority reaches for all populations.

Mitigation actions and their relation to Habitat Work Schedule (Habitat Work Schedule) factors.

	HWS Factor	Mitigation Actions
1	Off channel and side channel habitat	Side Channel/ Off-Channel Habitat Restoration
2	Stream channel habitat structure and bank stability	In-channel Improvements
3	Watershed conditions and hillslope processes	Wetland Restoration
4	Floodplain function and channel migration processes	Floodplain Re-connection
5	Riparian conditions and functions	Riparian Preservation and Restoration

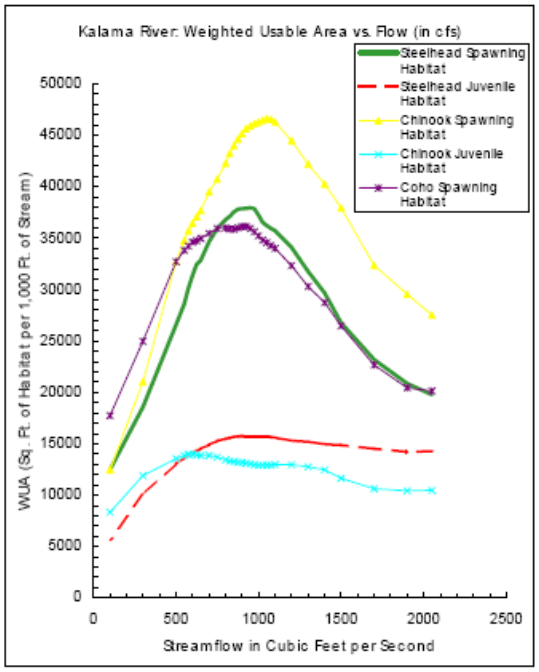
East Fork Lewis River Fish Habitat: Weighted Usable Area vs. Flow (in CFS)



Flow in cfs	Steelhead Spawning Habitat	Steelhead Juvenile Habitat	Chinook Spawning Habitat	Chinook Juvenile Habitat	Coho Spawning Habitat
705	20516	17219	23848	11969	18418
650	21807	18102	25747	12687	19374
600	22665	18976	27412	13708	20607
580	22936	19346	28049	14352	21199
560	23111	19728	28529	15079	21865
540	23564	20075	28870	15783	22468
520	23898	20353	29089	16398	23098
500	24077	20590	29202	17186	23905
480	24196	20804	29178	18017	24816
460	24284	20979	29045	18754	25434
440	24112	21084	28879	19403	25893
420	23837	21157	28507	20105	26195
400	23659	21153	27846	20807	26499
380	23301	21067	27007	21421	26689
360	22767	20886	25962	22115	27167
340	22262	20554	24614	22754	27576
320	21649	20177	23051	23307	27652
300	20871	19677	21418	23815	27453
280	19986	19086	19893	24278	27149
260	18944	18346	18337	24646	26693
240	17913	17494	16898	24763	26204
220	16940	16540	15649	24708	25605
200	15958	15362	14439	24682	24908
175	14629	13757	12836	24286	23779
150	13169	12072	11162	23330	22460
125	11328	10511	9480	21162	20392
100	9625	8984	7663	17514	17482
70	7424	7091	5931	9089	12606
50	5578	5801	4244	6464	8680
14	1054	3192	283	2680	1770

Source: Caldwell (1999)

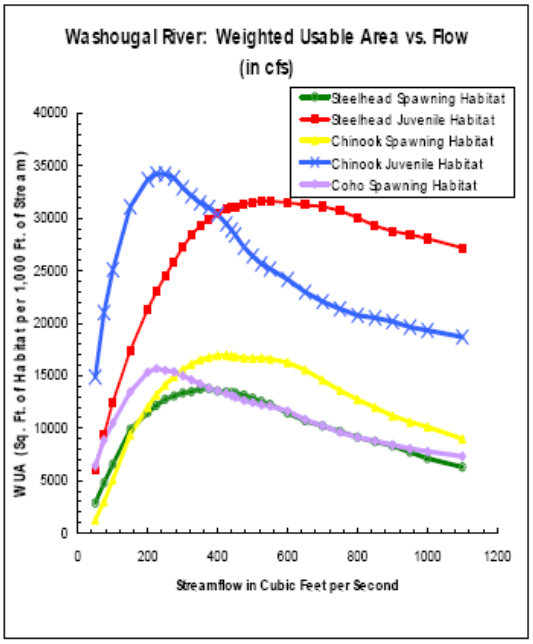
Kalama River Fish Habitat: Weighted Usable Area vs. Flow (in cfs)



Flow in cfs	Steelhead Spawning Habitat	Steelhead Juvenile Habitat	Chinook Spawning Habitat	Chinook Juvenile Habitat	Coho Spawning Habitat
2050	19775	14274	27521	10475	20137
1900	20849	14199	29559	10433	20440
1700	23193	14512	32358	10616	22670
1500	26753	14862	37943	11634	26467
1400	29665	14961	40256	12470	28732
1300	31748	15197	42193	12765	30299
1200	34095	15289	44474	12963	32324
1100	35716	15588	46308	12972	34019
1075	35960	15643	46557	12928	34274
1050	36204	15670	46619	12899	34575
1025	36540	15669	46476	12903	34811
1000	37244	15663	46296	12911	35215
975	37866	15685	46136	12959	35621
950	37964	15708	45919	13045	35950
925	37886	15713	45651	13119	36130
900	37878	15736	45166	13173	36145
875	37823	15729	44610	13208	36004
850	37551	15669	44001	13242	35850
825	37114	15571	43252	13318	35893
800	36798	15466	42289	13437	35991
750	35926	15277	40753	13705	35929
700	34667	14896	39520	13858	35462
650	32856	14497	37688	13864	34992
625	32458	14319	37082	13916	34747
600	31367	14126	36466	13952	34619
575	30124	13899	35709	13978	34224
550	28596	13628	34759	13863	33821
500	26572	13064	32710	13550	32711
300	18565	10044	21030	11902	24969
100	12474	5671	12467	8339	17729

Source: Caldwell et al. (1999a)

Washougal River Fish Habitat: Weighted Usable Area vs. Flow (in cfs)

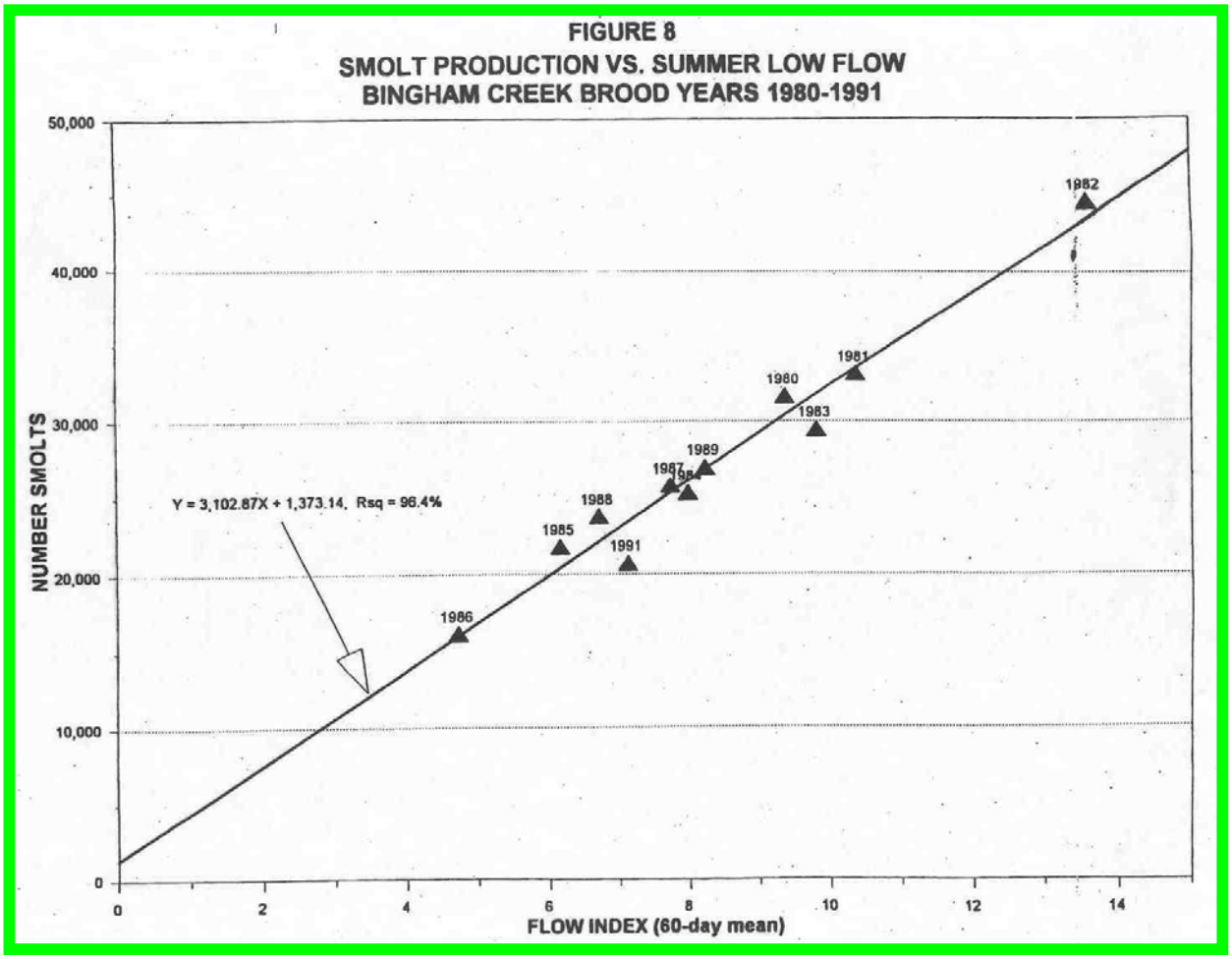


Flow (in cfs)	Steelhead Spawning Habitat	Steelhead Juvenile Habitat	Chinook Spawning Habitat	Chinook Juvenile Habitat	Coho Spawning Habitat
1100	6300	27171	8962	18695	7326
1000	7122	28064	10134	19329	7794
950	7716	28432	10806	19637	8061
900	8320	28765	11192	20165	8415
850	8738	29272	11981	20512	8785
800	9132	30038	12746	20744	9143
750	9700	30721	13599	21378	9630
700	10220	31095	14565	22066	10239
650	10710	31271	15553	22965	10818
600	11449	31487	16250	24173	11632
550	12272	31631	16595	25170	12099
525	12559	31638	16686	25662	12233
500	12871	31510	16656	26393	12452
475	13157	31320	16708	27248	12853
450	13376	31063	16824	28420	12963
440	13395	30980	16883	28873	13101
425	13442	30854	16970	29476	13313
400	13532	30442	16901	30368	13566
375	13776	29903	16755	31018	13834
350	13732	29278	16512	31459	14225
325	13491	28413	16087	32131	14815
300	13353	27243	15570	32896	15002
275	13071	25866	14925	33845	15386
250	12765	24508	14125	34207	15509
225	12173	22995	13173	34225	15698
200	11473	21345	12024	33695	15328
150	9903	17428	9368	31087	13459
100	6575	12490	5112	25110	10491
75	4799	9371	3012	21006	8869
50	2873	6010	1275	14882	6445

Source: Caldwell et al. (1999b)

Average Sq. ft. lost per 1000 ft of stream per 0.1 cfs incremental reduction in flow

Sub-Basin	Change in WUA
E.F. Lewis River	7
Kalama River	8
Washougal River	4



Source: Seiler (2001)

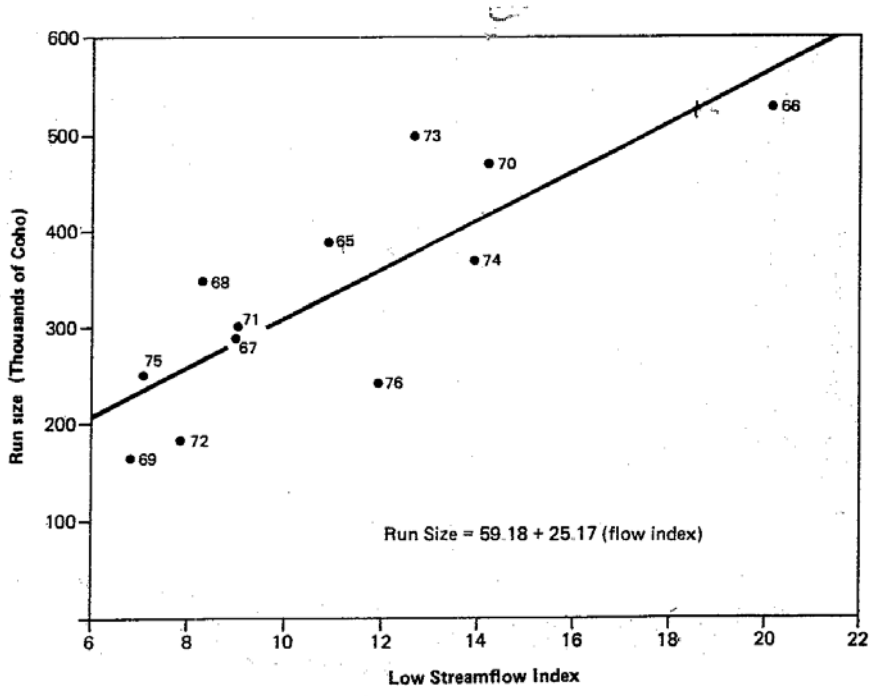


Figure 3-8
Relationship between Puget Sound Coho Run Sizes and Summer Low Flow

Source: Olson (1983)

Reference Information

Caldwell, B. 1999. East Fork Lewis River Fish Habitat Analysis Using the Instream Flow Incremental Methodology and Toe-Width Method for WRIA 27. Washington State Dept. of Ecology Publication No. 99-151.

Caldwell, B., Shedd, J., and Beecher, H. 1999a. Kalama River Fish Habitat Analysis Using the Instream Flow Incremental Methodology. Washington State Dept. of Ecology Publication No. 99-152.

Caldwell, B., Shedd, J., and Beecher, H. 1999b. Washougal River Fish Habitat Analysis Using the Instream Flow Incremental Methodology and the Toe-Width Method for WRIAs 25, 26, 28, and 29. Washington State Dept. of Ecology Publication No. 99-153.

LCFRB. 2008. Lower Columbia Fish Recovery Board Habitat Work Schedule Evaluation Criteria. http://www.lcfrb.gen.wa.us/2008%20HWS.htm

F.W. Olson, F.W. 1983. Draft EIS; South Fork Skokomish River Hydroelectric Project.

Seiler, Dave. 2001 Wild Coho Forecasts for Puget Sound and Washington Coastal Systems. WDFW.

Attachment F
Example of Flow-Related Mitigation

Clark Public Utilities (CPU)
Fargher Lake (Gilmour) Water Rights Case Study

Note: This case study description was authored by Clark Public Utilities. The WRIA 25-28 Mitigation Subcommittee responses to the questions raised are included below.

Case Study Description:

Clark Public Utilities needs additional water rights in the Pioneer, Meadow Glade, and Sara areas to augment supply in the north Clark County vicinity, including growth that is occurring in the Battle Ground and Ridgefield areas. Consistent with the WRIA 27/28 Planning Unit recommendations; CPU is targeting the deep Sand and Gravel Aquifer (SGA) as an source of supply while remedial solutions are implemented to clean up contamination that has affected the shallow Pleistocene Alluvial Aquifer (PAA) in the Vancouver Lake lowland. Operation of new supply sources would ultimately affect discharge of groundwater to nearby surface water bodies such as the East Fork Lewis River, Lake River, and the Columbia River. The East Fork would be considered a closed water body under the new watershed planning rules whereas Lake River and the Columbia River would be open to further appropriations.

PGG developed a preliminary groundwater flow model to evaluate how SGA development might influence stream flow in the lower portions of the East Fork Lewis River. **Figure 1** shows the locations of potential future supply wells in the model area. Under peak supply development Wells 32 and 33 would be operated at about 1,400 gpm and the Sara well would be operated at about 1,500 gpm (total pumping rate of 4,300 gpm or 9.6 cfs). Average rates of withdrawal would be about one-half the peak rates or a total of about 2,150 gpm (4.8 cfs).

PGG used the preliminary groundwater flow model to assess rates of streamflow capture based on the average rate of groundwater withdrawal from the proposed supply areas. **Figure 2** presents the estimated baseflow depletion along the East Fork of the Lewis River under these average withdrawal conditions. Baseflow depletion accumulates from upstream to downstream. Predicted rates of depletion are relatively small upstream of RM 9.4 due to isolation of the East Fork from the production aquifer (SGA). The model predicts that only 0.04 cfs of stream flow depletion would occur upstream of RM 9.4. Downstream of RM 9.4, where the pumped aquifer is in greater hydraulic connection to the East Fork, the model predicts a higher rate of stream flow depletion. Just above the confluence between the East Fork and the North Fork, the model predicts a net stream flow depletion of about 2.0 cfs (46% of pumping).

The model assumes that the wells would be operated at a continuous average rate. However actual production would be linked to seasonal demand with pumping rates varying by a factor of about two. The exact timing of seasonal capture would be dependent on the distance of the pumping well from the river and the storage properties of the aquifer. Given the distance of the proposed pumping centers from the river and the fact that the aquifer in the Pioneer area is

unconfined, significant lag times might be expected. Most of the capture would be focused on the mainstem, although the lower portion of small tributaries such as McCormick Creek might be affected to some extent. Very limit capture would occur below RM 2.5 as the East Fork enters the bedrock canyon downstream of LaCenter.

To mitigate for the potential impacts to the East Fork system CPU purchased a surface-water right for irrigation from the Gilmour farm near Fargher Lake Village, in the East Fork Lewis River watershed. The Gilmour water right has been evaluated and determined to represent an active water use from a small creek (Swale Creek tributary to Rock Creek), for a substantial amount of water, in a surface water basin with limited flows.

The water right was issued for 0.92 cfs and irrigation of 92 acres. In recent years, Gilmour's irrigated acreage expanded to about 150 acres. Water was used to grow mint and seed grass and for processing of the mint during the harvest season. Total consumptive use during the irrigation season for the Gilmour agricultural operation varied between 0.07 cfs in April to as high as 1.3 cfs during July and then to as low as 0.65 cfs in September. The Gilmour Farm did not use water during the non-irrigation season that extends between October and March.

The retirement of the Gilmour right will have significant instream flow benefits for the entire length of Rock Creek downstream from Fargher Lake, as well as for the East Fork Lewis River from the mouth of Rock Creek to La Center, where the river becomes tidally influenced via the Columbia River. **Figure 2** illustrates how the retirement of the Gilmour right will enhance flows in Rock Creek and portions of the East Fork Lewis River above RM 9.4 and mitigate stream flow capture impacts due to groundwater pumping below RM 9.4.

The diversion lies near the headwaters of Rock Creek or approximately 6 river miles north of the East Fork Lewis River. Rock Creek enters the East Fork at RM 16 or approximately 7 miles upstream of where future withdrawals by CPU will induce capture from the stream. Increased flow would be realized through a reach of about 13 miles that extends from Gilmour diversion on Rock Creek down to Daybreak Park (**Figure 1**).

Stream flow surveys by PGG and Clark County personnel indicate that flow ceases in the upper reaches of Rock Creek during the late summer and early fall. The stream was observed to be dry at the SR-503 crossing in early July, 2003 and county personnel have observed dry streambed conditions at Gabriel Road in early fall. Therefore, additional water introduced near the headwaters of the stream should provide substantial habitat benefits to the entire Rock Creek drainage.

Questions presented to the WRIA 25-28 Mitigation Subcommittee, and Proposed Responses:

1. Most debits from Reserve Block are going to be year-round uses, while most of water rights available for mitigation are going to be seasonal in nature with a different use profile – how do we reconcile that difference?

   Mitigation Subcommittee Response: Management of both high and low flows is addressed in the Plan (Section 4.1, Appendices H and F). However, the plan emphasizes

the importance of managing flows during the dry periods of the year to provide for protection of fish, other aquatic life, recreation, and watershed health (Pg 4-1, Pg H-5, etc). The Plan makes numerous references to maintenance of baseflows as a high priority (Pg H-5). In light of this, for each application Ecology and WDFW would need to define the critical baseflow period, based on the fish populations and life histories present in relation to the hydrograph. Ecology would also make the determination on how much of an existing water right proposed for retirement would be recognized for use in mitigation, as well as the timing, using existing procedures. Ecology would then assess the volume and timing of mitigation flows in relation to the critical baseflow period, using the WRIA 25-28 mitigation guidelines.

(Note: Please refer to the attached "CPU Fargher Lake (Gilmour) Mitigation Example Weighting of Flow-Related Mitigation" document for an example of how to evaluate seasonality.)

2. With a larger summer irrigation season hit and minimal use the rest of the year, how do we assess "value" of an irrigation right for mitigation and how do we factor in the timing of capture vs. the timing of consumptive irrigation use vs. the timing of low flow season which may extend into late September or early October?

   Mitigation Subcommittee Response: As noted above, the critical flow period would have to be defined based on the hydrograph, fish considerations, and the other beneficial uses involved. Pg H-7 states that "*responsibility for analysis of available water sources lies with the water rights applicant*", and that the "*application for the reservation will be reviewed, analyzed, and processed by Ecology in consultation with Fish and Wildlife*". Based on this, if information on the relationship between capture, consumption and critical flow periods is lacking, Ecology could require it as part of the submittal. If it is not available, assumptions would have to be made and documented for use in the evaluation process.

3. Historical water use by Gilmour has varied seasonally due to his historical agricultural practices. Theoretically, Mr. Gilmour would be able to place the full 0.92 cfs into use between May 1 and October 1 of every year. Therefore, shouldn't the full water right quantity be recognized for mitigation regardless of what recent patterns were established for consumptive use?

   Mitigation Subcommittee Response: The authority for determining how much of a water right will be recognized as valid for mitigation purposes lies with the Department of Ecology. The WRIA 25-28 Mitigation Subcommittee has not developed specific guidelines or recommendations for determining how much of an existing water right would be recognized based on use patterns.

4. How do we define the stream flow capture reach? As noted above, capture would accrue incrementally from near zero at Daybreak Park (RM 9.4) to about 2.0 cfs near the bedrock notch just downstream of LaCenter (RM 2.5). If we define depletion in terms of both capture and distance along the stream, then what values do we assign to each?

Mitigation Subcommittee Response: In cases where capture varies across stream reaches, it could be proportioned along the stream gradient (see attached worksheet). If modeling is available, it should be used as the basis for proportioning. Two options for determining a "point of withdrawal" for assessing whether the 50% requirement is met could include using the midpoint of each proportioned reach and making individual depletion determinations, or establishing a single midpoint and averaging depletion for the combined reaches.

5. How much credit should CPU receive for the flow mitigation? Mitigation will be introduced almost 13 miles upstream of the area of capture. How do you assess "value" of providing mitigation water this far upstream from the area of capture? If no additional surface water rights become available for purchase, will CPU's total capture within the lower East Fork be limited to 1.84 cfs with half this amount mitigated by the Gilmour right?

   Mitigation Subcommittee Response: Credit will be determined using the draft flow-related mitigation guidelines the Planning Unit has been developing. Credits and debits will address factors such as length of stream affected, the reach tiering, and the flow impacts/benefits in each reach. Other weighting factors include water quality, timing, and the mainstem/tributary relationship. The attached draft spreadsheet presents one example of how the various factors could be documented to assist with credit determinations (see attached).

6. CPU is also investigating development of water supply from the Lewis River and Vancouver Lake lowland areas. The Lewis River supply would come from the shallow Pleistocene Alluvial Aquifer (PAA) that is hydraulically connected to the tidal reaches of both the East Fork and North Fork of the Lewis River. The Vancouver Lake lowland supply would initially come from the deep SGA aquifer and eventually the PAA aquifer after a remedial solution has been developed for the environmental sites that occur in the area. The costs associated with development of both of these supply areas would be far greater than development of new supplies in the Pioneer, Meadow Glade, and Sara area and it may take considerably longer to develop these supplies given the need to secure water rights and build infrastructure. CPU currently uses most all of their primary annual (Qa) water rights and new water rights are needed immediately to meet projected growth.

   According to Section 3.3.3 of the WRIA 27/28 Watershed Plan:

   Communities requesting additional ground water rights to serve growth must evaluate the relationship of their proposed water supply projects to stream flows.

   Where this evaluation indicates that development of the source of supply will impact the flow regime, the Planning Unit recommends that the municipal water supplier analyze alternative options for water supplies. In such cases, supply alternatives include use of a different (most likely a deeper) aquifer, purchase of water from a neighboring community, development of a tidally-influenced source, or purchase of water from a regional water system.

If the supply alternatives analysis indicates that no practicable alternative is available, the water right applicant may petition Ecology to utilize a 'reservation of water defined within state rule (see Section 4.4.1).

A critical question for the Planning Unit is whether CPU is eligible to access their Reserve Block in the East Fork Lewis River if they have alternate supplies available in areas with out stream closures even though it may be far more expensive and time consuming to use these alternative supplies?

Mitigation Subcommittee Response: Development of regional water sources is described as a "critical" Planning Unit recommendation (Pg H-5 and H-6), and based on the above we understand that CPU is investigating two potential sources identified in the Plan. If alternative supplies with fewer impacts are available, then per Section 3.3.1 the Planning Unit recommends they be used. However, the Plan also recognizes temporal constraints. Pg H-5 states that

> "*Municipalities striving to meet demand in the interim period prior to development of a regional source, or in cases where regional sources are not feasible, should develop deep groundwater sources that are not in connectivity with surface waters. In cases where it is not feasible to avoid the use of groundwater in connectivity with surface water, a reservation of water will be reserved in rule to meet demand. The water rights applicant must evaluate all potential sources and demonstrate why use of the reservation is required*"

Pg H-7 goes on further to state the following

> *"The Planning Unit recommends that Ecology consider the applicant's request to access the reservation of water relative to its intended use and timeframe. Several public purveyors have interim needs while a regional water source is developed. The Planning Unit supports an interim use of the reservation, especially as the certainty of a regional source increases <u>and</u> the reservation is retired after this interim use, or its use is diminished to fill a water system redundancy (backup) need. Ecology should consider a diminished use in terms of its predicted frequency of use and impact on fish habitat".*

These Plan provisions suggest that while CPU continues to investigate and pursue development of regional water sources, use of the reservation would be appropriate.

CPU Fargher Lake (Gilmour) Mitigation Example
Weighting of Flow-Related Mitigation

As an illustration of the weighting procedure for flow-related mitigation, the CPU Fargher Lake (Gilmour) mitigation project is scored below. The scoring is illustrative only, for purposes of discussing the weighting methodology. This weighting example is not intended to be used for actual processing of CPU's associated water rights application. This information is not a complete representation of the flow-related mitigation evaluation procedure. This information should be used in conjunction with other data developed for this example.

The example addresses only the East Fork Lewis River mainstem and Rock Creek. At this time, consideration is not given to other tributaries that could be affected by the proposed well withdrawals, as they have not been modeled. The scoring process for this case study is described below, and is summarized in Table 1.

Table 1. Summary Scoring Table

Weighting Factor	**Depletion Weight** (normalized to 100 total)	**Mitigation Weight** (assessed relative to Depletion Weight)
Mainstem/trib relationship	n/a	n/a
Length of stream affected	34	49
LCFRB Tiers	33	57
Seasonality	33	28
Water Quality	n/a	n/a
Total Weight	**100**	**134**
Relative Value of Mitigation:	**134/100 = 1.34**	

Step 1: Select Weighting Factors
Three weighting factors are selected from the menu of five possible factors.

- The mainstem/tributary relationship is excluded because mitigation affects all the depleted reaches on the mainstem. Additional contribution for Rock Creek is covered under "length" and "tiers" so it was not being counted again here.
- Water quality is excluded because mitigation water and depleted water are both "high quality".

Step 2: Determine Depletion Weights
The three remaining weighting factors are assigned depletion weights, summing to 100. In the absence of better information, for this example it is assumed they should be equally weighted.

Step 3: Determine Mitigation Weights
Each individual factor is assessed. The Mitigation weight is scored either higher or lower than depletion weight, based on the analysis provided in the attached spreadsheet and application of professional judgment. In determining weighting factors related to length of stream and LCFRB reach tiers, flow is factored into each calculation. To accurately reflect habitat quantity, distance is also factored into tier weighting (see attached Excel spreadsheet).

- Length. Flow benefits and impacts vary along stream distance. To accurately assess the relative value of length, it must be considered in relation to flow quantity. For weighting purposes, length is therefore expressed in terms of "cfs-miles". As presented in the attached spreadsheet, this is calculated by multiplying flow (cfs) by the stream reach length (miles).

  The mitigation covers approximately 20 cfs-miles, while the depletion affects approximately 14 cfs-miles. Dividing 20 by 14 yields a factor of 1.4. This indicates the mitigation is 1.4 times "longer" than the depletion, taking into account flow. The mitigation score is thus 1.4 times higher than the depletion score.

- Tiers. Tier designations reflect the relative importance of a particular stream reach to fish from a population recovery perspective. To accurately weigh the value of tier designations in relation to overall flow benefits and impacts, the reach length and flow contribution must also be considered. For weighting purposes, stream tiering is therefore expressed in terms of "cfs-tier-miles". As presented in the attached spreadsheet, this is calculated by multiplying "cfs-miles" by the assigned tier score.

  The mitigation covers the same reaches as the depletion, as well as additional reaches. This gains some extra credit for the mitigation score. Rock Creek is a Tier 4 reach and thus doesn't add much in terms of tiering score (note that the extra length for Rock Creek was credited separately). However, East Fork Reach 8b is Tier 1 and over 5 miles long, and therefore adds substantial habitat value. The mitigation provides approximately 52 cfs-tier-miles, while the depletion score addresses approximately 30 cfs-tier-miles. The mitigation score is thus 1.7 times higher than the depletion score.

- Seasonality. In evaluating seasonality, consideration must be given to flow benefits and depletion in relation to the hydrograph, as well as flow-habitat relationships for the species of interest. IFIM results demonstrate that for the species of interest, habitat availability is sensitive to flow changes from the lowest flows of record to approximately 500 cfs, at which point weighted usable area (WUA) begins to decline with increased flow. Average monthly statistics indicate that for the 50% exceedance flow, a discharge of 500 cfs or lower usually occurs between mid-May to mid-October, thus defining the critical flow period. As described in this case study, irrigation typically occurred between April and September, which addresses approximately 5 of the 6 critical months. The seasonality weighting is therefore given a rating of 27 (5 divided by 6, multiplied by 33). (Note: if the full water right quantity were recognized throughout the critical flow period, down-weighting would not result).

Step 4: Determine Mitigation Credit

The weighted mitigation scores are summed up, and the sum (134) is then compared with the standard 100 score on the depletion side. In this case, the mitigation scores higher, by a factor of 1.34. The overall result of 1.34 can be used to determine how much "credit" will be awarded for the mitigation action. Assuming a value of 0.92 cfs is used as the base quantity of mitigation, this could be up-weighted as follows:

$$1.34 \text{ X } 0.92 \text{ cfs} = 1.23 \text{ cfs}$$

While this quantity cannot be used to satisfy the 50% requirement, it can be used to calculate the remaining, unmitigated stream depletion. Assuming a maximum depletion quantity of 2.0 cfs, this is:

2.0 cfs – 1.23 cfs = 0.77 cfs

(Note: The variable depletion presented in the case study may warrant a more complex calculation)

Use of Results (after weighting procedure). For purposes of determining whether the 50% flow-related mitigation threshold is met, the mitigation guidelines (Appendix C) call for establishment of a discrete "point of impact" on the affected water body for ground water applications. In this case study, streamflow depletion varies across stream reaches, increasing from RM 9.4 (Daybreak Park) to the mouth. Streamflow depletion was therefore partitioned into distinct segments (see attached spreadsheet).

The attached analysis demonstrates that if the acquired water right is valued at 0.92 cfs, mitigation flows would exceed 50% of the modeled depletion levels at the mid-point of all but the lower-most 5 affected stream reaches. In the lower-most 5 reaches, where flow would be depleted by 2 cfs, mitigation flows would only comprise 46% of the net stream flow depletion. This is below the required 50% threshold. When distance, tiering and flow are factored together, a net positive gain of 22 cfs-tier-miles would result from the proposed mitigation.

For illustrative purposes, if flow-related mitigation requirements were deemed satisfied, the applicant would be required to mitigate the remaining 0.77 cfs of stream flow depletion using habitat/watershed mitigation actions; as long as it is "practicable" (including cost considerations).

It should be noted that this example is presented to demonstrate how the flow-related and habitat scoring procedures could be applied, and how a spreadsheet analysis could be used to facilitate calculations. Factors such as tributary impacts, modeling assumptions, "point of impact" establishment, and the variable pumping and streamflow depletion described in this case study may necessitate more complex calculations and evaluation.

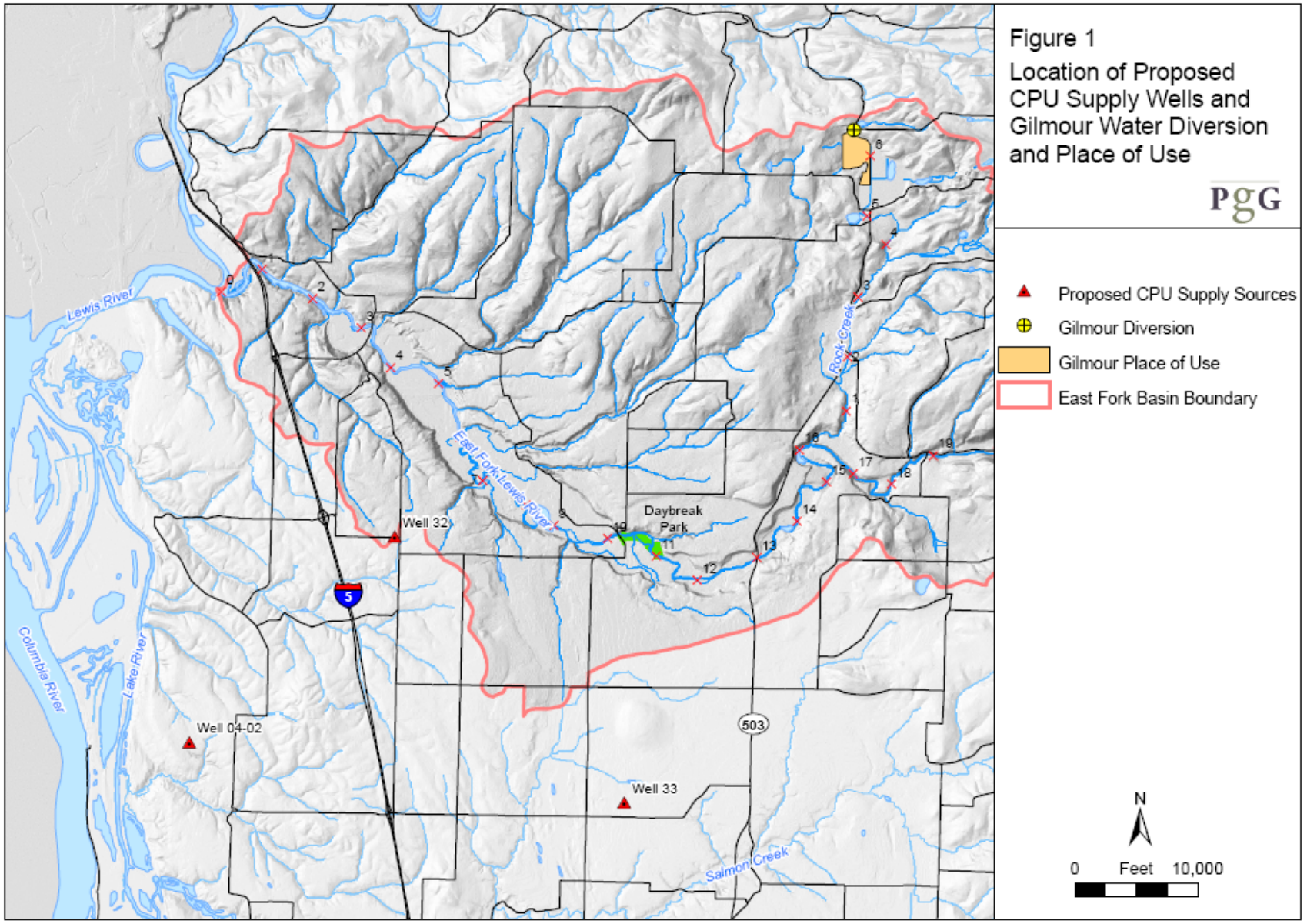
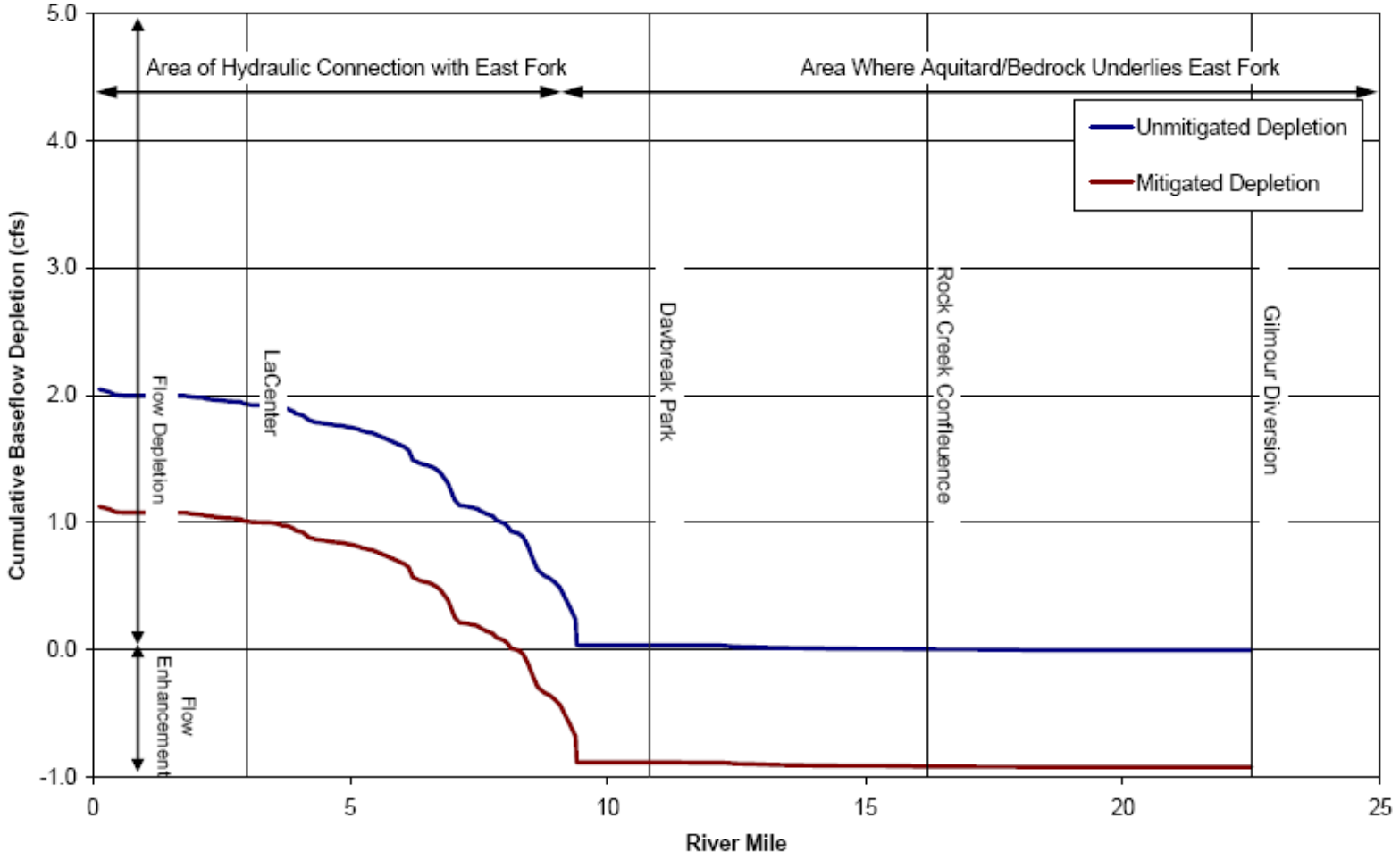
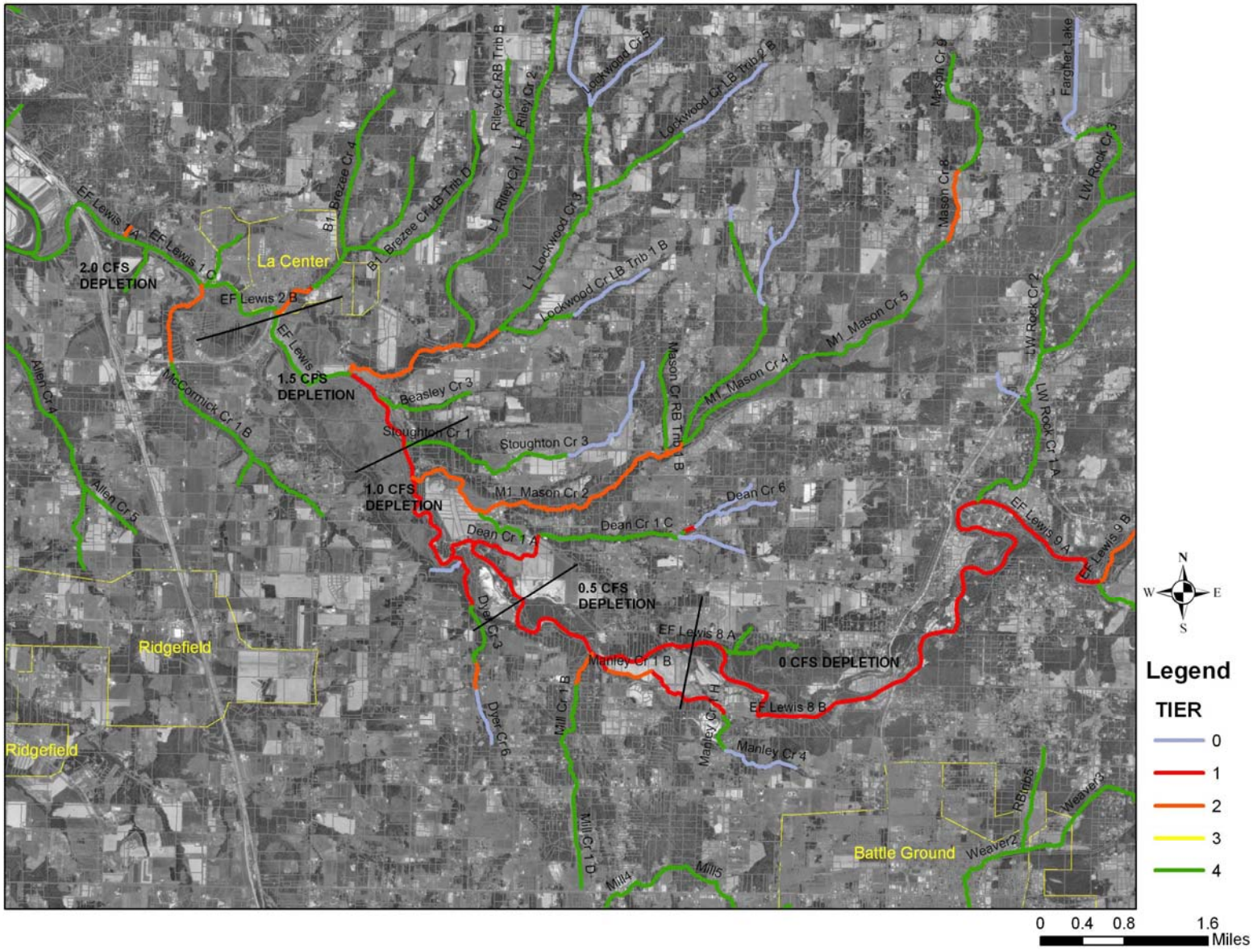


Figure 1
Location of Proposed CPU Supply Wells and Gilmour Water Diversion and Place of Use
PgG
Proposed CPU Supply Sources
Gilmour Diversion
Gilmour Place of Use
East Fork Basin Boundary
Lewis River
Columbia River
Lake River
East Fork Lewis River
Rock Creek
Salmon Creek
Daybreak Park
Well 32
Well 04-02
Well 33
5
503
N
0 Feet 10,000

Figure 2
Estimated Baseflow Depletion in East Fork Lewis River




2.0 CFS DEPLETION
1.5 CFS DEPLETION
1.0 CFS DEPLETION
0.5 CFS DEPLETION
0 CFS DEPLETION
La Center
Ridgefield
Ridgefield
Battle Ground
EF Lewis 1 A
EF Lewis 1 C
EF Lewis 2 B
EF Lewis 2 A
B1_Brezee Cr 4
B1_Brezee Cr LB Trib D
Riley Cr RB Trib B
L1_Riley Cr 1
L1_Riley Cr 2
Lockwood Cr 5
Lockwood Cr LB Trib 2 B
L1_Lockwood Cr 3
Lockwood Cr LB Trib 1 B
Mason Cr 8
Fargher Lake
Mason Cr 6
LW Rock Cr 3
M1_Mason Cr 5
LW Rock Cr 2
M1_Mason Cr 4
Mason Cr RB Trib 1 B
LW Rock Cr 1 A
Allen Cr 4
McCormick Cr 1 B
Beasley Cr 3
Stoughton Cr 1
Stoughton Cr 3
Allen Cr 5
M1_Mason Cr 2
Dean Cr 6
Dean Cr 1 C
Dean Cr 1 A
EF Lewis 9 A
EF Lewis 9 B
Dyer Cr 3
EF Lewis 8 A
Manley Cr 1 B
Mill Cr 1 B
Manley Cr 1 H
EF Lewis 8 B
Manley Cr 4
Dyer Cr 6
RB trib 5
Weaver 3
Weaver 2
Mill Cr 1 D
Mill4
Mill5
N
W
E
S
Legend
TIER
0
1
2
3
4
0 0.4 0.8 1.6
Miles

CPU Fargher Lake (Gilmour) Water Rights Mitigation Example

					CREDIT			DEBIT				NET		
				LENGTH		CFS X MI		CFS X MI		CFS X MI				CFS X MI
EDT_REACH	DESCRIPTION	TIER	TIER SCORE	MILES	CFS	MAINSTEM	TRIB	X TIER	CFS	MAINSTEM	TRIB	X TIER	CFS	CFS X MI	X TIER
EF Lewis 1 A	Mouth to Jenny Cr	4	1	1.42	0.92	1.3064	0	1.3064	2	2.84	0	2.84	-1.08	-1.5336	-1.5336
EF Lewis 1 B	Jenny Cr to EF Lewis LB Trib 1	4	1	0.24	0.92	0.2208	0	0.2208	2	0.48	0	0.48	-1.08	-0.2592	-0.2592
EF Lewis 1 C	EF Lewis LB Trib 1 to McCormick Cr 1	4	1	0.65	0.92	0.598	0	0.598	2	1.3	0	1.3	-1.08	-0.702	-0.702
EF Lewis 2 A	McCormick Cr 1 to EF Lewis RB Trib 1	4	1	0.05	0.92	0.046	0	0.046	2	0.1	0	0.1	-1.08	-0.054	-0.054
EF Lewis 2 B	EF Lewis RB Trib 1 to Brezee Cr 1	4	1	0.89	0.92	0.8188	0	0.8188	2	1.78	0	1.78	-1.08	-0.9612	-0.9612
EF Lewis 3	Brezee Cr to Lockwood Cr	4	1	1.24	0.92	1.1408	0	1.1408	1.5	1.86	0	1.86	-0.58	-0.7192	-0.7192
EF Lewis 4 A	Lockwood Cr to Beasley Cr	1	4	0.37	0.92	0.3404	0	1.3616	1.5	0.555	0	2.22	-0.58	-0.2146	-0.8584
EF Lewis 4 B	Beasley Cr to Stoughton Cr	1	4	0.53	0.92	0.4876	0	1.9504	1.5	0.795	0	3.18	-0.58	-0.3074	-1.2296
EF Lewis 4 C	Stoughton Cr to Mason Cr	1	4	0.35	0.92	0.322	0	1.288	1	0.35	0	1.4	-0.08	-0.028	-0.112
EF Lewis 5 A	Mason Cr 1 to Dyer Cr	1	4	1.29	0.92	1.1868	0	4.7472	1	1.29	0	5.16	-0.08	-0.1032	-0.4128
EF Lewis 5 B	Dyer Cr to Dean Cr	1	4	0.36	0.92	0.3312	0	1.3248	1	0.36	0	1.44	-0.08	-0.0288	-0.1152
EF Lewis 6 A	Dean Cr 1 to Storedahl Pools	1	4	0.27	0.92	0.2484	0	0.9936	1	0.27	0	1.08	-0.08	-0.0216	-0.0864
EF Lewis 6 B	Storedahl Pools	1	4	0.51	0.92	0.4692	0	1.8768	1	0.51	0	2.04	-0.08	-0.0408	-0.1632
EF Lewis 6 C	Storedahl pools to Mill Cr 1	1	4	1.19	0.92	1.0948	0	4.3792	0.5	0.595	0	2.38	0.42	0.4998	1.9992
EF Lewis 7	Mill Cr 1 to Manley Cr 1	1	4	0.09	0.92	0.0828	0	0.3312	0.5	0.045	0	0.18	0.42	0.0378	0.1512
EF Lewis 8 A	Manley Cr 1 to EF Lewis RB Trib 2	1	4	1.25	0.92	1.15	0	4.6	0.5	0.625	0	2.5	0.42	0.525	2.1
EF Lewis 8 B	EF Lewis RB Trib 2 to Rock Cr 1	1	4	5.47	0.92	5.0324	0	20.1296	0	0	0	0	0.92	5.0324	20.1296
LW Rock Cr 1 A	Mouth to Lw Rock Cr RB Trib	4	1	1.50	0.92	0	1.38	1.38	0	0	0	0	0.92	1.38	1.38
LW Rock Cr 1 B	Lw Rock Cr RB Trib to Lw Rock Cr LB Trib 1	4	1	0.58	0.92	0	0.5336	0.5336	0	0	0	0	0.92	0.5336	0.5336
LW Rock Cr 2	Lw Rock Cr LB Trib 1 to Lw Rock Cr LB Trib 2	4	1	1.68	0.92	0	1.5456	1.5456	0	0	0	0	0.92	1.5456	1.5456
LW Rock Cr 3	Lw Rock Cr LB Trib 2 to Lw Rock Cr Culv 1	4	1	0.64	0.92	0	0.5888	0.5888	0	0	0	0	0.92	0.5888	0.5888
LW Rock Cr 4	Lw Rock Cr Culv 1 to Lw Rock Cr Culv 2	4	1	0.55	0.92	0	0.506	0.506	0	0	0	0	0.92	0.506	0.506
LW Rock Cr 5	Lw Rock Cr Culv 2 to Fargher Lake mint/blueberry farms	4	1	0.47	0.92	0	0.4324	0.4324	0	0	0	0	0.92	0.4324	0.4324
LW Rock Cr LB Trib 1 A	Mouth to Lw Rock Cr LB Trib Dam 1	4	1	2.16	0	0	0	0	0	0	0	0	0	0	0
LW Rock Cr LB Trib 1 B	Lw Rock Cr LB Trib Dam 1 to Lw Rock Cr LB Trib Dam 2	0	0	0.17	0	0	0	0	0	0	0	0	0	0	0
LW Rock Cr LB Trib 1 C	Lw Rock Cr LB Trib Dam 2 to end of presumed coho/std	0	0	0.18	0	0	0	0	0	0	0	0	0	0	0
LW Rock Cr LB Trib 2	Mouth to end of presumed Coho	4	1	1.60	0	0	0	0	0	0	0	0	0	0	0
LW Rock Cr RB Trib A	Mouth to Lw Rock Cr RB Trib Culv	4	1	0.07	0	0	0	0	0	0	0	0	0	0	0
LW Rock Cr RB Trib B	Lw Rock Cr RB Trib Culv to end of potential Coho, creek bypasses the ponds	0	0	0.35	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 A	Mouth to Manley Cr Culv 1	1	4	0.15	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 B	Manley Cr Culv 1 to Manley Cr Culv 2	2	3	0.44	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 C	Manley Cr Culv 2 to Manley Cr Culv 3	1	4	0.42	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 D	Manley Cr Culv 3 to Manley Cr Culv 4	1	4	0.13	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 E	Manley Cr Culv 4 to Manley Cr Culv 5	1	4	0.24	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 F	Manley Cr Culv 5 to Manley Cr Culv 6	1	4	0.11	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 G	Manley Cr Culv 6 to Manley Cr Culv 7	1	4	0.03	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 1 H	Manley Cr Culv 7 to Manley Cr Culv 8	4	1	0.34	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 2	Manley Cr Culv 8 to Manley Cr Culv 9	4	1	0.11	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 3	Manley Cr Culv 9 to Manley Cr Culv 10	0	0	0.07	0	0	0	0	0	0	0	0	0	0	0
Manley Cr 4	Manley Cr Culv 10 to end of potential coho/std	0	0	0.71	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 A	Mouth to McCormick Cr Culv 1	2	3	0.95	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 B	McCormick Cr Culv 1 to McCormick Cr Culv 2	4	1	0.87	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 C	McCormick Cr Culv 2 to McCormick Cr LB Trib	4	1	0.43	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 D	McCormick Cr LB Trib to McCormick Cr Culv 2	4	1	0.03	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 E (pond)	Pond associated with McCormick Cr Culv 2	4	1	0.13	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 F	Top of McCormick Cr 5 (pond) to McCormick Cr Culv 4	4	1	0.41	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 G (pond)	Pond associated with McCormick Cr Culv 4	4	1	0.11	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 H (pond)	Pond associated with McCormick Cr Culv 5	4	1	0.10	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr 1 I	Top of McCormick Cr 8 (pond) to end of potential coho/std	4	1	0.13	0	0	0	0	0	0	0	0	0	0	0
McCormick Cr LB Trib	Mouth to end of pre std	4	1	0.29	0	0	0	0	0	0	0	0	0	0	0
Mill Cr 1 A	Mouth to Mill Cr Fishway	2	3	0.34	0	0	0	0	0	0	0	0	0	0	0
Mill Cr 1 B	Mill Cr Fishway to Mill Cr Culv 1	4	1	0.72	0	0	0	0	0	0	0	0	0	0	0
Mill Cr 1 C	Mill Cr Culv 1 to Mill Cr Culv 2	4	1	0.28	0	0	0	0	0	0	0	0	0	0	0
Mill Cr 1 D	Mill Cr Culv 2 to end of coho/std, joins with Salmon Cr Trib Mill Cr	4	1	1.15	0	0	0	0	0	0	0	0	0	0	0
				34.81		14.8764	4.9864	52.0996		13.755	0	29.94		6.1078	22.1596
						Total M+T	19.8628	52.0996		Total M+T	13.755	29.94			

Impact Partitioning Assumptions

Partitioning of Impacts:

North Fork Lewis to LaCenter = 2.0 cfs impact

LaCenter to Stoughton Creek = 1.5 cfs impact

Stoughton Creek to Storhdahl Ponds = 1.0 cfs impact

Stordahl Ponds to Daybreak = 0.5 cfs impact

Partitioning is for illustrative purposes and can be refined based on modeling results

Other Assumptions

Impacts to McCormick, Dyer, Mill and Manley Creeks are likely, but not quantified or modeled. Consideration of tributary impacts is needed.

No debit assumed upstream of Daybreak

No benefit assumed in tribs to Rock Creek or East Fork

Assumes 0.92 CFS water right value - actual to be determined by Ecology

Attachment G
Guidelines for Performance Standards

Table H-1. Side Channel/ Off Channel Habitat Restoration Performance Standards.

Objective	Performance Standards	Monitoring Frequency
Continued function as designed	An "As-Built" survey must be completed after construction. The "as-built" should meet the specifications defined in the proposed design. If differences between the proposed design and "as-built" exist, justification must be provided to meet this performance standard. Structural components should be evaluated using standard engineering protocols.	Upon Completion
Continued function as designed	The side-channel will remain connected to the stream. However recognizing the dynamic nature of stream channels, adaptive management provisions may be implemented to meet this standard if the provisions are accepted by Ecology and WDFW.	Years 1, 3, 5, and 10
Enhance native trees and Shrubs in the Riparian Zone	Planted woody species in the upland buffer at the mitigation site will achieve ≥ 50% percent survival after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.	Years 1, 3, 5, and 10
Minimize Invasive Species	Control of noxious plant species will meet state and local requirements (see applicable list for the County of interest). Invasive species will be controlled to protect habitat quality	Years 5 and 10
Enhance native trees and Shrubs in the Riparian Zone	3-layer riparian vegetation presence (proportion of reach) will increase by ≥ 20% ten years after initial planting	Year 10
Enhance native trees and Shrubs in the Riparian Zone	Mean percent canopy density at the bank will increase by ≥ 20% ten years after initial planting	Year 10

Adapted from the Washington State Salmon Recovery Funding Board action effectiveness monitoring protocols (2008).

Table H-2. In-Channel Improvements Performance Standards.

Objective	Performance Standards	Monitoring Frequency
Continued function of Instream Structures as designed or placed	An "As-Built" survey must be completed after construction. The "as-built" should meet the specifications defined in the proposed design. If differences between the proposed design and "as-built" exist, justification must be provided to meet this performance standard. Structural components should be evaluated using standard engineering protocols.	Upon Completion

Adapted from the Washington State Salmon Recovery Funding Board action effectiveness monitoring protocols (2008).

Table H-3. Wetland Performance Standards.

Objective	Performance Standards	Monitoring Frequency
Achieve hydrological conditions necessary to re-establish, rehabilitate, or create new wetland acreage.	In the intended wetland area, soils will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least ___ consecutive weeks (___ percent) of the growing season in years when rainfall meets or exceeds the 30-year average at the mitigation site.	Every Year
Achieve hydrological conditions necessary to re-establish, rehabilitate, or create new wetland acreage.	The wetland area at the mitigation site will be delineated using current methods to assure that the mitigation site contains ___ acres of wetland.	Year 10
Enhance native plant community in Wetland	Aerial cover of native, wetland (facultative and wetter) herbaceous plant species will be at least ___ percent in the emergent wetland at the mitigation site.	Years 1 and 10
Enhance native plant community in Wetland	Planted woody species in the scrub-shrub (and/or forested) wetland at the mitigation site will achieve at least ___ percent survival one year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.	Year 1
Enhance native plant community in Wetland	Native woody species (planted and volunteer) will achieve an average density of at least ___ plants per ___ in the scrub-shrub (and/or forested) wetland at the mitigation site.	Years 1 and 3
Enhance native plant community in Wetland	Aerial cover of native woody species will be at least ___ percent in the scrub-shrub (and/or forested) wetland at the mitigation site.	Years 5 and 10
Enhance trees and Shrubs in the Upland Buffer	Planted woody species in the upland buffer at the mitigation site will achieve ___ percent survival one year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.	Year 1
Enhance trees and Shrubs in the Upland Buffer	Native woody species (planted and volunteer) will achieve an average density of at least ___ plants per ___ in the upland buffer at the mitigation site.	Years 1 and 3
Enhance trees and Shrubs in the Upland Buffer	Aerial cover of native woody species will be at least ___ percent in the upland buffer at the mitigation site.	Years 5 and 10
Achieve Woody Plant Species Diversity	At least ___ native, facultative and wetter woody plant species will achieve a minimum ___ percent relative cover for each species in the scrub-shrub (and/or forested) wetland at the mitigation site.	Years 5 and 10
Minimize Invasive Species	Control of noxious plant species will meet state and local requirements (see applicable list for the County of interest). Invasive species will be controlled to protect habitat quality	Years 5 and 10
Establish Habitat	Wildlife habitat structures including _____ snags and _____ large woody debris piles will be present at the mitigation site.	First Year

Note: some percentages to be filled in on a case-by-case basis.
Adapted from Washington State Department of Transportation: "Writing Performance Measures and Performance Standards for Wetland Mitigation" (2008). The wetland performance standards allow for case-specific customization because of the variable nature of site limitations.

Table H-4. Floodplain Reconnection Performance Standards.

Objective	Performance Standards	Monitoring Frequency
Implement the floodplain reconnection as described in the construction plans.	An "As-Built" survey must be completed after construction. The "as-built" should meet the specifications defined in the proposed design. If differences between the proposed design and "as-built" exist, justification must be provided to meet this performance standard. Structural components should be evaluated using standard engineering protocols.	Upon Completion

Adapted from the Washington State Salmon Recovery Funding Board action effectiveness monitoring protocols (2008).

Table H-5. Stream Riparian Restoration and Preservation Actions

Objective	Performance Standards	Monitoring Frequency
Enhance native trees and Shrubs in the Riparian Zone	Planted woody species in the upland buffer at the mitigation site will achieve ≥ ___ % percent survival. If all dead woody plantings are replaced, the performance measure will be met.	Year 1, 3, 5, and 10
Minimize Invasive Species	Control of noxious plant species will meet state and local requirements (see applicable list for the County of interest). Invasive species will be controlled to protect habitat quality	Year 5 and Final
Enhance native trees and Shrubs in the Riparian Zone	3-layer riparian vegetation presence (proportion of reach) will increase by ≥ 20% ten years after initial planting	Year 10
Enhance native trees and Shrubs in the Riparian Zone	Mean percent canopy density at the bank will increase by ≥ 20% ten years after initial planting (note: only for bank revegetation projects)	Year 10

Note: some percentages to be filled in on a case-by-case basis.

Adapted from the Washington State Salmon Recovery Funding Board action effectiveness monitoring protocols (2008).

Attachment H
Cost Considerations Background and Options Considered

I. Background: References to Cost Considerations from Watershed Management Plans

"If the supply alternatives analysis indicates that no **practicable** alternative is available, the water right applicant may petition Ecology to utilize a 'reservation' of water defined within the State Rule." (see further text below regarding definition of "practicable.")

"The Planning Unit recommends that where an applicant applies for a water right under a reservation, they be required to mitigate the predicted stream flow depletion to the maximum extent practicable through flow-related actions. **Practicable** is meant to include both **economic and logistical considerations**."

"The Planning Unit recommends that Ecology (and Fish & Wildlife) consider **cost** to the applicant in terms of other supply alternatives, water supply total project cost, and the cost of the off-setting and mitigating actions. **These costs should be evaluated** within the context of other fish recovery actions that may be needed to compensate for impairment to stream flow."

"No less than half of the predicted stream flow depletion must be offset through the acquisition of active upstream water rights or other flow augmenting actions in the same subbasin upstream of the new proposed water right. The Planning Unit recognizes there may be occasional exceptions where offsetting one half of the predicted stream flow depletion fully or in part may be **infeasible or cost-prohibitive**…"

[emphasis added]

II. Approaches Considered for Cost Considerations

Several methods were considered for defining a cost threshold for the reservation program. These include:

- Percentage of total cost for a water development project;
- Market value of water rights (selected as recommended approach);
- Economic value of water for in-stream purposes;
- Representative costs of similar mitigation actions.

These are discussed below, with pros and cons of each alternative. ***(Note: the alternatives presented here focus on cost considerations for evaluating mitigation actions. They do not necessarily apply to evaluating water supply alternatives.)***

1. Percentage of total cost for a water development project

Whether a cost is reasonable or not would be considered in the context of the applicant's overall cost for a new water source linked to the water right. The new supply project will typically be a new well or group of wells. Some percentage of total cost of the supply project could be defined as "reasonable" for mitigation. It may be useful to express this as a range, both to allow flexibility in application and to avoid distorting the external market for mitigation opportunities such as water rights available for sale in a given area.

Example:

- if mitigation cost is less than or equal to x % of total project cost, the cost of mitigation is automatically deemed reasonable (Note: the percentage levels would need to be defined in the Mitigation Strategy. Options could range from some fraction of total project cost to a value that potentially exceeds project cost [i.e. greater than 100%]);
- if mitigation cost is from x % to y % of total project cost (same x as above; and y > x), the amount of mitigation may be negotiable;
- In no case will mitigation be required at levels greater than y % of total project cost (same y as above). An applicant may voluntarily exceed this cap, but will not be required to do so in order to tap reserved water.

Pros:

- This option would be relatively easy to administer. The primary complication will be how to define "total project cost" for more complex water supply projects.

Cons:

- There is no direct relationship between project cost and the economic value of the water resource. Two projects using exactly the same resource and having similar impacts could have very different project costs and therefore yield different cost thresholds in the evaluation process. This could lead to inconsistent program outcomes from one user to another.

- Selection of the specific percentages to be used may be somewhat subjective.

2. Market value of water rights

Water rights are routinely bought and sold, or leased, in the State of Washington, other areas of the Pacific Northwest, and throughout the western states. Considerable data has been accumulated on the range of prices paid by municipal water suppliers for water rights. These prices are independent of project infrastructure needs for water projects, and reflect a cost solely to obtain access to a water resource.

Conceptually, use of comparable costs for water rights appears to provide an appropriate basis for comparison with mitigation costs, because mitigation costs also represent a cost to obtain access to the reserved water resource.

Under this approach, it is proposed that a standard unit cost be defined for water through comparison with actual water rights transactions. The cost would need to be adjusted periodically, reflecting changes in market conditions and willingness-to-pay. If mitigation costs per unit do not exceed this value, then the cost of mitigation would be considered "reasonable."

Pros:

- As long as "comparable" transactions are used as the basis, prices paid for water rights represent the "willingness-to-pay" of municipal water systems, and thus yield a threshold that is not excessively burdensome.
- If a "standard" cost is defined, this approach can be relatively simple to apply to individual applications, and would also yield consistent results from user to user. The primary challenge is defining the standard cost and the means of adjusting it periodically.
- Most water users should find this approach easy to understand.
- The price of water rights reflects both immediate conditions and long-term expectations about the value of water.

Cons:

- This approach does not directly account for the resource value of water in the stream.
- Prices for water rights vary considerably from place to place based on local market conditions; and depending on the specific characteristics of each water right. This approach will require developing a standard cost, and some parties may not agree on the cost level that is selected for the program.

3. Economic value of water for in-stream purposes

Water has an intrinsic value for instream purposes. Society places a value on instream flows, as demonstrated by regulatory programs that limit withdrawal of water affecting stream flow.

This approach would involve estimating the value of instream flows in monetary terms, using methods that have been developed in the field of natural resource economics. The value

established would be used as a ceiling for expenditures on mitigation. The premise is that a municipal water supplier should not be required to pay more than the water is worth to support instream flows.

This approach could be applied case-by-case, with valuation applied to particular streams and reaches; or it could be applied on a standardized basis, with a single value being established across the region.

Pros:

- Among the options considered, this one would most closely reflect natural resource values. The mitigation program is intended to protect aquatic resources (in balance with serving water user needs), so it may be attractive to develop an approach based on intrinsic value of the affected resource.

Cons:

- This alternative would not represent "willingness to pay" by municipal water suppliers, because the basis is the intrinsic value of the resource rather than the value of water to the user.

- Estimating the value of instream resources in monetary terms is not an exact science, and typically results in a range of estimates. These ranges may be subject to considerable debate. Since instream values are not reflected in actual market data, indirect techniques for economic valuation are required. To develop a standardized value in the local context would require substantial economic analysis. The resulting cost is likely to be subject to controversy, and may need to incorporate a fairly wide range. To some, the methods used may appear to be a "black box." If values are pulled from studies in other localities, the results are likely to be subject to even more debate.

- Estimating values on a case-by-case basis is likely to be prohibitively expensive. Because of the widely varying attributes of streams and reaches across the region, this would require considerable analysis by professional economists for each water right application.

4. <u>Representative costs of similar mitigation actions (or water supply projects)</u>

(Note: in addition to its applications to evaluating mitigation actions, this alternative may also apply to evaluating whether water supply alternatives are "practicable".)

Whether a cost is reasonable or not would be considered in the context of costs of other water projects or habitat restoration actions already performed or planned in the affected watershed; county; or WRIA. In this case a set of "comparable" projects or mitigation actions that have actually been carried out would be identified at the local level. If other parties have been willing to carry out similar projects or mitigation at a given cost, this would provide evidence that the cost is "reasonable."

It would be important that these comparable actions be matched to the type of applicant involved. For example it may not be appropriate to compare a small town's proposed action with a mitigation action carried out by a state agency or a private developer, since financial resources may be quite different among these categories.

Pros:

- The fact that other parties had actually implemented projects or mitigation actions would provide a suitable basis for concluding that the costs were "reasonable."
- This approach allows direct use of data on mitigation actions by multiple organizations. Thus it is not tied exclusively to a water-user perspective on how costs should be defined.

Cons:

- This approach would be challenging to apply. It may be difficult to find "comparable" projects and mitigation actions, or to determine what the true cost of those actions was. There may be considerable disagreement over whether another project or mitigation action is really comparable to the one proposed.
- Costs may vary widely, making it difficult to select the "right" cost. This could lead to inconsistent outcomes for different applicants.

Recommended Approach

Based on review of these four approaches, staff propose that a representative market value of water rights be defined for the WRIA 25 – 28 planning area (Approach #2). This value will serve as ceiling on "reasonable cost" in order for communities to gain access to their designated water reservations.

This approach is recommended because it best combines attributes of practicality and consistency with the intent of the cost threshold in the mitigation program. Of the approaches considered, this one best matches with the principles defined for cost considerations by the Mitigation Subcommittee.

Attachment I
Representative Costs for Municipal Water Right Purchases

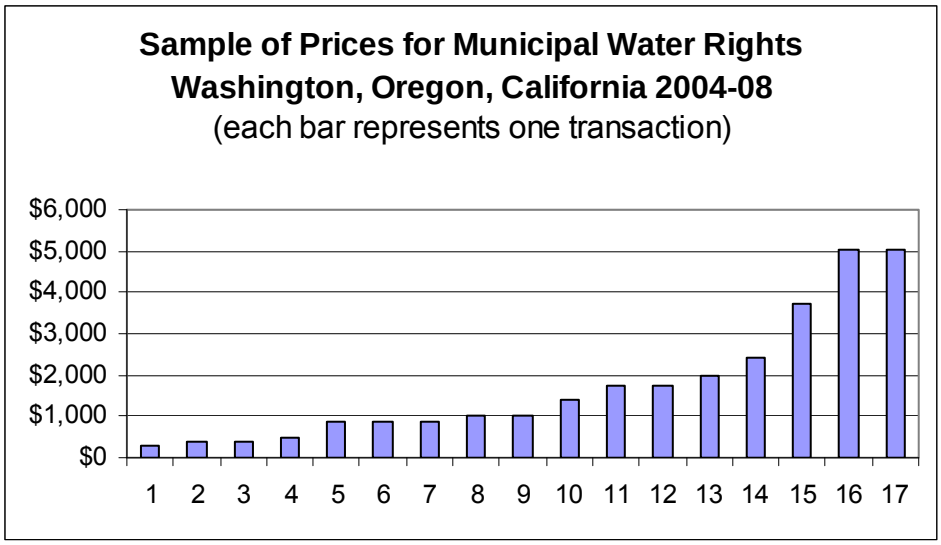
Table 1
Cost Data on Water Rights Acquisitions
Prepared for WRIA 25-28 Mitigation Subcommittee
(Sales Price Only. Does not include legal or engineering fees)

Prepared: June 19, 2008
Updated: n/a

Purchaser(s)	Seller(s)	Quantity (AF)	Cost (per AF)	Citation
Washington				
Thurston Co.	Port of Centralia; Irrigator	575	$2,000	WS - Dec. 07
City of Lacey	Access Golf Management	363	$1,400	WS - May 07
City of Olympia	All American Bottled Water	TBD	$1,750	WS - May 06
City of Yelm	Private irrigator	76	$1,000	City of Yelm
Oregon				
Salem	Pictsweet Corp.	600	$500	WS - Jan. 08
California				
Norwalk		456	$3,728	WS - Oct 07
Glendora		743	$5,025	WS - Oct 07
Glendora	Loyola Marymount Univ.	324	$5,025	WS - Jun 06
Sweetwater Water Authority [1]	Poseidon Resources Corp.	2,400	$861	WS - Sept 07
Rainbow Munic. Water District [1]	Poseidon Resources Corp.	7,500	$861	WS - Sept 07
Vallecitos Water District [1]	Poseidon Resources Corp.	7,500	$861	WS - Sept 07
Multiple public & private entities (Mojave Valley)	Private entities	240	$400	WS - Jan 06
Multiple public & private entities (Mojave Valley)	Private entities	116	$2,400	WS - Jan 06
Apple Valley Hts. Water District; private entities	Private entities	60	$400	WS - Jun 05
Apple Valley Hts. Water District; private entities	Not specified.	39	$994	WS - Jun 05
Town of Apple Valley (Mojave Valley)	Western Water co.	533	$1,748	WS - Jan 05
Town of Apple Valley (Mojave Valley)	Western Water co.	53	$300	WS - Jan 05
HIGH PRICE			**$5,025**	
LOW PRICE			**$300**	
MEDIAN PRICE			**$1,000**	
25th Percentile			**$861**	
75th Percentile			**$2,000**	

Criteria:
Purchaser is a public, municipal supply agency
Supplier is not federal agency or California Water Project
Leases not included, except long-term as indicated.
Recent data only (2004 or later)

[1] 30-year lease of desalinated water. Price does not include delivery charges that vary with price of power.
N/A = Not applicable or no data available
WS = *Water Strategist* newsletter
TBD = to be determined


Sample of Prices for Municipal Water Rights
Washington, Oregon, California 2004-08
(each bar represents one transaction)
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Attachment J
Numerical Examples of Cost Ceiling for Mitigation

Examples were developed to show how a cost ceiling set at different levels would relate to the mitigation procedure outlined in the *Integrated Strategy for Implementing Water Right Reservations*. The examples explore this question from two perspectives:

1.) Will the cost be "reasonable" for a water system needing its reserved water supply? and
2.) Will the cost ceiling permit enough mitigation to achieve environmental protection objectives of the Watershed Management Plans?

To explore these questions, four hypothetical water supply projects are examined. The costs of water supply at various cost ceilings are calculated. These cost ceilings were designed to include both the "access cost" based on data from Table 1 and additional "transaction costs" for legal fees and engineering studies that often accompany water source acquisition.

In order to apply these hypothetical examples, assumptions were also needed regarding stream flow depletion and habitat quality (tiers) that affect the mitigation requirement under the mitigation scoring system previously developed for WRIAs 25-28.

A summary of these examples is presented in Table 2 (the basis for the summary is presented in additional tables that follow). Examples are given for a small municipal water system needing to acquire additional supply of 50,000 gallons per day; and a larger system requiring 500,000 gallons per day in new supply. Table 2 displays these quantities and also estimates stream flow depletion for hypothetical wells producing those quantities. The examples use two different assumptions regarding hydraulic continuity with local streams (this factor can vary from zero to 100% so the values should be considered illustrative only). This results in four examples altogether.

Table 2: Cost Ceiling Summary

Case	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Maximum Day Demand (gpm)	Annual Demand (AFY)	Hydraulic Continuity Factor (Assumed)	Depletion (cfs)	Cost Ceiling	Average Mitigation Cost Range		
							$2,000	Low		High
1a. Small System	50,000	100,000	69	56	25%	0.04	$112,000	$24,000	to	$144,000
1b. Small System	"	"	"	"	75%	0.12		$71,000	to	$431,000
2a. Large System	500,000	1,000,000	694	561	25%	0.39	$1,121,000	$237,000	to	$1,435,000
2b. Large System	"	"	"	"	75%	1.16		$708,000	to	$4,285,000

gpd = gallons per day
gpm = gallons per minute
AFY = acre-feet per year
cfs = cubic feet per second

The results show that if a cost ceiling of $2,000 per acre-foot of supply is used, the total cost ceiling will be $112,000 for the small system example; and $1.1 million for the larger system example. Table 2 also shows that these two dollar amounts fall within the range of expected

mitigation costs developed in a separate paper prepared for the Mitigation Subcommittee (see Pooling and Banking paper). The range of mitigation costs encompasses values for both lower cost categories of mitigation actions and higher cost categories. It is expected that applicants would normally aim to carry out lower cost actions. At $2,000 per acre-foot of supply the cost ceiling appears high enough to enable many or most water supply projects to be fully mitigated at levels indicated by the mitigation scoring system, as long as opportunities are available for lower-cost types of mitigation actions in the subbasin involved. If only high-cost mitigation opportunities were available, the cost-ceiling would become limiting. This would protect the applicant from excessive costs for access to reserved water, but would also reduce the amount of mitigation that could be accomplished.

Additional details of these examples are displayed in Tables 3 – 5. Table 3 also shows three alternative "access costs" that could be set by the Planning Units. These levels are $1,000 for each acre foot of water supply needed on an annual basis; or $2,000; or $3,000. These values are illustrative only; a higher or lower value could also be selected. The value of $2,000 per acre-foot of water supply was used in the summary table shown previously.

Tables 4 and 5 show how the stream flow depletion defined in Table 2 is converted to mitigation requirements. Table 4 applies the mitigation scoring system already developed. Table 5 shows how many square feet or acres of mitigation would be required, using the different categories of mitigation actions. Associated costs were drawn from data used to determine an "in-lieu payment," covered in a separate briefing paper on Pooling and Banking of mitigation credits. These tables were then used to generate the summary results shown in Table 2.

Table 3: Cost Ceiling Examples

Case	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Maximum Day Demand (gpm)	Annual Demand (AFY)	Hydraulic Continuity Factor	Depletion (cfs)	Cost Ceiling at $1,000/AFY	Cost Ceiling at $2,000/AFY	Cost Ceiling at $3,000/AFY
1a. Small System	50,000	100,000	69	56	25%	0.04	$56,000	$112,000	$168,000
1b. Small System					75%	0.12			
2a. Large System	500,000	1,000,000	694	561	25%	0.39	$561,000	$1,121,000	$1,682,000
2b. Large System					75%	1.16			

Note: the cost ceiling is based on the water pumped, not the stream flow depletion.
Hydraulic continuity values may range from zero to 100%. Values given are illustrative only.
Note: these examples represent an incremental addition in supply capacity to an existing water system.

Table 4: Impact Points from Scoring Procedure

(Points per 0.1 cfs-mile)

	Reach Importance		
	Tier 1	**Tier 2**	**Tier 3**
Instream flows is not an ecological limiting factor (i.e. medium or low project benefit on the Habitat Work Schedule).	5	3	1
Instream flow is an ecological limiting factor (i.e. high project benefit on the habitat work schedule)	10	6	2

Formula to calculate depletion points:
(cfs depleted) x (River Miles x 10) x (impact points per 0.1 cfs-mile)

Note: River miles are multiplied by 10 because points are awarded for every tenth of a RM affected.

Example: Case Assumptions (all cases):

River Miles Affected	3.0
Tier	2
Flow limiting?	yes

Examples: Depletion Points Using these Assumptions:

Case 1a	7
Case 1b	21
Case 2a	70
Case 2b	209

(Modify depletion-point formulas if change tier or flow-limiting assumptions)

Table 5: Units of Restoration Required for Based on Mitigation Scoring System (Examples)

	Cost per Unit	Case 1a		Case 1b		Case 2a		Case 2b	
		Units	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**
Side-Channel/Off Channel (Sq. feet req'd)	$632 per sq. ft.	78	$49,180	233	$147,539	778	$491,797	2,322	$1,468,364
Channel Improvements (sq. feet habitat req'd)	$305 per sq. ft.	78	$23,727	233	$71,181	778	$237,269	2,322	$708,417
Wetlands *Creation* (acres req'd)	$174,000 per acre	0.6	$97,440	1.7	$292,320	5.6	$974,400	17	$2,909,280
Flood Plain Reconnection (acres req'd)	$82,000 per acre	1.8	$143,500	5.3	$430,500	18	$1,435,000	52	$4,284,500
Riparian *Restoration* (acres req'd)	$101,000 per acre	1.4	$141,400	4.2	$424,200	14	$1,414,000	42	$4,221,800
Lowest cost			**$24,000**		**$71,000**		**$237,000**		**$708,000**
Highest cost			**$144,000**		**$431,000**		**$1,435,000**		**$4,285,000**

Assumptions:
Mitigation actions are performed in Tier 2 streams.
Where mitigation point system is given as a range, a value in the middle of the range was chosen.
Unit costs from Table X in Mitigation Pooling & Banking Paper (Total Mitigation Cost per habitat unit)

The numerical examples given above assume 100 percent of the flow depletion is offset with habitat/watershed mitigation. However, under the mitigation policies established in the Watershed Plans for WRIAs 25 – 28, applicants are required to offset at least 50 percent of flow depletion with flow-related actions instead (as long as feasible and economical opportunities are available). Therefore it is important to review whether the recommended cost ceiling provides adequate funds for combining 50% flow-related actions with 50% habitat/watershed actions.

The most obvious flow-related actions would be purchase of water rights somewhere upstream of the point of impact of the planned new water source. If municipal water rights could be purchased that had similar peaking factors and hydraulic continuity as the new source, then it is clear that the cost ceiling shown in Table 2 would be adequate. Using Example 1b, the applicant would need to purchase 28 acre-feet in annual water rights from a willing seller. Table 1 shows a median price per acre foot of $1,000. Therefore 28 acre-feet would cost $28,000. Assuming transaction costs of $10,000 the applicant would need to spend $38,000 on the water rights purchase. Since the cost ceiling is 112,000 in this example, the applicant would have $74,000 left over for habitat/watershed mitigation. This compares with the range of costs of $36,000 to $215,000 estimated for mitigating the remaining 50% through habitat/watershed actions. This means that if lower-cost mitigation opportunities were available in the watershed, the cost ceiling would be sufficient. If only higher-cost opportunities were available, then the cost ceiling would not fully fund the required mitigation.

If an agricultural surface water right were purchased instead of a municipal right, the numbers would be somewhat different. Under Example 1b, offsetting 50% of the depletion would require purchase of an agricultural irrigation water right with an instantaneous flow of 0.06 cfs. As a rule of thumb, irrigation rights typically allot 0.02 cfs (10 gpm) per acre. Therefore 0.06 cfs translates into just three acres of irrigated farmland. The annual water right for three acres at a water duty of two acre-feet per acre would be six acre feet. Assuming a median price per foot of $1,000, this would require just $6,000. If transaction costs were $5,000, this would yield a total cost of $11,000 for offsetting 50% of the depletion using flow-related mitigation. Out of the $112,000 cost ceiling, this would leave $101,000 for habitat/watershed actions.

These are just two examples, and many permutations are possible. Hydraulic continuity could be lower or higher than stated here. The same is true of transaction costs (legal fees and engineering analysis supporting the water rights purchase). If water rights acquired are located far upstream of the supply projected, then the weighting factor embedded in the mitigation evaluation procedure would give additional credit to the flow-related actions, leaving more money left over under the cost ceiling to fund habitat/mitigation actions. Other types of flow-related mitigation actions could be proposed, such as water conservation or reclaimed water projects. However these examples serve to illustrate how the cost of flow-related actions and habitat/mitigation actions relate under the cost ceiling.

Attachment K
Data Used in Determining In-Lieu Payment

The following procedure was developed to define the in lieu payment amount:

1. Collect Cost Data: Cost data for completing mitigation actions were collected from several sources and compared against each other (Table 1). Simple averages were calculated when more than one source was relevant to a mitigation action.

Table 1. Cost data for mitigation actions.

Mitigation Action	Unit	SRFB PRISM[1]	Puget Sound Shared Stragegy[2]	Snohomish Wetland Bank[3]	Average Base Cost
Riparian Restoration	per acre		$45,000- $65,000		$55,000
In-Channel Improvements	per 100 sq. ft	$19,249	$15,000- $45,000		$24,625
Side Channel/ Off Channel Habitat Restoration	per 100 sq. ft	$19,249	$70,000- $100,000		$52,125
Wetland Creation and Land Acquisition	per acre			$174,240	$174,240
Floodplain Reconnection	per acre		$20,000- $30,000		$25,000

[1] http://www.rco.wa.gov/rco/prism/prism.htm
[2] http://www.sharedsalmonstrategy.org/files/PrimeronHabitatProjectCosts.pdf
[3] *http://www.habitatbank.com/snohomishbank.html*

Add costs from land acquisition, monitoring and maintenance, and overhead. Land acquisition costs were estimated from two different sources and averaged (Table 2). Monitoring/ maintenance costs were calculated as percentages of the average base cost and were derived from the percent Clark County Public Works (CPW) has spent on mitigation projects in 2007- 2008 (phone interview, CPW, Karen Streeter). Overhead costs are not derived from existing cost data, but are meant to cover typical administration of in lieu fees, associated mitigation project oversight, and reporting to the Department of Ecology.

Table 2. Land Acquisition Costs.

PRISM	Shared Strategy	**Average**
$62,503.00	$24,000- $60,000	$52,251.00

Note: Costs are per acre of land acquired.

Table 3 lists total mitigation costs with all of these elements included. For projects where access is required but land requirements are minimal, a cost was derived by pro-rating land acquisition costs to the quantity of land indicated (e.g. 100 square feet), then multiplying by ten. This reflects the expectation that some of those projects may require a small acquisition of land or access rights; but many projects will involve access rights granted freely by public or private landholders.

Table 3. Total Mitigation Cost per habitat unit.

Mitigation Action	Unit	Average Base Cost	Land Acquisition (fee simple)	Monitoring/ Maintenance (14%)	Overhead (5%)	Total
Riparian Restoration	per acre	$41,320	$52,251	$5,785	$2,066	$101,422
In-Channel Improvements	per 100 sq. ft	$24,625	$1,202	$3,448	$1,231	$30,506
Side Channel/ Off Channel Habitat Restoration	per 100 sq. ft	$52,125	$1,202	$7,298	$2,606	$63,231
Wetland Creation and Land Acquisition	per acre	$174,240	$0	$0	$0	$174,240
Floodplain Reconnection	per acre	$25,000	$52,251	$3,500	$1,250	$82,001

2. Normalize costs according to the habitat mitigation point system. Since the impact of concern is always flow depletion, but the mitigation actions vary in their function and units of measure, a point system was applied. The point system defines the value of each mitigation action relative to the common flow depletion impact. An in lieu payment for flow depletion assumes that the administrator will carry out the mitigation actions with money paid by the applicant, and that the money will fully mitigate for the flow impacts. Therefore, the mitigation costs must be normalized to the point system (Table 4). Since one in lieu fee value is desired, the costs among the mitigation actions and reach tiers must be averaged (Tables 5 and 6). The Reach tier costs had a weighted average based on how the LCFRB intends to implement mitigation actions with the in lieu funding.

Table 4. Cost per Mitigation Point

			Mitigation Points			Cost per Mitigation Point		
Mitigation Action	Unit	Average Cost	Tier 1	Tier 2	Tier 3-4	Tier 1	Tier 2	Tier 3-4
Riparian Acquisition	per acre	$52,251	6	5	3	$8,709	$10,450	$17,417
Riparian Restoration	per acre	$101,422	12	6	5	$8,452	$16,904	$20,284
In-Channel Improvements	per 100 sq. ft	$30,506	15	9	3	$2,034	$3,390	$10,169
Side Channel/ Off Channel Habitat Restoration	per 100 sq. ft	$63,231	15	9	3	$4,215	$7,026	$21,077
Wetland Creation and Land Acquisition	per acre	$174,240	15			$11,616	$11,616	$11,616
Floodplain Reconnection	per acre	$82,001	5	4	2	$16,400	$20,500	$41,001
Average						**$8,571**	**$11,648**	**$20,261**

Table 5. Average Cost per Mitigation Point

Average Cost per Mitigation Point		
Tier 1	Tier 2	Tier 3-4
$8,571	$11,648	$20,261

Table 6. Weighted Average Cost per Mitigation Point.

Average Cost per Mitigation Point		
Tier 1	Tier 2	Tier 3-4
85%	15%	0%
$8,571	$11,648	$20,261
Weighted Average:	**$9,032**	

If fees are based on cfs-miles, an assumption of average points per 0.1 cfs-miles must be made. If we assume an average 6 depletion points per 0.1 cfs-mile (tier 2, flow limited), then a fee of **$54,000 per 0.1 cfs-mile** will be charged to an applicant. This amount can be pro-rated in increments of 0.01 cfs-mile (e.g. the in-lieu payment for an impact of 0.05 cfs-mile would be $27,000).

Appendix II Pending Applications for New Water Rights, WRIAs 27 & 28

Priority Date	Purpose	Qi	Unit	Qa	Irrigated Acres	WRIA	County	1stSource
12/19/1990	FS	1	CFS			27	COWLITZ	ROSS CREEK
1/18/1991	DS	5	GPM			27	COWLITZ	WELL
9/12/1991	PO	500	CFS			27	CLARK	CANYON CREEK
11/12/1991	IR,DS	20	GPM	1	1.5	28	CLARK	WELL
2/27/1992	IR,DS	30	GPM	1		28	CLARK	WELL
6/15/1992	DS	20	GPM	0.5		28	CLARK	WELL
7/14/1992	FS	0.05	CFS			28	SKAMANIA	UNNAMED STREAM
8/25/1992	IR,DS	6	GPM	1	1.5	28	CLARK	WELL
9/22/1992	IR,DS	20	GPM	0.83	33	28	CLARK	WELL
10/23/1992	IR	400	GPM		40	28	CLARK	WELL
11/24/1992	IR,DM	150	GPM	150	0	28	CLARK	WELL
12/2/1992	IR,DS	100	GPM		20	27	CLARK	WELL
12/22/1992	WL,IR	15	GPM	2.25	1.5	28	CLARK	WELL
1/13/1993	DM	50	GPM			28	SKAMANIA	WELL
1/25/1993	FS	1	CFS			27	CLARK	UNNAMED STREAM
2/22/1993	ST,IR	20	GPM		10	27	CLARK	WELL
3/16/1993	IR,DS	0.17	CFS		4	27	COWLITZ	NORTH FORK LEWIS
4/6/1993	DS	0.03	CFS			28	SKAMANIA	UNNAMED SPRING
4/26/1993	IR	1.11	CFS		160	28	CLARK	UNNAMED POND
5/4/1993	IR,FP	2.45	CFS		60	27	CLARK	NORTH FORK LEWIS
6/25/1993	IR,DM	60	GPM		38	27	CLARK	WELL
7/6/1993	DM	58	GPM			27	COWLITZ	WELL
8/4/1993	WL,DS	0.01	CFS			28	SKAMANIA	UNNAMED SPRING
8/4/1993	IR	16	GPM		9.4	28	CLARK	WELL
9/1/1993	IR	100	GPM		10	28	CLARK	WELL
9/27/1993	DS	0.01	CFS			27	CLARK	UNNAMED SPRING
11/12/1993	CI	800	GPM			28	CLARK	WELL
11/19/1993	ST,IR	0.2	CFS		5	27	COWLITZ	NORTH FORK LEWIS
1/7/1994	IR,DS	20	GPM		5	27	CLARK	WELL
4/28/1994	IR	0.004	CFS		0	28	CLARK	UNNAMED SOURCE
5/26/1994	ST,DS	0.02	CFS	1.5		28	SKAMANIA	UNNAMED SPRING
6/28/1994	IR,DS	1250	GPM		2	27	CLARK	WELL
7/19/1994	IR	90	GPM		9	27	COWLITZ	WELL
7/20/1994	DM	0.02	CFS			28	SKAMANIA	UNNAMED SPRING
7/28/1994	DS	0.02	CFS			28	SKAMANIA	UNNAMED SOURCE
11/28/1994	DM	50	GPM			27	COWLITZ	WELL
12/5/1994	DM	46	GPM			28	CLARK	WELL
1/3/1995	DM,CI	400	GPM			27	CLARK	WELL
1/19/1995	DM,CI	500	GPM			28	CLARK	WELL
1/30/1995	IR	100	GPM		40	28	CLARK	WELL
2/17/1995	IR,DM	1.3	CFS		120	28	CLARK	UNNAMED SPRING
4/27/1995	DS,CI	0.04	CFS			28	SKAMANIA	UNNAMED SPRING
6/5/1995	ST,DS	0.01	CFS			28	SKAMANIA	UNNAMED SPRING
6/6/1995	DS	0.02	CFS			28	SKAMANIA	UNNAMED STREAM
6/19/1995	DS	5	GPM			27	CLARK	WELL
7/27/1995	DM	50	GPM			27	COWLITZ	WELL
9/13/1995	IR	0.04	CFS		1.5	27	COWLITZ	UNNAMED STREAM
9/27/1995	MU	600	GPM			28	CLARK	WELL
10/2/1995	DS	0.02	CFS			27	CLARK	UNNAMED SPRING
10/5/1995	IR	250	GPM		50	27	COWLITZ	WELL
10/9/1995	DM	150	GPM			28	CLARK	WELL

Priority Date	Purpose	Qi	Unit	Qa	Irrigated Acres	WRIA	County	1stSource
12/6/1995	DM	6	GPM			27	COWLITZ	WELL
12/6/1995	DM	24	GPM			27	COWLITZ	WELL
1/4/1996	IR	325	GPM		120	28	CLARK	WELL
8/1/1996	IR,DM	700	GPM		10	28	CLARK	WELL
8/29/1996	DS	0.02	CFS			27	CLARK	UNNAMED SPRING
9/17/1996	IR	0.03	CFS		1.5	28	CLARK	UNNAMED SPRING
9/27/1996	DS	2	GPM			27	COWLITZ	WELL
2/3/1997	DM	25	GPM			27	COWLITZ	WELL
3/13/1997	IR,DS	60	GPM		4	27	CLARK	WELL
4/24/1997	DS	0.01	CFS			27	CLARK	UNNAMED SPRING
6/9/1997	DS	0.02	CFS			28	SKAMANIA	UNNAMED SPRING
8/5/1997	IR,DS	7	GPM		3	28	SKAMANIA	WELL
12/16/1997	DS	20	GPM			28	CLARK	WELL
12/29/1997	ST,IR	30	GPM		64	28	CLARK	WELL
1/13/1998	DM	8	GPM			28	CLARK	WELL
1/20/1998	DM	120	GPM			27	CLARK	WELL
3/19/1998	DM	30	GPM			27	COWLITZ	WELL
3/19/1998	DM	31	GPM			27	COWLITZ	WELL
4/6/1998	DM	0.2	CFS			28	CLARK	UNNAMED SPRING
5/18/1998	DS	0.02	CFS			27	CLARK	NORTH FORK LEWIS
6/25/1998	ST,IR	75	GPM		15	27	CLARK	WELL
7/27/1998	ST,DS	0.02	CFS			27	COWLITZ	UNNAMED SPRING
9/17/1998	DM	25	GPM			28	CLARK	WELL
10/21/1998	DS	0.03	CFS			28	SKAMANIA	UNNAMED SPRING
2/5/1999	DM	90	GPM			28	SKAMANIA	WELL
3/25/1999	IR	0.11	CFS		0	28	CLARK	UNNAMED POND
9/20/1999	DM	0.08	CFS			27	COWLITZ	KALAMA RIVER
1/24/2000	DM	90	GPM			28	SKAMANIA	WELL
7/20/2000	IR,DS	0.02	CFS		2	27	CLARK	UNNAMED SPRING
8/4/2000	EN	80	GPM			28	CLARK	WELL
8/14/2000	MU	1300	GPM			27	CLARK	WELL
11/7/2000	IR,DS	15	GPM		11	27	CLARK	WELL
1/19/2001	DS	15	GPM			27	CLARK	WELL
2/20/2001	DM	1100	GPM			27	CLARK	WELL
3/2/2001	IR	50	GPM		4	27	SKAMANIA	WELL
3/5/2001	DM	0.08	CFS			28	SKAMANIA	UNNAMED SPRING
4/16/2001	DM	25000	GPM			28	CLARK	WELL
4/23/2001	DM	1200	GPM			27	CLARK	WELL
4/27/2001	DM	1200	GPM			27	CLARK	WELL
5/18/2001	DM,CI	2100	GPM			27	COWLITZ	WELL
7/5/2001	MU	775	GPM			27	COWLITZ	WELL
9/4/2001	MU	350	GPM			28	CLARK	WELL
9/4/2001	MU	1000	GPM			28	CLARK	WELL#1
10/1/2001	DM	75	GPM			28	CLARK	WELL
2/22/2002	DM	40	GPM			28	SKAMANIA	WELL
3/6/2002	DM	45	GPM			28	SKAMANIA	WELL
3/15/2002	IR,DM	20	GPM		2	28	CLARK	WELL
10/1/2002	IR	0.35	CFS		8	27	COWLITZ	DAVIS CREEK
12/12/2002	IR	50	GPM		4	27	CLARK	WELL
3/12/2003	IR	150	GPM	50	100	27	CLARK	
4/20/2003	IR,DS	50	GPM	3	2	28	CLARK	
4/24/2003	DM	1100	GPM	1050		28	CLARK	
5/1/2003	IR	110	GPM	25	10	27	CLARK	

Priority Date	Purpose	Qi	Unit	Qa	Irrigated Acres	WRIA	County	1stSource
8/21/2003	DM	500	GPM			28	CLARK	Well 4
8/21/2003	DM	1000	GPM	880		28	CLARK	
8/21/2003	DM	1000	GPM	880		28	CLARK	
8/21/2003	DM	1000	GPM	880		28	CLARK	
1/22/2004	FR	0.2	CFS			28	CLARK	
3/8/2004	DM	21	GPM	5		27	CLARK	
3/8/2004	IR	54	GPM	20	2.5	28	CLARK	
4/19/2004	RE	0.29	CFS	3		27	COWLITZ	UNNAMED TRIBUTARY
5/6/2004	MU	1000	GPM	645		28	CLARK	
5/20/2004	MU	1200	GPM	1000		27	CLARK	
8/30/2004	RE	0	CFS	157		28	CLARK	SHILLAPOO WILDLIFE
3/31/2005	PO	0.2	CFS			28	SKAMANIA	UNNAMED SOURCE
9/28/2005	DM	70	GPM	8		27	SKAMANIA	
9/28/2005	IR,DM	351	GPM	156	40	27	SKAMANIA	
12/30/2005	DM	500	GPM			28	SKAMANIA	
12/6/2006	MU	7000	GPM	9900		28	CLARK	
6/5/2007	ST,IR	0.06	CFS	1.875	15	28	SKAMANIA	UNNAMED SPRING
6/25/2007	FS	11	CFS			27	COWLITZ	LAKE MERWIN
8/31/2007	WL	0	CFS	462		28	CLARK	LAKE RIVER
1/29/2008	HE	500	GPM			28	CLARK	
2/25/2008	HE	3500	GPM			28	CLARK	
3/10/2008	CI	4000	GPM	6452		28	CLARK	Well 9
5/8/2008	WL	4	CFS			27	COWLITZ	FRASIER CREEK