# 5. Fifteenmile Subbasin Management Plan

DRAFT

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Compiled by Wasco County Soil and Water Conservation District
in cooperation with
Fifteenmile Coordinating Group

## Plan Overview

The Fifteenmile Management Plan picks up where the Assessment and Inventory left off. The Assessment determined limiting factors, a working hypothesis and a desired future condition for the focal species. The Inventory described what has or is already being done. The Plan begins with the vision, goals and objectives for fish and wildlife recovery, and moves on to specific strategies.

The Plan includes an analysis of the extent to which the strategies described are consistent with the Endangered Species Act. This analysis relies on review of five Biological Opinions issues by NOAA Fisheries that cover the majority of the strategies and actions proposed in this plan.

The proposed strategies were reviewed by representatives of Oregon Department of Environmental Quality and Department of Agriculture. These reviewers analyzed the strategies for consistency with the Clean Water Act. Their statements are included.

The Plan is completed by a research, monitoring and evaluation plan designed to fill the gaps in our understanding, which were identified in the Subbasin Assessment.

## 5.1. Vision for the Subbasin (Desired Future Conditions or Goal Statements)

***Fifteenmile Coordinating Group envisions the future Fifteenmile Subbasin as "a healthy, self-sustaining ecosystem of people, fish, wildlife, plants and other natural and cultural resources that provides direct benefits to society and nourishes the spirit."***

### 5.1.1. Human Use of the Environment (Economic and Social Considerations)

The Fifteenmile Subbasin is home to around 18,000 people, and includes three urban areas. The primary economic drivers outside of the City of The Dalles are agriculture and grazing. More than 110,000 acres are used for agriculture in the Subbasin. Timber management occurs on both private and public lands in the higher elevations.

### 5.1.2. Aquatic Species

Healthy habitat can be achieved for all four aquatic focal species. Given that all other factors remain equal or improve, the populations can be supported at a sustainable level. In years of strong runs, individuals in excess of escapement goals could be harvested.

### 5.1.3. Terrestrial Species

Habitats for the seven wildlife focal species will be maintained or increased.

### 5.3.4. Goals and Objectives of the Watershed Councils

The three watershed councils in the Fifteenmile Subbasin have each updated their goals and objectives and submitted them for inclusion in the Fifteenmile Subbasin Plan. These goals and objectives represent the priorities developed by the local population for the specific areas covered by each watershed council.

#### Fifteenmile Watershed Council

Fifteenmile Watershed Council considers natural resource issues within the Fifteenmile Watershed itself, including Eightmile Creek and other tributaries. The mission of the Fifteenmile Watershed Council is to foster better stewardship of the Fifteenmile watershed resources, deal with issues in advance of resource degradation, and ensure sustainable watershed health, functions, and uses. Fifteenmile Watershed Council completed a watershed assessment using the Oregon Watershed Assessment Manual in 2003.

**Goals:**

1) Maintain or improve soil quality and quantity.

2) Increase upland water storage and availability.

3) Minimize sediment delivery to streams.

4) Improve instream habitat.

5) Improve water quality and quantity.

6) Protect or improve limiting types of wildlife habitat.

7) Sustainably manage grassland and forestland resources.

**Objectives**:

**Primarily on agricultural lands:**

A) **Erosion:** By 2010, 90% of agricultural acres in Fifteenmile Watershed will be farmed according to plans that produce erosion rates at or below "T", the soil loss tolerance. (FSA is working on ways to better track management techniques.)

B) **Soil Quality:** By 2010, 90% of agricultural acres in Fifteenmile will be farmed under management plans that maintain or increase organic matter.

C) **Weed and Pest Control:** By 2012, develop and adopt integrated pest control plans on 40% of agricultural acres in Fifteenmile Watershed.

D) **Water Quantity:** By 2012, all surface water diversions in Fifteenmile will be metered and will be in compliance with water rights certificates.

E) **Water Quantity:** By 2012, summer flows in Fifteenmile Creek through Dufur Valley and other areas with high spawning and rearing potential will be increased through voluntary means, including adoption of efficient technology, conversion of surface water to groundwater, instream transfers and leases.

**Primarily on forest or grazing lands:**

E) **Forest Harvest:** Ongoing and Immediately: all forest harvest will follow plans to minimize erosion and sedimentation.

F) **Grazing:** By 2010, Identify instances of continued overgrazing and implement sustainable grazing management plans on 90% of the identified acres.

G) **Fuels Buildup:** By 2010, identify areas of dangerous fuels buildup and develop plans or programs to address 90% of them.

**Throughout Fifteenmile Watershed:**

H) **New Noxious Weeds:** Ongoing and immediately: Prevent invasion of new noxious weeds through education, reporting and quick response. ***Management of noxious weeds is a concern in the management of riparian buffers.***

I) **Established Noxious Weeds:** Ongoing and immediately: Those noxious weeds that are already present and widely established should be managed to prevent further damage to the resources.

J) **Riparian Vegetation:** By January 2005, on all lands, private and public, allow establishment and development of adequate riparian vegetation for streambank

stability and shading, consistent with site capability. (This is consistent with the LD Ag Water Quality Management Plan, except that it applies to all land uses, not just agriculture.)

K) **Roads and Culverts:** By 2008, identify highest priority roads or culverts that cause gully erosion, deliver sediment directly to streams, or constrict floodplain function and develop plans and programs to mitigate their negative effects. Separate plans and programs should be developed for public roads, farm roads and National Forest roads.

## The Dalles Area Watershed Council

The Dalles Area Watershed Council considers natural resource issues within the watersheds of Threemile Creek, Mill Creek, Chenowith Creek, and adjoining areas that drain to the Columbia River from Threemile Creek to Rowena.

The mission of The Dalles Area Watershed Council is to foster stewardship of natural resources, deal with issues in advance of resource degradation where possible, support restoration activities where degradation has already occurred, and encourage and ensure sustainable watershed health, functions, and uses.

The Dalles Watershed Council completed a watershed assessment using the Oregon Watershed Assessment Manual in 2003.

**Table 5.1. The Dalles Area Watershed Council Goals and Objectives**

| Goals | Objectives |
|---|---|
| **1) Improved water quality** | 1a) In 2020, turbidity will meet City of The Dalles standards on South Fork Mill Creek and DEQ standards elsewhere. |
| | 1b) In 2020, stream temperatures throughout the watershed will meet DEQ standards. |
| | 1c) By 2020, there will be no detectable organophosphates or other broad-spectrum chemicals in the streams. |
| | 1d) By 2020, there will be no nutrient loading above background levels due to land use practices. |
| **2) Improvement in watershed awareness** | Education-based objectives. |
| **3) Protect agricultural lands and floodplains.** | 3a) Carefully manage growth into agricultural lands or floodplains. |
| | 3b) Fewer zoning variances in rural areas. |
| **4) Functioning Domestic Water Sources.** | 4a) In 2020, domestic water sources will continue to meet the needs of the population |
| **5) Decreased erosion and sedimentation** | 5a) By 2020, soil erosion due to land use practices will be reduced to at or below the soil loss tolerance as defined by NRCS. |
| | 5b) By 2020, cobble embeddedness in all streams will meet ODFW benchmarks (Kelly Moore, ODFW) |
| **6) Better fish habitat for both resident and anadromous fish.** | 6a) By 2020, all endangered species will be recovered and delisted. |
| | 6b) By 2020, all riparian areas will have healthy, mature vegetation, featuring an appropriate mix of plant ages and communities with little or no noxious weeds. |
| | 6c) By 2020, cover, pool/riffle ratios, stable banks and large woody debris in 90% of stream reaches will meet ODFW benchmarks (Kelly Moore, ODFW) |
| | 6d) By **2010**, there will be no artificial fish passage barriers in the Mill Creek system. |
| | 6e) By **2010**, there will be no artificial fish passage barriers in Threemile Creek below RM4.5. |
| **7) Healthy Wildlife Populations** | Objectives not developed. |

## Mosier Watershed Council

Mosier Watershed Council considers natural resource issues in Mosier Creek, Rock Creek and Rowena Creek, as well as adjacent lands draining to the Columbia River. Their mission is to foster better stewardship of the natural resources in Mosier, Rock, and Rowena Creek watersheds and associated lands, deal with issues in advance of resource degradation, and ensure sustainable watershed health, functions, and uses. Mosier Watershed Council completed a watershed assessment using the Oregon Watershed Assessment Manual in 2002.

The Mosier Watershed Council emphasizes that the greatest threat to natural resources in the Mosier Watershed is groundwater overdraft and surface water overallocation. Groundwater and surface water are closely linked in the Mosier area. Falling groundwater levels in the aquifers of the Mosier Valley threatens not only the sustainability of agriculture within the valley, but also threatens the cutthroat and steelhead populations within the watershed. Because of this, action planning by the Mosier Watershed Council has focused on groundwater conservation.

**Mosier Watershed Council Groundwater Action Plan Goals:**

1) Stabilize or increase the groundwater level in Priest Rapids and Frenchman Springs Aquifers.
2) Stabilize or increase the groundwater level in the Pomona Aquifer.
3) Allow sustainable agricultural and residential groundwater use, but prevent overuse of water in the area of concern.
4) Continue monitoring efforts to determine when and if goals 1-3 are met.

**Table 5.2. Mosier Watershed Council Groundwater Action Plan Objectives and Actions:**

| Objective | Actions | Timeline |
|---|---|---|
| 1) Maximize efficiency of existing irrigation operations, and reduce groundwater withdrawals. | A) Inventory irrigation technologies currently in use. Quantify efficiency. | 2004-2005 |
| | B) Assist landowners to make efficiency upgrades. | 2004-2005 |
| | C) Where economically feasible and desirable for the irrigator, transfer water rights out of the area of concern. | 2005-2008 |
| | D) If needed, develop an irrigation district with withdrawals from Columbia River. | 2004-2005 |
| 2) Improve well efficiency, either by casing or by replacement of old wells with new, in order to reduce | A) Identify wells that allow comingling of aquifers. Estimate total volume of comingling. | 2004-2005 |
| | B) Repair or replace comingling wells. | 2004-2005 |

| | | |
|---|---|---|
| aquifer co-mingling and thus improve hydrologic head in the Priest Rapids and Frenchman Springs aquifers. | C) Replace or repair City of Mosier Well #3. Implement most cost-effective option that addresses City's legal obligations. | 2004 |
| 3) Allow sustainable level of resource use, allowing conservation of local values. | A) Study and develop water budget. | 2004-2006 |
| | B) Explore critical groundwater area. | 2006 |
| | C) Develop county ordinance governing residential well use in the area of concern. | 2006 |
| 4) Monitor observation wells. | A) If aquifers recover, revisit issues of aquifer withdrawal and county ordinances after 10 years. | 2013 |
| | B) If aquifers continue to drop, use public process to seek more options. | 2013 |

## 5.2. Biological Objectives—Aquatic Species

### Steelhead

#### *Biological Performance—Responses of focal species to habitat conditions*

##### Capacity and Productivity

Capacity refers to the maximum output of a given habitat unit. If, for any reason, a population exceeds the capacity of the habitat to support that population, density-dependent mortality factors increase, thus reducing the population to below the capacity. After completing all feasible restoration alternatives, EDT projects a rough doubling of smolt production capacity in Fifteenmile Watershed (figure 5.1).

Productivity is a measure of the potential expansion of a population that is at very low levels, i.e. when density dependent factors do not limit growth. A productive population will rebound more quickly from a disturbance. After modeling the integrated suite of restoration alternatives, EDT predicts an increase in productivity of the Fifteenmile steelhead population from 207 smolts per spawner to 366 (table 3.13).

##### Abundance

Abundance is the self-sustaining population level, given a particular capacity and productivity. When the population exceeds this level, it will tend to fall. When the population is below this level, it will tend to increase. Abundance might be thought of as the predicted population level, but this would be misleading, as the population naturally varies from year to year as conditions change. In this document, biological objectives will be expressed as a desired population range.

Biological objectives for steelhead production within Fifteenmile Subbasin should logically be expressed in terms of smolt production, rather than adult returns. Adult returns are affected by out-of-subbasin conditions. Smolt production is somewhat buffered from such effects, especially if the population is highly productive or is close to capacity. Furthermore, counts of returning adults are not available in Fifteenmile, whereas infrastructure exists to estimate outmigrating smolts from the Fifteenmile Watershed.

The thought process described in the Fifteenmile Subbasin Assessment leads to a restoration goal of 8,125-18,697 smolts per year (table 3.13). Such a range is 78% higher than the range of population estimates based on screw trap results from 1998, 2000 and 2003.

The Interior Columbia Basin Technical Recovery Team (IC-TRT) of NOAA Fisheries set an interim recovery goal of 500 spawners in Fifteenmile Subbasin.[1] Below this level, salmonid populations are noted by the IC-TRT to experience a higher risk of genetic drift due to inbreeding.[2] However, the IC-TRT recovery goal refers to the steelhead run of the entire Fifteenmile Subbasin. Based on Dan Rawding's estimate that 5% of the wild winter steelhead that pass Bonneville Dam return to Mill Creek, while 25% return to Fifteenmile[3], the IC-TRT interim recovery goal could be split with 417 spawners returning to Fifteenmile and 83 returning to Mill Creek or other streams in the subbasin (Table 5.3). These numbers exceed the low end of the estimated population range after proposed restoration. In fact, they exceed the low end of the estimated population range under the 100% restoration scenario (Table 5.3). Thus, while the average steelhead run after restoration activities would probably exceed the interim recovery goals, some poor run years would fall short. Because of the variability in life history patterns (smolting at 1-3 years and adult returns at 1-3 salt years), a single poor run would probably pose minimal risk of genetic drift.

**Table 5.3. Comparison of Interim Recovery Goals with estimated population ranges under proposed restoration plan, 100% restoration scenario, and presettlement conditions.**

| | Interior Columbia Basin Technical Recovery Team | Estimated Spawners under proposed restoration plan | 100% Restoration Scenario | Estimated Spawners under Presettlement conditions[1] |
|---|---|---|---|---|
| Fifteenmile | 417 | 268-2,274 | 311-2,638 | 439-3,726 |
| Mill Creek and other streams | 83 | 54-455 [2] | 62-528 [2] | 88-745 [2] |

[1] Equivalent to 100% restoration of both in-basin and out-of-subbasin conditions
[2] Fifteenmile estimate divided by 5.

The process described in the Fifteenmile Subbasin Assessment would suggest that if all proposed habitat restoration efforts were completed, adult returns would vary from 268-2,274. The stock production curves generated by EDT suggest that escapement of about 1,200 would be sufficient to provide a stable population, either under current conditions or under projected restored conditions (figure 5.1).

The eventual goal includes delisting the steelhead based on recovery of the populations. IF the steelhead were delisted, the opportunity for harvest appears. In-basin harvest goals

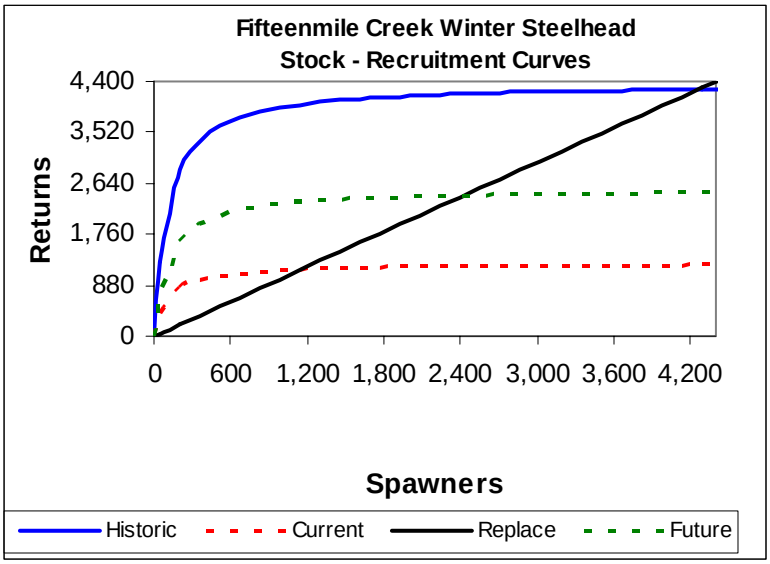
[1] Lynn Hatcher, pers. comm. Via e-mail, 4/30/2004.

[2] IC-TRT July 2003

[3] Dan Rawding, WDFW. Quoted in memorandum from Steve Pribyl to Rod French, March 26th, 2004

have not been discussed among the co-managers. However, it could be tentatively suggested that returning adults in excess of 1,200 could be harvested in-basin with little or no effect on the next generation of returns. Half of this harvest would legally be allocated to tribes and the other half might be allocated to sport fishery. If an in-subbasin harvest is included as part of our goal, it would be desirable to count returning spawners as well.

**Figure 5.1: Stock Recruitment Curves for current conditions, historic conditions and restoration goal, generated by EDT.**




**Diversity and Spatial Structure**

The spatial structure of the Fifteenmile winter steelhead population has been modified and restricted by culvert barriers and hostile environmental conditions in the middle and lower elevations of the Fifteenmile Watershed.

Five culvert barriers were identified in the Fifteenmile Subbasin Assessment on Fifteenmile Creek. Together, these cut off a total of 7,623 feet of modeled presettlement spawning habitat in Fifteenmile Creek. Fixing these barriers would, according to EDT, increase smolt production by 1%, increase steelhead spawner runs by 8%, and increase life history diversity by 4%.

While the replacement of culverts is included in the proposed suite of restoration activities, restoration activities that focus on the middle watershed have much greater potential to increase life history diversity and spatial range, as revealed by the Fifteenmile Subbasin Assessment.

### *Environmental Characteristics—conditions needed to achieve the desired biological performance*

#### Fifteenmile Creek Watershed

The biological performance described above relies on improvement of conditions in the lower half to two-thirds of the Fifteenmile watershed. The following improvements in habitat are listed in the order of priority implied by results the restoration scenarios described in the subbasin assessment:[4]

1. Development of fully functional floodplains and riparian vegetation throughout the watershed.

2. Restoration of large woody debris to recreate presettlement habitat characteristics in approximately 40 stream miles where key habitat and habitat diversity are most severely reduced.

3. Restoration of summer flows throughout the watershed by about 50% of the presettlement condition. At the mouth, this would correspond to at least 7 cfs in August, with corresponding improvements in other months. Flow restoration would provide corresponding improvements in stream temperature.

4. Restoration of upland watershed function to reduce runoff, erosion and sedimentation.

#### Mill Creek Watershed and other Streams

Outside of Fifteenmile Watershed, Mill Creek Watershed provides the most potential habitat for steelhead, with approximately 20 miles of potential spawning grounds. Potential capacity, productivity and abundance can not be estimated without conducting habitat surveys and water quality tests. Based solely on stream miles, Mill Creek Watershed might be estimated to have a similar productivity and a steelhead capacity about one fifth that of Fifteenmile Watershed, thus leading to a *very tentative* biological objective of 1,625-3,739 smolts per year and 62-528 adults per year.

The current population abundance is probably below the biological objective due to widespread loss of floodplain function and riparian vegetation, chemical pollution, runoff, and low flows. Most of these issues are most intense in the lower mainstem, although low flows are most notable in the South Fork below Wick's Water Treatment Plant. Development and implementation of a restoration program to achieve the biological goals should begin with baseline monitoring to determine the current condition of the watershed and the steelhead population.

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[4] As of May 28th, 2004, the Fifteenmile Coordinating Group had not come to full agreement on the order of priorities.

Passage is the major issue on Threemile Creek. The culvert at I84 cuts off most or all steelhead access to that watershed. Upstream of that, a stabilized headcut creates a 20 foot cascade at RM 4.5. Between those points, other barriers have been identified, but not quantified. In addition, Threemile Creek suffers all the same water quality issues as Mill Creek.

Oregon Department of Transportation has tentative plans to replace the I84 culvert on Threemile in 2006. This plan calls for projects to study and restore water quality on Threemile Creek in the first 4.5 miles of stream. After replacement of the I84 culvert, spawning surveys should be conducted for four to five years to determine whether steelhead are entering and using Threemile Creek. If steelhead successfully spawn and rear in Threemile following the replacement of the I84 culvert, this plan might be amended to place a greater priority on Threemile Creek, and to consider restoration of access upstream of RM4.5.

Chenowith Creek, Mosier Creek and Rock Creek offer a total of four miles of habitat. Of these, the highest restoration value was in Mosier Creek. While the total stream miles open to steelhead in Mosier Creek is less than a half mile, the habitat in the canyon downstream of Pocket Falls is potentially valuable spawning and rearing habitat. Water quality impacts to this reach mostly originate upstream, from residences and agriculture. Restoration of steelhead habitat would thus correspond with restoration of cutthroat habitat and would have to do with reducing the impact of human land uses upstream of Pocket Falls.

## Lamprey

The capacity, productivity, abundance and life history of lamprey in Fifteenmile Subbasin are unknown. Before biological performance objectives can be developed, data must be collected allowing estimates of abundance and capacity.

Lamprey are believed to have similar habitat requirements to steelhead. Thus, the same measures that improve steelhead habitat should improve conditions for lamprey.

## Resident Rainbow-type Trout

Current capacity, productivity and abundance of resident rainbow-type trout is unknown, as are the genetic relationship and habitat interactions between resident rainbow-type trout and steelhead. Resident trout have slightly different habitat needs from steelhead, though both require cool water temperatures and clean, highly oxygenated water, and both utilize the same sorts of prey. Habitat projects designed to improve conditions for steelhead should be evaluated carefully to make sure that they do not reduce habitat quality for resident trout.

## Cutthroat Trout

Management for cutthroat trout should be the focus in most areas without anadromous access, including South Fork Mill Creek above Mill Creek Falls, Mosier Creek above

Pocket Falls, and Rock Creek above Rock Creek Falls. The capacity, productivity, abundance and life history of cutthroat in Fifteenmile Subbasin are unknown, although their range is fairly well determined as a result of surveys conducted by ODFW and Oregon Department of Forestry in compliance with the Oregon Forest Practices Act. ODFW and US Forest Service have collected some data for Fivemile Creek. Before biological performance objectives can be developed, data must be collected allowing population estimates and characterizing habitat conditions.

In those areas where cutthroat and steelhead are both present (Fivemile Creek, lower South Fork Mill Creek, North Fork Mill Creek, possibly Threemile Creek), habitat projects designed to improve conditions for steelhead should be evaluated carefully for their impact on cutthroat habitat.

## 5.3. Prioritized Strategies--Aquatic Species

### 5.3.1. Restoration Strategies

Six restoration strategies are presented in the order of the relative increases each produced in life history diversity, productivity, capacity and abundance when modeled through the EDT Scenario Builder. EDT was only applied to Fifteenmile Watershed, and only applied to steelhead. However, these same restoration strategies are believed to be generally appropriate to the other focal species and to the other watersheds, as well. Following the first six restoration strategies, other restoration strategies will be listed that were not modeled, either because they address issues specific to The Dalles and Mosier Watersheds, or because they did not conform to restoration, as defined by EDT.

#### Riparian/Floodplain Restoration

Activities that might be undertaken in this strategy include:

- Grading/leveling/filling/seedbed preparation in riparian areas
- Establishment of riparian vegetation through active planting of grass, shrubs and trees, or through passive protection activities.
- Control or removal of invasive plant species.
- Construction of fencing to create separate grazing management units for riparian areas.
- Installation of livestock exclusion fencing, off-channel livestock watering facilities and livestock stream crossings
- Removal of levees, dikes, berms, weirs or other water control structures.
- Setback of levees, dikes, and berms.
- Reshaping of streambanks as necessary to reestablish vegetation.
- Excavation and removal of artificial fill materials from former wetlands.
- Reintroducing beavers in areas where they have been removed.
- Removing structural bank protections and other engineered or created structures that do not meet the definition of Bioengineering Methods (see below).
- Recontouring offstream areas that have been leveled.

Of any one restoration strategy, wide-spread implementation of riparian buffers on private lands produced the greatest increase in steelhead capacity and abundance when modeled by the EDT Scenario Builder. It also produced the second highest increase in productivity. This result was consistent across multiple EDT runs in which environmental and population parameters were varied.

Generally, the function of riparian restoration is to restore floodplain functions. In more detail, the purposes are: (1) Reestablish a hydrologic regime that has been disrupted by human activities, including functions such as water depth, seasonal fluctuations, flooding periodicity, and connectivity; (2) increase area available for rearing habitat; (3) improve

access to rearing habitat; (4) increase channel diversity and complexity; (5) provide resting areas for fish and wildlife species at various levels of inundation; (6) reduce flow velocities and streambank erosion; (7) provide protective cover for fish and other aquatic species; and (8) improve or reestablish riparian/wetland processes and functions which have been disrupted by human activities, such as provision of fish and wildlife habitat, flood water attenuation, nutrient and sediment storage, support of native plant communities and removal of pollutants.

Programs that are currently in place to establish riparian buffers include the Fifteenmile Creek Habitat Enhancement Program (ODFW), Conservation Reserve Enhancement Program (CREP) and Continuous Sign-up of the Conservation Reserve Program (cCRP). These three programs are well coordinated, with USDA, SWCD and ODFW personnel working together with landowners. Bonneville Power Administration supports these programs by funding the Fifteenmile Creek Habitat Enhancement Program and by funding technical assistance to develop and implement buffer plans.

Funding for these and similar programs should continue and expand. Despite the efforts of USDA personnel and BPA-supported SWCD personnel, the backlog of landowners waiting for CREP plans continues to expand. As of April 23, 2004, 51 landowners await technical assistance for CREP plans in Wasco County.

Additional incentive should be offered for landowners to enroll wide riparian buffers in the programs. The average width of riparian buffer enrolled in CREP to date is ever 100 feet on each side of the creek,[5] but many landowners still choose the minimum 35 foot width in order to maintain some economic use of the floodplain. Depending on the width of the floodplain, 35 feet on either side of the stream may not be wide enough to gain the full ecological benefit. An additional monetary incentive offered to those landowners that choose to enroll buffers wider than 100 feet might help offset economic losses.

One concern in the management of riparian buffers is the management of noxious weeds. Many species of noxious weeds can be spread by water. In the absence of management, noxious weeds can take root and spread in a riparian buffer. The Fifteenmile Watershed Council identified this as a significant concern that must be addressed whenever riparian buffers are established. The Habitat Improvement Projects Biological Opinion (HIP BiOp) does not make note of this effect, although it does encourage the use of riparian pastures "in which livestock may be managed specifically to meet riparian or aquatic restoration goals."[6]

It should be noted that this strategy will take at least 15 years and sometimes much longer to reap maximum benefits. Landowners will continue to sign up for the program for another 4-5 years. Active tree and shrub plantings will take place for 2-3 years after that.

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[5] CCRP/CREP Records, USDA Office, The Dalles OR, 5/21/04

[6] NOAA Fisheries 2003 (HIP BiOp) page 138

Then, we must wait for the trees to grow to maturity. Both CREP and ODFW lease agreements last 10-15 years.

This long time frame is both a strength and a weakness of the CREP program. Before trees reach maturity, the monetary incentive for private landowners to keep the trees there will disappear. The Fifteenmile Watershed Council identified this as a concern in March 2004 and emphasized the need to renew these leases starting in 2014.

## Streambank Bioengineering

Streambank bioengineering would be used in some locations to protect and repair eroding streambanks, thereby reducing sediment loading in streams and promoting naturally functioning channels and more stable stream courses. Potential activities would include:

- Woody plantings and variations (*e.g.,* live stakes, brush layering, facines, brush mattresses).
- Herbaceous cover, where analysis of available records (*e.g.,* historical accounts and photographs) shows that trees or shrubs did not exist on the site within historic times, primarily for use on small streams or adjacent wetlands.
- Deformable soil reinforcement, consisting of soil layers or lifts strengthened with fabric and vegetation that are mobile ('deformable') at approximately two- to five-year recurrence flows.
- Coir logs (long bundles of coconut fiber), straw bales and straw logs used individually or in stacks to trap sediment and provide growth medium for riparian plants.
- Bank reshaping and slope grading, when used to reduce a bank slope angle without changing the location of its toe, increase roughness and cross-section, and provide more favorable planting surfaces.
- Floodplain roughness, *e.g.,* floodplain tree and large woody debris rows, live siltation fences, brush traverses, brush rows and live brush sills; used to reduce the likelihood of major channel movement in areas where natural floodplain roughness is poorly developed or has been removed.
- Floodplain flow spreaders, consisting of one or more rows of trees and accumulated debris used to spread flow across the floodplain.
- Flow-redirection structures known as barbs, vanes, or bendway weirs, possibly constructed with natural materials such as rootwads and logs.

## Large Woody Debris (Habitat Forming Natural Material Instream Structures)

When modeled in EDT, large woody debris placement in key restoration reaches resulted in the second highest increases in capacity, abundance and productivity. This strategy aims to:

(1) Provide instream spawning, rearing and resting habitat for salmonids; (2) provide high flow refugia; (3) increase interstitial spaces for benthic organisms and juvenile

salmonids; (4) increase instream structural complexity and diversity; (5) promote natural vegetation composition and diversity; (6) reduce embeddedness in spawning gravels; (7) reduce siltation; (8) reduce the width/depth ratio of the stream; (9) mimic natural input of large woody debris in aquatic systems that have been altered by channelization and land use practices; (10) restore historic hydrologic regimes; (11) decrease flow velocities; (12) deflect flows into adjoining floodplain areas, and (13) aggrade incised channels, increasing stream channel and floodplain connectivity.

The scenario modeled in EDT applied this strategy to Fifteenmile Creek reaches 4, 5, 7, 8, and 9, Eightmile reaches 6 and 8, and Fivemile reaches 3 and 4 (see figure 3.2), the reaches that ranked highest in terms of restoration value. These reaches are all on private lands.

All activities intended for installing habitat-forming, instream structures will provide the greatest degree of natural stream and floodplain function achievable through application of an integrated, ecological approach (NOAA Fisheries 2003b). Instream structures capable of enhancing habitat forming processes and migratory corridors will be installed within previously degraded stream reaches. These structures include engineered log jams and other cover structures designed with large woody debris and/or boulder materials. Structures will be installed only in streambed gradients of 6% or less. Structure placement activities include structure types that are designed to lower a stream's width to depth ratio while providing habitat and migratory corridors capable of connecting existing habitats and promoting a naturally-functioning channel. Dependent on site location and design criteria, some structures may be anchored. If anchored, a variety of methods may be used. These include buttressing the wood between riparian trees, cabling the structure to existing structures, and/or anchoring with boulders, concrete blocks or new log wedges. Roni *et al.* (2002) citing Thom (1997) stated that pinning channel spanning logs between trees in the riparian zone is an effective method of naturally anchoring LWD (NMFS 2001f).

Placement of large wood will occur in channels with an intact, well-vegetated riparian buffer area that is not mature enough to provide large wood, or in conjunction with riparian rehabilitation and/or management. Wood placement will be limited to areas where the absence of large wood has been identified as a limiting factor for fish habitat using survey data.

The placement of large boulders will generally be restricted to streams where boulders naturally occur but are currently lacking. Boulder placement projects will usually rely on the size of boulder for stability, not on artificial cabling or other devices. Structures that include large boulders will be designed to promote naturally-functioning channel conditions.

Some of the instream habitat improvement projects may involve pulling or felling trees into streams. Although trees would be sacrificed and maneuvered within the riparian zone and stream channel, in these projects, no trees would be harvested or removed from riparian reserves. In addition, the projects would extend over substantial distances and stocking levels of remaining trees would remain high.

Private landowners often have justifiable concerns about large woody debris placement. Will the wood move? Will it back up behind bridges and culverts? Will it direct water into farm fields and infrastructure? Such concerns must be thoughtfully addressed before this strategy can be implemented on private lands. The following points should be considered on a case-by-case basis:

- The greater density of infrastructure on private lands will require anchoring, such as cables and trash racks, to be used much more frequently than would be the case in a similar project on public land. On public lands, logs are often not cabled into place. Experience has shown that large woody debris placements are more likely to mimic natural conditions if the logs have a chance to shift. However, in cases where infrastructure might be threatened, logs must be anchored and/or trash racks placed to prevent logs from moving downstream.

- The best locations for large woody debris placements may be in wide riparian buffers (as recommended by NOAA Fisheries)[7]. Such locations will generally minimize unintended stream channel movement into adjoining land uses, while allowing natural levels of channel migration to occur.

- Incentives may be required for landowners to allow large woody debris placements to occur. Incentives could include a one-time bonus payment plus an extension of the riparian buffer lease agreement, desirable in its own right for fish restoration.

- Direction and administration of a large woody debris placement program might come from ODFW, SWCD or Forest Service. The program would most likely be a cooperative venture between all three.

## Low Flow Restoration

Flow restoration (both high and low flows) produced the third highest increase in steelhead capacity and abundance, although the increase in productivity was relatively low. The scenario modeled in EDT assumed that both high and low flows would be returned to presettlement conditions. This is not considered a feasible objective, but was simply used to represent the maximum potential of this strategy.

Restoration of low flows and mitigation of peak flows are actually two separate challenges requiring different actions. Low flows will be considered first.

The average natural flow at the mouth of Fifteenmile Creek in August is only 10.7 cfs, and the expected average flow after diversions is 3.45 cfs.[8]

[7] NOAA Fisheries 2003 (HIP BiOp)

[8] OWRD website, April 2004, www.wrd.state.or.us

Several actions can be undertaken that will lead to increases in the average summer low flows. Each has advantages and limitations.

Irrigation efficiency upgrades represent an early source of savings. Orchard Ridge Ditch and Wolf Run Ditch have a combined total of about 12 miles of unpiped ditches with significant water loss. Piping both of these ditches would save approximately 1.5 cfs each, which, according to the Oregon State "Allocation of Conserved Water Statute", could be allocated partially to instream flow and partially to the water rights holders, thus creating a win-win situation. Funding would be needed for design, NEPA, materials, labor and inspection. With cooperation from the Forest Service, SWCD and water rights holders, both project could be completed within four years and immediately begin to reap benefits for focal fish species.

The Fifteenmile Watershed Council recommended on January 28th, 2004 that restoration of low flows be made a priority specifically in the Dufur Valley, because this is the reach of Fifteenmile Creek in which flows and temperatures quickly degrade. For instance, on August 1 2002, the daily maximum surface temperature quickly rose from approximately 13° C at the National Forest boundary to 22°C at the City of Dufur.[9] EDT also identified these reaches as priorities (Fifteenmile 8 and 9). The same result occurs in Eightmile Creek between the National Forest boundary and Japanese Hollow. Once again, these reaches were identified as priority restoration reaches by EDT (Eightmile 6, 7, and 8).

One suggestion from the watershed council is the conversion of surface water rights to groundwater rights. This approach is recognized by the Biological Opinion on Habitat Improvement Projects (HIP BiOp) developed by NOAA Fisheries in consultation with Bonneville Power Administration. The BiOp notes several beneficial effects, but also notes the potential indirect effect that "if wells are not well regulated, pump rates can significantly reduce the level of the local water table and create a deficit in the groundwater budget."[10] This same concern was noted by the Fifteenmile Watershed Council.

Instream water rights totaling 13 cfs are registered for Fifteenmile Creek from the confluence with Eightmile to the Dufur Intake. Instream water rights in Eightmile Creek total 10 cfs below Fivemile and 5 cfs above Fivemile.[11] These instream water rights have priority dates after 1980, and therefore have relatively little effect on streamflow, because consumptive rights with priority dates prior to 1980 must be met before the instream right takes effect. Lease or purchase of selected senior water rights from willing seller/leasors would allow establishment of instream water rights with senior priority dates in key reaches, including Eightmile Creek above Fivemile Creek, and Fifteenmile Creek from the Forest Service boundary to the confluence with Eightmile Creek.

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[9] SWCD/DEQ Infrared aerial survey, 2002

[10] HIP BiOp, page 149.

[11] http://stamp.wrd.state.or.us/apps/wr/summary_reports/pod_summary.php

OWRD generally allows points of diversion to be moved downstream. In some cases, a point of diversion can be moved downstream from a tributary into a mainstem. This can be advantageous where the tributary has very low flows and the mainstem has strong flows, or where a change in point of diversion will rewater a high priority reach.

The proposed restoration scenario assumed a 50% recovery of presettlement flows throughout the watershed. It is unknown whether such an objective is possible or practical. To determine the potential for flow restoration, one would have to estimate the amount of water that could be saved through irrigation efficiency, the number of water rights holders that might be interested in instream leases or sale of water rights, the impact and potential of point-of-diversion changes, etc.

## Mitigation of Upland Runoff and Sediment Sources

Peak flows can be moderated by reducing upland runoff, reducing impervious surfaces, increasing vegetative cover, and restoring floodplain function and meanders. Methods include continued adoption of no-till farming and other conservation farming practices, closure of forest roads and by restoring the length and complexity of the stream channel.

### *Conservation Farming on Drylands*

Incentive programs will encourage private farm owners to adopt the following conservation practices, outlined in the NRCS Conservation Practice Standards:

329a Residue Management, No-till and Strip Till (NRCS 2000c)

329b Residue Management – Mulch Till (NRCS 1999a)

328 Conservation Crop Rotation (NRCS 2000f)

330 Contour Farming (NRCS 2000a)

585 Contour Strip Cropping (NRCS 2000)

590 Nutrient Management (NRCS 1999e)

777 Residue Management Direct Seed (NRCS 2000h)

586 Stripcropping (NRCS 2002b)

The most effective conservation cropping systems available for dryland crops in the Fifteenmile Subbasin is No-till or Direct Seed. These two practices are nearly the same thing. Both of them minimize soil disturbance by using high-tech drills to seed and fertilize directly into standing crop residue with no prior tillage. The practices are distinguished by the percentage of ground disturbance produced by the particular drill being used. After this, both practices will be refered to as “No-till.”

No-till has been adopted on 45,000-50,000 acres of dryland agriculture in the Fifteenmile Watershed. An additional 50,000-60,000 acres could be converted, given sufficient incentives. No-till farming techniques lead to new management challenges, some of which have been identified in recent years by early adopters of the technology. For instance, field lanes are a minor issue under minimum tillage, because tillage operations more or less obliterate them every year. Under no-till, these field lanes, if used year after year, can become compacted and incised into the soil surface. Precipitation can then collect and run off, causing gully erosion and carrying sediment to streams or other downslope areas.

Another issue is noxious weeds. One of the purposes for tillage is the mechanical control of weeds. Under minimum till, perennial weeds are largely controlled by a combination of mechanical and chemical methods. Typical herbicides used in minimum till systems are glyphosate and 2,4-D. Annual weeds, such as annual rye, downy brome, goat grass and field bindweed are the major management challenges under minimum till. By contrast, no-till discourages annual weeds due to the presence of crop stubble and the lack of soil disturbance, but perennial weeds are encouraged. Because mechanical control is eliminated, no-till systems may have a heavier reliance on herbicides to control broadleaf perennials.

Such issues must be addressed with adaptive management and education. New technologies, such as Weedseeker infrared sensors, have the potential to reduce herbicide usage by 40-80% by turning off spray nozzles where no weed is present. Demonstration projects and incentives for early adopters have proved themselves effective techniques for adoption of new technology.

### *Road Maintenance or Decommissioning*

The primary proposed road maintenance activities are:

- Creating barriers to human access: Gates, fences, boulders, logs, tank traps, vegetative buffers, and signs.
- Surface maintenance, such as building and compacting the road prism, grading, and spreading rock or surfacing material.
- Drainage maintenance and repair of inboard ditch lines, waterbars, and sediment traps.
- Removing and hauling or stabilizing pre-existing cut and fill material or slide material.
- Relocating portions of roads and trails to less sensitive areas outside of riparian buffer areas.

Interrelated activities addressed elsewhere in this plan are:

- Native Plant Community Establishment and Protection
- Bridge, Culvert, and Ford Maintenance, Removal, and Replacement.

Roads can be significant sources of runoff and sedimentation, depending on their density, placement, design, construction and upkeep. Dirt roads, poorly designed roads, roads

within 200 feet of a stream, roads on slopes of greater than 50%, poorly maintained roads, or roads lacking culverts in appropriate places can suffer from gully erosion, becoming point sources of sediment. Early settlers often followed the canyon bottoms when building roads. In ephemeral drainages, roads were often built directly up the middle of the waterway. This issue exists on both public and private lands.

In former timber sales, primitive logging roads were often built at high densities, with multiple stream crossings. The Mount Hood National Forest has a program of road closures to address the high density of logging roads in some parts of the watershed.

In general, road maintenance will involve minor construction efforts, typically using a small work crew equipped with one or two vehicles. In some cases, heavy equipment may be used.

Decommissioning roads will be used to increase water infiltration rates, eliminate or reduce erosion and mass-wasting hazards and thereby the sedimentation potential to down-slope habitats, reduce the impact of roads on the hydrology of watersheds and eliminate or reduce human access and use/disturbance associated impacts, such as: timber theft, disturbance to wildlife, road density, poaching, illegal dumping of waste, erosion of soils, and sedimentation of aquatic habitats, particularly in sensitive areas such as riparian habitats or geologically unstable zones.

## Removal of Passage Barriers

The primary proposed bridge, culvert and ford activities are:

- Culvert removal, where possible, and natural channel cross section reestablishment.
- Replacement of undersized culverts that present a barrier to fish movement with appropriately-sized culverts, bottomless arches or bridges.
- Replacement of perched culverts to meet the natural bed of the stream.
- Excavation and realignment of misaligned culverts.
- Modification of culverts by means such as installing step-and-pool weirs at culvert outlets, trash/debris racks, or erosion protection structures at culvert outlets or inlets where replacement or lowering is not feasible.
- Redesign of stream crossings determined to be inappropriate for culvert installations to steel/concrete reinforced bridge installations or fords;
- Removal or lowering of artificial structures that impede fish passage;
- Repair, upgrade or replacement of bridges and culverts, except that bridge replacements will be full-span, *i.e.*, no bents, piers, or other support structures below bankfull elevation.

These activities improve fish passage, minimize streambank and roadbed erosion, facilitate natural sediment and wood movement, and—during flood events—eliminate or reduce excess sediment loading and dynamic changes in stream flow that cause streambank erosion, undermining of roadbeds, and the washout of culverts. Proper road

drainage upgrades, culvert replacements, etc., are likely to diminish the potential adverse effects of roads, including turbidity, sedimentation, and channel extension, by allowing the drainage design features to work properly and erosion to be minimized.

In Fifteenmile Watershed itself, passage has been reestablished to the majority of the potential anadromous habitat. Replacement of the five culverts identified in the EDT model would restore 7,623 feet of headwater habitat on the Mount Hood National Forest. EDT predicts an 8% increase in spawners due to this action.

Possibly more significant is the continued search for partial fish barriers throughout the watershed. The Endersby Road culvert on Eightmile Creek was not identified in the EDT process, but was recently identified as a barrier to adult passage at flows of less than 6 or greater than 37.5 cfs[12]. Some of the most productive spawning grounds in the watershed occur upstream of this culvert, thus demonstrating that it is not an adult barrier during the spawning run under typical conditions, but that it could have a drastic effect on spawning under very low water or high water years and at certain times of year.

Furthermore, the Endersby Road culvert is a total passage barrier to juveniles during the summer. Infrared aerial surveys were conducted on Eightmile Creek on August 3, 2002. At the time of the surveys, the stream temperature just downstream from this culvert was 6$^{o}$C warmer than it was upstream (17$^{o}$C versus 23$^{o}$C).[13] Thus, this culvert might have a significant effect on juvenile survival, which was not modeled by EDT.

Despite the fact that culvert surveys have been done in the past, this potential barrier was not identified until 2004. More such hidden barriers may exist. Identifying and replacing such barriers may significantly improve the viability of the steelhead population in Fifteenmile Watershed.

## Pesticide Reduction

Threemile Creek, Mill Creek, Chenowith Creek and Mosier Creek run through orchard areas. Conventionally managed orchards use a greater number and quantity of agricultural chemicals than do the dryland grains that predominate in the Fifteenmile Watershed. Malathion and chlorpyriphos both exceed state standards at certain times of year in Mill Creek, and malathion has been found in Threemile Creek and Fifteenmile Creek, as well. Farmworker housing is often placed near the streams, increasing impervious surfaces, roadways, household and automotive chemicals and harassment of fish species.

Additional strategies are called for to address the issues raised by these land use patterns.

[12] Asbridge, March 2004

[13] Watershed Sciences, LLC, 2003.

Strategies to reduce agrichemical input to the streams are already under way in the form of the Integrated Fruit Production Program and IFPnet. IFP is a management-intensive method of pest control that, among other conservation goals, minimizes the use of broad-spectrum pesticides, and also minimizes spray drift. Detailed weather information is needed to predict pest outbreaks and improve timing of orchard operations. Wyeast RC&D, working with the Wasco County Fruit and Produce League, has spearheaded the installation of a network of weather stations throughout the orchard areas that provide the necessary data. They have also provided an entomologist to growers who develop IFP plans with growers and scouts for pests, thereby pinpointing the location of outbreaks.

Long term funding to continue the IFP Program has not yet been secured. Nor has long-term funding been secured to continue monitoring for malathion and chlorpyriphos. Such monitoring must continue in order to track progress at reducing or eliminating pesticide detections in the waters of the creeks.

## High Density Rural and Urban Issues

All three Dalles area creeks, Mill, Threemile and Chenowith, flow through urban areas, where residences abut the creek, and road density is far higher than anywhere else in the subbasin. Storm sewers feed into Mill Creek at several points in its lower mile.

The human population density throughout these watersheds is greater than in Fifteenmile Watershed, as is the road density. In addition, both Threemile Creek and Mill Creek have a number of irrigation pasture operations that abut the creek.

Strategies to reduce impacts from pasture management include riparian buffers, resource management system plans to deal with mud and manure and barnyard runoff, irrigation efficiency, and other issues typical to this land use. Both technical and financial assistance, as well as public education programs, will be needed to address these issues.

## Groundwater Conservation in Mosier Watershed

Key environmental factors affecting fish populations in Mosier Creek include changes in channel form, loss of habitat diversity, low summer flows and consequent high temperature, and potential agrichemical contamination. Data is lacking on chemical pollutants in Mosier Creek. Mosier Creek Road follows the stream for nearly its first eight miles, and riparian vegetation is interrupted by rural residential development.

Groundwater declines has occurred in the Mosier Valley since commercial irrigation began in the 1970's. Declines of up to 120 ft have been documented in several wells monitored by the Oregon Water Resources Department (OWRD) since the 1970s.[14] This overdraft has been shown to have an effect on stream flows. A study conducted by OWRD in the 1980's suggested that Mosier Creek might be losing water to the Priest Rapids Aquifer in a reach that had received water from the aquifer as recently as the

[14] Larry Toll, OWRD, Comments to the Mosier Watershed Council, April 2004

1960's.[15] The largest water-level declines are occurring in the Priest Rapids basalt aquifer. Irrigation wells, municipal wells, domestic wells, and improperly completed wells that allow well bore leakage probably all contribute to the declines. With the possible exception of municipal pumping, none of these stresses on the aquifer have been well quantified.

Another consequence of water-level declines in the basalt aquifers may have been a decrease in ground-water discharge (baseflow) to Mosier Creek. If ground-water levels have fallen below the bed of the creek, there may now be losses from Mosier Creek to the ground-water system.[16] Reductions in ground-water discharge could negatively impact flow and temperature conditions in Mosier Creek, particularly during the summer and fall low-flow period when typical flows are less than 3 cfs. Mosier Creek and Rock Creek are on the Oregon 303(d) list for temperature.

Following a hydrogeologic assessment by OWRD in 1985 (Lite and Grondin, 1988) the orchard tract area, where most pumping is concentrated, was designated as a "ground-water restricted area". The Pomona and Priest Rapids Aquifers were closed to further appropriations for any use other than domestic. At the time of the OWRD study (1985), nearly 600 acres received irrigation from ground water and depending on the method used to estimate withdrawals, they ranged from 600 to 1,500 acre-ft per year. Today (2004), OWRD lists over 900 acres where ground water provides some or all of irrigation needs (WRIS data from OWRD web site, April 2004). By extrapolation, this 50-percent increase since 1985 may have resulted in an additional 300-800 acre-ft/yr of withdrawals. The increased acreage may not have resulted in a proportional increase in withdrawals because irrigation methods on new acres are usually more efficient as farms have shifted from sprinkler systems to drip irrigation.

Another factor that contributes to an unknown degree to water level declines in the Priest Rapids aquifer is discharge to the overlying Pomona aquifer and underlying Frenchman Springs aquifer via well bores. An unknown number of the irrigation and public supply wells in the area are not cased and sealed into a single aquifer and thus may "short-circuit" the natural flow system by allowing vertical flow within the well bore. This condition is called "co-mingling" by OWRD because it causes mixing of water from separate aquifers beyond that which would occur under natural flow conditions. The effect is the same as if the co-mingling wells were pumping from the Priest Rapids aquifer and injecting into the Pomona aquifer or Frenchman Springs aquifer. State well-construction standards are designed specifically to prevent this condition. The number of wells and the degree to which they co-mingle and contribute to water-level declines in the Priest Rapids aquifer is unknown.

The Mosier Watershed Council has established three goals for the watershed: 1) to reverse or stabilize water-level declines in the principal aquifers of Mosier Valley, 2) to

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[15] Lite and Grondin, 1988.

[16] Lite and Grondin, 1988

increase summer baseflows in Mosier Creek, and 3) to sustain productive, profitable agriculture in Mosier Valley.[17] To meet these goals, the Mosier Watershed Council must develop a strategy for achieving sustainability of the ground-water resource. Determining the sustainable yield of ground water from the basin is a process that relies upon having a thorough scientific understanding of the complex, three-dimensional ground-water system. In addition to this understanding, a set of water management tools is needed to facilitate an evaluation of alternative strategies and their effects on water levels, streams and springs, and wetlands.

The USGS has proposed a groundwater study to provide the necessary information. The overall objective of the proposed study is to advance the scientific understanding of the hydrology of the basin and use that understanding to develop a set of tools that can be used to evaluate the sustainable yield of the ground-water resource. Some of the key scientific questions to be addressed include:

- What are the boundaries to the ground-water system?
- What are the hydrologic inputs and outputs to and from the ground-water system and how have they changed since development began?
- What was the nature of flow between basalt aquifers under natural conditions and how has that been affected by pumping? By co-mingling wells?
- To what extent can water-level declines be attributed to pumping? Co-mingling wells? Climatic variations?

The major findings of the study, description of the data, and documentation of the model will be published in a USGS Scientific Investigations Report. A project web site will be created to disseminate information on the goals and approach of the study, as well as data and reports. Project staff will meet with the Mosier Watershed Council at regular intervals to convey progress, preliminary results, and plans. The study will take 2.5 to 3 years from inception to publication of the final report. Preliminary budget estimates are $400-$500k. USGS will provide 50% of the project funds. Bonneville Power Administration is a potential source for the matching funds.

A citizen's group called The Mosier Alliance is using federal funds obtained through the Columbia Gorge National Scenic Area to develop the Mosier Waterfront, utilizing the mouths of Mosier Creek and Rock Creek for public access under the railroad and the freeway to the Columbia River. This project includes projects intended to protect, restore and mitigate any damages to the riparian and aquatic ecosystems.

[17] Mosier Watershed Council 2004

## Off-channel Water Storage

As described in the Fifteenmile Subbasin Assessment, long-term climate change is projected to reduce the snowpack in the middle elevations of the Cascade Mountains over the course of the next 50 years with probable adverse impacts on already limited stream flow. The highest elevation in the Fifteenmile Subbasin is 6,525 feet at Lookout Mountain.

In an average year, persistent winter snowpack is currently found at elevations above 2,800 feet, providing an effective water reservoir. This area encompasses approximately one eighth of the subbasin, and includes the headwaters of Fifteenmile, Ramsey, Eightmile, Fivemile, Mill and Mosier Creeks. It does not include Rock, Chenowith, Dry or Threemile Creeks which are lower elevation drainages.

One expected effect of long term climate change is a gradual increase in the proportion of winter precipitation from snow to rain, and a reduction of snowpack in mid-elevations. If average winter temperatures were to rise above freezing in the zone below 3400 feet, the area of the subbasin with a snowpack would be reduced by approximately 40%. Mosier Creek Watershed's winter snowpack would be completely eliminated. Summer stream flows in the affected watersheds would be reduced even further than current levels. Simultaneously, average winter flows are expected to be higher due to the combination of higher precipitation and higher proportion of rainfall to snowfall. The risk of winter/early spring flooding would therefore be intensified.

Long term planning should consider construction of off-channel reservoirs to replace the expected snowpack storage losses. These reservoirs might be used to store water during the winter months (November to February) and release it at a sustained rate during low flow summer months. The concept of constructing multiple reservoirs in the Fifteenmile Subbasin has been explored, potential sites identified, and found to be feasible as early as the 1960's.[18] Today's fish passage issues and the need to protect existing habitat would reasonably limit sites for such structures to ephemeral drainages with no fish presence. The local conservation partnership and subbasin stakeholders need to fully explore this concept over the next 2-3 years.

There are likely issues that would need to be worked out before there would be any appreciable benefits to fish and wildlife. Potential issues include:

1. Footprint of the reservoirs themselves compromising wildlife habitat.

2. Downstream nutrient loading following initial creation of reservoirs.

3. Degraded water quality: temperature, oxygen, nutrients.

4. Physical loss of upland fish/habitat.

[18] SCS et. al., 1964.

5. Alteration of the natural hydrology of subbasin (fewer peak flow events, which are important for channel forming events and fish habitat) will significantly alter natural hydrology of stream that delivers water downstream.

In a related activity, City of The Dalles is conducting feasibility studies on raising the dam at Crow Creek Reservoir. The City of The Dalles Water Quality Manager has noted that such an action would allow the City to increase the bypass flows at the fish screen on the City's municipal water intake structure. When implemented, the increased bypass flows would address the issue of low flow on the South Fork Mill Creek.

## 5.3.2. Protection Strategies

The Fifteenmile Subbasin Assessment revealed certain reaches that are currently supporting most or all of the steelhead production in the Fifteenmile Watershed. These reaches correspond to the highest elevations of the watershed. Many of them are on the National Forest and are managed in keeping with the Northwest Forest Plan. Others are on private lands.

The Subbasin Assessment also placed protection priorities on the forks of Mill Creek and on Rock Creek, each watersheds in which the combination of higher elevations and relatively fewer human impacts have led to better water quality.

### Fifteenmile Watershed

As described in the gap analysis of the Subbasin Inventory of Existing Activities, 3.8 miles of Fivemile Creek and 2 miles of Eightmile Creek are in private ownerships and not enrolled in a riparian protection program. In Fifteenmile, approximately three miles are on private lands and not yet enrolled in a riparian protection program. A public outreach program will target these landowners to inform them of the importance of their portion of the creek to the health of focal fish species, and to encourage them to enroll in one or another of the existing programs aimed at riparian protection.

### South Fork Mill Creek

Existing programs for protection of water quality and watershed function in the South Fork Mill Creek are outlined in the Subbasin Inventory under Management Plans and Programs. These existing plans provide as comprehensive of protection measures as exist any place in the Subbasin and should be sufficient to protect cutthroat trout upstream of Mill Creek Falls. However, samples of cutthroat trout taken from South Fork Mill Creek show the fish to be of small size and poor to fair condition. Monitoring is needed to ensure that the health of this population remains at or better than its current condition. See Research and Monitoring, section 5.6.

### North Fork Mill Creek Watershed

As noted in the gap analysis of the Fifteenmile Subbasin Inventory, the upper 5 miles North Fork Mill Creek are on the Mount Hood National Forest, while the lower 6.5 miles

are on privates lands. None of the portion of North Fork Mill Creek on private lands is protected by any specific management. One landowner with approximately 0.2 miles of this reach has applied to enroll in CREP and is awaiting technical assistance.

This reach, while identified as a protection priority due to its low intensity of land use, is also in need of a number of restoration projects to address identified concerns. A dirt road parallels 5 miles of this reach. Undersized culverts constitute partial migration barriers and pose the risk of sedimentation during peak flow events. The roads in this canyon are used for illegal dumping of derelict vehicles and other equipment. Illegal dwellings have existed in the past and may still exist. Many of the identified culvert and road issues are on county roads. Wasco County Public Works is aware of these issues, but needs additional funding to address them in the near future. A private (?) road climbs the south side of the canyon, and contributes sediment at a number of known locations where culverts should have been installed, but were not.

A plan for the restoration and protection of North Fork Mill Creek would begin with a dialog between the public and private landowners and local natural resource managers. A number of projects could be accomplished through voluntary means, while law enforcement would be required to address some of the dumping issues and unpermitted activities currently occurring in this watershed.

## Rock Creek

As noted in the gap analysis of the Subbasin Inventory of Existing Activities, protection of the upper six miles of Rock Creek currently relies entirely on effective enforcement of the standards in the Oregon Forest Practices Act for fish-bearing streams. Any further protection of this cutthroat and steelhead stream would require a cooperative agreement with some or all of the three commercial and one public landowner in the upper six miles of this stream.

## 5.4. Terrestrial Species

Conservation efforts for terrestrial species should focus first on preserving critical habitat types, and only thereafter turn to actions for specific species. This strategy will promote the health of the overall ecosystem and thereby benefit the greatest number of wildlife species, as well as providing benefits to associated streams. Therefore, this section will consider management strategies for Shrub-steppe habitat, East-slope Cascade Conifer Forests, and then look at recommendations for the particular focal species.

### 5.4.1. Conservation Recommendations for Shrub-steppe Habitat

Conservation of shrub-steppe habitat will support loggerhead shrike, Brewer's sparrow, mountain quail, beaver and other fish and wildlife species. The following objectives for conservation of shrub-steppe habitat are modified from Altman and Holmes (2000):

*General:*

- Institute policy of "no net loss" of shrub-steppe habitat (i.e. mitigate habitat conversions and natural losses with equal or greater restoration efforts).
- Maintain existing areas of moderate to high quality shrub-steppe vegetation and actively manage to promote their sustainability.
- Initiate actions to enhance the size and connectivity of existing shrub-steppe patches.
- Use native species and local seed sources in restoration.

*Agricultural Operations:*

- Minimize or avoid agricultural field operations and recreational activities (e.g. ATV's) during the breeding season (April 15-July 15).
- Delay mowing, haying, or harvesting of grass/legume fields as long as possible, preferably until after July 15.
- Space mowing or haying frequency as widely as possible to increase the probability of successful nesting.
- Where possible, use no-till practices or avoid tillage between April 15 and July 15. No-till will allow maximum nesting opportunities in stubble fields and also increase foraging opportunities by providing habitat for insect prey.

*Grazing Lands Management:*

- Better manage livestock grazing to avoid or minimize further degradation further degradation of shrub-steppe habitat.
- Maintain cryptogrammic crusts (soil lichen) where they occur, and restore properly functioning native vegetation at ecologically appropriate sites.
- Implement grazing practices that are consistent with growth of native plants and forbs. This may include increasing rest cycles in rest-rotation systems, and/or deferring grazing until bunchgrasses have begun to cure.

- Manage livestock numbers or time on rangeland to maintain ecological integrity of the plant community through fencing exclusions or time management.
- Minimize or exclude grazing in relatively pristine areas.

*Weed and Pest Management:*

- Prevent infestations of exotic vegetation.
- Practice Integrated Pest Management for reduced destruction of nontarget insect species.
- Encourage biological controls, rather than chemical controls wherever possible.
- Limit the application of herbicides to invasive non-native species and use in conjunction with habitat enhancement projects which include long-term solutions to control future infestations.
- Establish healthy stands of desirable native vegetation adjacent to irrigated fields to avoid the spread of noxious weeds.

*Uncultivated Areas--Conservation Reserve Program (CRP) Fields, Field Borders, Buffer Strips:*

- Provide uncultivated herbaceous areas (field buffers or filter strips) within or adjacent to cultivated fields.
- Encourage restoration of agricultural lands to native cover through Conservation Reserve Program (CRP), easements or incentive programs.
- Develop economic incentive programs for private landowners to certify their land as a Shrub-steppe Bird Conservation Area.
- Restore grassland diversity in fields that were seeded to crested wheatgrass.
- Develop criteria for NRCS incentive programs to maximize benefits to birds.

*Education and Outreach:*

- Develop brochures or other educational materials for private landowners describing shrub-steppe values and management strategies to incorporate with farming practices that will maintain forage value and provide habitat for birds and other wildlife.
- Support cooperative extension research, education, and workshops that demonstrate and promote the economic benefit of sustainable grazing and farming practices and also benefit landowners.

### 5.4.2. Conservation Recommendations for Pine-Oak Woodlands

Conservation of pine-oak woodlands will support western grey squirrel, mule deer, mountain quail, beaver and other fish and wildlife species. The following objectives for conservation of shrub-steppe habitat are modified from Altman (2000):

- Institute policy of “no net loss” of Pine-Oak Woodland habitat (i.e. mitigate habitat conversions and natural losses with equal or greater restoration efforts).

- Maintain existing moderate to high quality Oak-Pine Woodland stands, and actively manage to promote their sustainability, regardless of size.
- Emphasize conservation of large patches of Oak-Pine Woodland with large-diameter and open-form oaks.
- Retain all oak and ponderosa pine trees and snags >53 cm (20 in.) dbh, regardless of landscape context.
- Maintain or initiate actions to ensure <10% canopy cover of conifers in stands where pure oak woodland is appropriate.
- Maintain or initiate actions to provide young, subcanopy (i.e. recruitment) trees and native shrubs and herbaceous vegetation in the understory.
- Enhance size and connectivity of existing Pine-Oak Woodland patches.
- Maintain or provide high quality Oak-Pine Woodland habitat in tracts greater than 40 ha (100 acres) in a mosaic of habitat conditions.
- Use mechanical removal (e.g. girdling, manual removal) and/or fire to create/maintain appropriate species composition and growth form and cover amounts.
- Where safe and practical, use low-intensity prescribed burns to exclude Douglas fir encroachment, stimulate oak and pine sprouting, and contribute to multi-aged stands.
- Limit grazing periods with fewer animals for less impact.
- Allow but monitor low impact recreational activities if oak and pine regeneration is not compromised and activities are not likely to adversely affect wildlife.
- Develop incentive programs through city, county, state and/or federal agencies for enhancement of oak-pine forest for wildlife.
- Discourage clearing or conversion of large tracts of Pine-oak woodland.
- Develop educational materials to foster an appreciation of oak-pine forest and assist landowners in restoration.
- Develop economic incentive programs for private landowners to certify their land as an Oak-Pine Bird Conservation Areas.

### 5.4.3. Conservation Recommendations for Late Successional (old Growth) Mixed Conifer Forests

Conservation of Late Successional Mixed Conifer Forests will support spotted owls, mule deer, beaver and other fish and wildlife species. The following objectives for conservation of Late Successional Mixed Conifer Forest habitat are modified from Altman (2000):

*General*

- Institute policy of “no net loss” of Late Successional Mixed Conifer Forest habitat (i.e. mitigate habitat conversions and natural losses with equal or greater restoration efforts).

- Retain large diameter (>53 cm [22 inches]) trees and snags.
- Maintain existing moderate to high quality Mixed Conifer Forest stands, and actively manage to promote their sustainability.
- Enhance size and connectivity of existing Mixed Conifer Forest patches.
- Improve quality of degraded Mixed Conifer habitat through appropriate management, particularly the use of natural disturbance regimes, such as fire.
- By 2025, establish/maintain >25% of landscape units where Mixed Conifer is appropriate as moving towards late-successional conditions.
- Establish Mixed Conifer Bird Conservation areas and promote their proper management.
- Develop conservation agreements with private landowners to enhance the quality of Mixed Conifer habitat.

*Burning*

- Use understory prescribed burning and/or thinning when and where appropriate to reduce fuel loads and accelerate development of late-seral conditions.
- Permit stand-replacing wildfires to burn where possible.

*Timber Management*

- Retain large trees, especially ponderosa pine >43 cm (18 inches) dbh.
- Initiate snag creation and recruitment where necessary.
- Retain all existing snags and broken-top trees >24cm (10 inches) dbh in harvest units.
- Implement road closures and obliteration where necessary to limit access to snags.
- Minimize mechanized harvest activities that increase susceptibility to invasion of exotic and noxious weeds and soil erosion.
- Restrict fuelwood cutting to trees <38 cm (15 inches) where snag objectives are not being met.

*Weed and Pest Management*

- Use Integrated Pest Management (IPM) practices.
- Encourage biological controls rather than chemical controls wherever possible.
- Applications should be by hand if practical to target species.
- Applications on lands adjacent to riparian areas should avoid environmental conditions where riparian zone may be threatened.

*Grazing Management*

- Properly manage or eliminate grazing to ensure appropriate understory conditions.

- Consider retirement of grazing allotments when they come up for renewal, where habitat degradation is occurring and/or where cowbirds are common.

*Recreation*

- Minimize timing and extent of human recreation in important Mixed Conifer bird habitat during nesting season.

*Education and Outreach*

- Develop brochures and other educational materials for private landowners describing Mixed Conifer values and management strategies to provide habitat for land birds and other wildlife.

## 5.4.4. Conservation Recommendations for Focal Species

**Mountain Quail –** Mountain quail utilize shrub-openings within forested parts of the subbasin and riparian corridors in all habitat zones within the subbasin. Nest sites vary with open-shrub-dominated communities within the forested areas and grass or shrub areas within riparian areas.

Create or restore shrub-openings within the mixed conifer zone via timber harvest or prescribed fire. Restore the shrub component within the riparian areas and increase the amount of riparian habitat outside of residential areas.

Transplanting mountain quail into under utilized habitat such as Ramsey Creek (Three miles of riparian habitat restoration was completed in 2003) would improve the genetic diversity and increase numbers of quail in those areas.

**Spotted Owl –** The Northwest Forest Plan established a network of Late Successional Reserves (LSRs) to maintain spotted owls over the long term. There are currently 19 (17 pairs and two resident singles) spotted owl activity centers within the subbasin. The number of spotted owls is thought to be stable, as no significant change in the amount of habitat has occurred within the last 10 years.

The Surveyor's Ridge LSR Plan identifies some habitat areas of concern and some possible restoration and protection projects. Implementing the LSR Plan would help reduce the risk of a catastrophic loss of spotted owl habitat within the subbasin.

Reducing the crown fire potential within the fire ecosystems would potentially reduce spotted owl habitat in the upland but reduce the risk of habitat loss in the riparian areas (where most of the activity centers are located).

**Loggerhead Shrike –** These recommendations come from the "Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Oregon and Washington" by Bob Altman, March 2000. This plan was prepared for the Oregon-Washington Partners In Flight.

Biological Objectives:

Habitat:

Where ecologically appropriate, initiate actions in steppe-shrubland habitat to maintain or provide the following conditions:

1. Late-seral big sagebrush or bitter brush with patches of tall shrubs (mean height of shrubs > 1 m (39 in).
2. <15% tall shrub cover (non-rabbitbrush).
3. Herbaceous cover < 20% and dominated by native species.
4. Mean open ground cover (includes bare and/or cryptogamic crusts) >30%.

Population:

Columbia Plateau BBS Region: In conjunction with conservation efforts described in the Idaho Landbird Conservation Plan (Ritter 2000) and Nevada Bird Conservation Plan (Neel 1999), reverse long-term declining trends to achieve stable populations (non-significant trends of <2%) or increasing populations in the next six years (by 2010).

Conservation Strategies:

1. Maintain sites with patches of tall shrubs and patches of open ground.
2. Avoid insecticide spraying during breeding season in shrike nesting habitat (March 21 –August 15).
3. Light to moderate grazing may provide open foraging habitat, but sustained grazing will reduce habitat suitability.
4. Where habitat degradation is extensive and cheatgrass cover is dominant, light grazing may provide open foraging habitat and reduce fuel loads at risk from fire, which would severely reduce sagebrush cover (Holmes and Geupel 1998).

**Mule Deer –** The population goal for the White River Management Unit is 9000 deer. The current population estimate was 8000 as of December 2003. Winter range loss is thought to be one of the major factors affecting the population (Keith Kohl, ODFW).

Improve winter range habitat on National Forest land by underburning and thinning dense tree stands (increase the amount of forage). Try to minimize the fragmentation of winter range habitat on private land by retaining current zoning laws, which limit fragmentation from 80 to 200 acres on agriculture and forestlands. Encourage restoration of shrub-steppe habitat on private land.

**Western Gray Squirrel –** The pine/oak habitat has been reduced by 14,263 acres from historic times. The squirrels utilize this habitat for food and nesting.

On National Forest land promote oaks where conifers have encroached into its' habitat zone. Restoring fire back into this ecosystem will also improve habitat in the long term by reducing tree densities, which may also increasing mast production.

On private lands, encourage the retention and restoration of pine/oak habitat.

**Brewer's Sparrow –** These recommendations come from the "Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Oregon and Washington" by Bob Altman, March 2000. This plan was prepared for the Oregon-Washington Partners In Flight.

Biological Objectives:

Habitat:

Where ecologically appropriate, initiate actions in sagebrush habitat to maintain or provide the following conditions:

1. Mean cover sagebrush 10-30% and in patches rather than evenly distributed.
2. Mean height sagebrush >60 cm (24 in).
3. High foliage density in sagebrush shrubs.
4. Mean native herbaceous cover > 10% with <10% cover of non-natives annual grasses.
5. Mean open ground cover (includes bare and/or cryptogamic crust) >20%.

Where ecologically appropriate at the landscape level, provide suitable habitat conditions described above in patches >8 ha (20 ac).

Population:

Columbia Plateau BBS Region: In conjunction with conservation efforts described in the Idaho Landbird Conservation Plan (Ritter 2000) and Nevada Bird Conservation Plan (Neel 1999), reverse long-term declining trends to achieve stable populations (non-significant trends of <2%) or increasing populations in the next six years (by 2010).

Conservation Strategies:

1. Maintain conditions in areas relatively free from cheatgrass by minimizing soil disturbance from grazing.
2. Fire suppression should occur where there is potential loss of sagebrush.

**Beaver –** Beavers are found in all major drainages with perennial water within the subbasin. Riparian habitat has been reduced by an estimated 85% from presettlement time.

Restoring the riparian habitat on National Forest land (15% of subbasin) and restoring the riparian habitat on private land (85% of subbasin) would increase the amount of habitat available for beavers. The beaver population will continue to fluctuate depending on the fur market and social tolerance. Increasing the amount of habitat would allow for an increase in population up to the social limit. Educating the public as to the benefits of beavers to the ecosystem might increase social tolerance.

## 5.5. Consistency with ESA/CWA Requirements

### 5.5.1. Consistency with Endangered Species Act Biological Opinions

Bonneville Power Administration is funding subbasin planning in response to Reasonable and Prudent Alternative (RPA) #154 of the 2000 Federal Columbia River Power System (FCRPS) Biological Opinion. RPA 154 provides:

> "BPA shall work with the NWPPC to ensure development and updating of subbasin assessments and plans … The action agencies will work with other Federal agencies to ensure that subbasin and watershed assessments and plans are coordinated across non-Federal and Federal land ownerships and programs." [19]

The Fifteenmile Subbasin Plan also addresses at least three other RPA's in the **FCRPS BiOp**:

- RPA 150: "In subbasins with listed salmon and steelhead, BPA shall fund protection of currently productive non-Federal habitat, especially if at risk of being degraded…"[20]
- RPA 151: "BPA shall, in coordination with NMFS, experiment with innovative ways to increase tributary flows…"[21]
- RPA 152: "The Action Agencies shall coordinate their efforst and support offsite habitat enhancement measures by other Federal agencies, states, Tribes, and local governments…"[22]

NOAA Fisheries has issued at least four other Biological Opinions that specifically address various restoration activities and agricultural practices described in this plan. Consistency of each restoration strategy with these Biological Opinions will be reviewed after strategy is described. The relevant Biological Opinions are:

- Programmatic Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Bonneville Power Administration Habitat Improvement Program (HIP) in the Columbia River Basin, August 1, 2003. This Biological Opinion will be referred to as the "**HIP BiOp.**" This programmatic BiOp covers a number of common tributary and upland restoration activities commonly funded by BPA. Many of the strategies in the Fifteenmile Subbasin Plan are described by the HIP BiOp. The

[19] NMFS 2000 (FCRPS BiOp)

[20] IBID

[21] IBID

[22] IBID

program described in the HIP BiOp was found to have long-term beneficial impact on steelhead and other listed fish species.

- Endangered Species Act—Section 7 Consultation, Biological Opinion, Oregon Conservation Reserve Enhancement Program. This Biological Opinion will be referred to as the "**CREP BiOp**." This programmatic consultation covers all activities undertaken as part of the Conservation Reserve Enhancement Program. Much of the riparian restoration undertaken through the Fifteenmile Subbasin Plan will be undertaken through the CREP, or will follow the same standards. The CREP Program was found to be "not likely to jeopardize the continued existence of the listed and proposed species."

- Endangered Species Act Section 7 Formal Consultation and Magnusen-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation on Resource Management Systems for Dryland Cropland and Range and Pastureland in Gilliam, Sherman and Wasco Counties, Oregon, April 22, 2004. This Biological Opinion will be referred to as the "**RMS BiOp**." The RMS BiOp covers resource management systems developed under the 9-step Planning Process of the Natural Resources Conservation Service for dryland agriculture and rangelands in Wasco, Sherman and Gilliam Counties. NOAA Fisheries concluded that the action described in the RMS BiOp is "not likely to jeopardize the continued existence of the listed species, and is not likely to destroy or adversely modify designated critical habitat."

- Endangered Species Act Section 7 Consultation Biological Opinion and Magnusen-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: Ten Categories of Forest Service and Bureau of Land Management Programmatic Activities in Northwest Oregon, February 25, 2003. The ten categories include road maintenance and stormproofing, road decommissioning and obliteration, aquatic and riparian habitat projects, and non-commercial vegetation treatments. Restoration projects either on- or off-Forest that used Forest Service funds would be tied to this document.

## Riparian/Floodplain Enhancements

The Conservation Reserve Enhancement Program is covered by a programmatic biological opinion. In that Opinion, NOAA Fisheries and US Fish and Wildlife Service concluded that:

> "…the following CREP activities are **not likely to adversely affect** listed or proposed fish species because they will avoid the addition of significant amounts of sediment into fish habitats, they will not allow for the introduction of toxic pesticides or herbicides into these same habitats, and these actions are of low potential to cause other adverse impacts to listed or proposed fishes or their habitats:
>
> 1. The Riparian Forest Buffer Practice and Riparian Herbaceous Cover Practice when:

> a. planting is done by hand and is outside of bankfull edge;
>
> b. there is no grading or shaping of the streambank;
>
> c. chemical pesticides do not enter the stream (i.e., noxious weeds are removed by mechanical means or with chemicals applied with hand sprayers at a sufficient distance from the water body); and
>
> d. native species are utilized as described in the BA (BMP #15) and consistent with President Clinton's Executive Order 13112 (February 3, 1999)(see below). It is our opinion that use of the non-native hybrid poplar is not consistent with BMP #15.
>
> 2. The Filter Strip Practice when it is installed upslope of an installed Riparian Forest Buffer or Riparian Herbaceous Cover and consistent with the BMPs in the BA.
>
> 3. Installation of livestock exclusion fencing when it is installed outside of bankfull edge and requires no instream crossings."[23]

To avoid impacts on eagles, Farm Services Agency agreed that activities in the CREP program would "occur greater than ½ mile from any eagle nest. For any project within ¼ mile non-line-of-sight or ½ mile line-of-sight of an eagle nest identified by ODFW, no activities producing noise above ambient levels will occur at the site from January 1 to August 31. If a proposed activity is near a bald eagle nest and must occur during this restricted period, site-specific consultation with USFWS will be initiated to evaluate the potential for adverse effects and take."[24]

> "The Services have determined, based on the information, analysis, and assumptions described in this Opinion, that FSA's proposed Oregon Conservation Reserve Enhancement Program is not likely to jeopardize the continued existence of the listed and proposed species under the respective jurisdictions of NMFS and USFWS shown in Table 1... The Services have evaluated the proposed action and found that it would cause short-term adverse degradation of some environmental baseline indicators for listed and proposed fishes. However, the proposed action is not expected to result in further degradation of aquatic habitats over the long term. Thus, the effects of the proposed action would not reduce prespawning survival, egg-to-smolt survival, or upstream/downstream migration survival rates to a level that would appreciably diminish the likelihood of survival and recovery of proposed or listed fishes, nor is it likely to result in destruction or adverse modification of critical habitats."[25]

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[23] NMFS 1999 (CREP BiOp)

[24] IBID

[25] IBID

Outside of the CREP program, riparian and streambank activities will likely be consistent with the HIP BiOp, which describes effects and provides standards for the following riparian and wetland restoration activities:

- Removal of levees, dikes, berms, weirs or other water control structures (NOAA Fisheries 2003b).
- Setback of levees, dikes, and berms (NOAA Fisheries 2003b)
- Reshaping of streambanks as necessary to reestablish vegetation (NOAA Fisheries 2003b).
- Excavation and removal of artificial fill materials from former wetlands (NMFS 2002).
- Developing berms or impoundments in upland areas with or without installing water control structures, to create a geomorphic depression in conjunction with a water source.
- Reintroducing beavers in areas where they have been removed.
- Excavating pools and ponds to groundwater to create wetlands in uplands.
- Removing structural bank protections and other engineered or created structures that do not meet the description and conservation measures under Section 2.2.1.3.1 "Streambank Protection Using Bioengineering Methods."
- Recontouring offstream areas that have been leveled.

The HIP BiOp found that these activities had long-term beneficial effects for salmonid species. Some potential short-term negative effects were identified associated with soil disturbance during construction. The HIP BiOp specifies means of mitigating for these short-term effects.

### Streambank Bioengineering

The HIP BiOp provides programmatic coverage for certain bioengineering projects.

### Large Woody Debris (Habitat Forming Natural Material Instream Structures)

The HIP BiOp provides programmatic coverage for placement of large woody debris and boulders according to certain standards. Specifically, the BiOp covers:

> "engineered logjams and other cover structures designed with large woody debris and/or boulder materials.. in streambed gradients of 6% or less… designed to minimize the need for anchoring. However, dependent on site location and design criteria, some structures may be anchored. If anchored, a variety of methods may be used. These include buttressing the wood between riparian trees, cabling the structure to existing structures, and/or anchoring with boulders, concrete blocks or new log wedges… Biodegradable manila/sisal rope may be used to temporarily stabilize structures… Permanently anchored structures, engineered

> structures and deflectors, debris jam structures relying on large rock, rebar and cable, and other similar habitat construction activities are not included in this Opinion."[26]

To the extent practical, instream habitat structures will be constructed according to the standards described in the HIP BiOp. However, as described previously, on private lands with a high density of infrastructure, it may be necessary to use cable, rebar and large rock to anchor structures in place. Case-by-case consultation will be required in such cases.

## Low Flow Restoration

The HIP BiOp provides programmatic coverage for several practices proposed for the purpose of restoring low flows:

- Conversion to Drip or Sprinkler Irrigation
- Convert Water Conveyance from Open Ditch to Pipeline or Line Leaking Ditches and Canals
- Convert from Instream Diversions to Groundwater Wells for Primary Water Source
- Water Rights Transfers
- Point of Diversion Transfers

The HIP BiOp is quoted below:

### *Conversion to Drip or Sprinkler Irrigation:*

> "The following potential adverse effects to listed species and their habitats associated with irrigation conversion activities - minor removal and trampling of vegetation, negligible erosion and sedimentation, and possible use of heavy equipment in the riparian area - are addressed under the general construction section (2.2.1.1). The irrigation conversion activities will incorporate the conservation measures for general construction as applicable.
>
> "There would not be any additional direct effects on fish or their habitat from this activity. Drip and sprinkler irrigation system indirect effects include the conservation of water instream... The application of water via drip and sprinkler irrigation can also significantly reduce the amount of soil erosion and nutrient and pesticide runoff that is normally associated with furrow irrigation systems (Ebbert and Kim 1998)."[27]

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[26] NOAA Fisheries 2003 (HIP BiOp)

[27] NOAA Fisheries 2003 (HIP BiOp)

### *Convert Water Conveyance from Open Ditch to Pipeline or Line Leaking Ditches and Canals:*

**"**The following potential effects to listed species and their habitats associated with irrigation conveyance activities - minor removal and trampling of vegetation, negligible erosion and sedimentation, and possible use of heavy equipment in the riparian area - are addressed under the general construction section (2.2.1.1). The irrigation conveyance activities will incorporate the conservation measures for general construction as applicable.

"There would not be any additional direct effects on fish or their habitat from this activity. The indirect effects include the conservation of water instream to improve fish habitat... The replacement of canals with pipelines will significantly reduce the amount of herbicides and fertilizers entering streams, as these substances can easily drain to streams through open ditch networks in agricultural fields (Louchart *et al.* 2001). The lining of leaking ditches will cover exposed soil, reducing the erosion of sediment from unlined ditch bottoms, sides, and berms. Lining of ditches will also decrease the colonization potential of invasive species, which typically establish on bare, disturbed sites."

### *Convert from Instream Diversions to Groundwater Wells for Primary Water Source:*

"Water from the wells will be pumped into ponds or troughs for livestock, or used to irrigate agricultural fields. Instream diversion infrastructure will be removed or downsized, if feasible. The criteria, plans and specifications, and operation and maintenance protocols of the Natural Resources Conservation Service (NRCS) conservation practice standards for waterwell code (NRCS 1999c) will be employed. The purpose of this activity is to increase the amount of in-stream flow for fish and to increase riparian functions.

"The following potential effects to listed species and their habitats associated with conversion from instream diversion to groundwater well activities - minor removal and trampling of vegetation, negligible erosion and sedimentation, and possible use of heavy equipment in the riparian area - are addressed under the general construction section (2.2.1.1). The conversion from instream diversion to groundwater well activities will incorporate the conservation measures for general construction as applicable.

"There would not be any additional direct effects on fish or their habitat from this activity. The indirect effects include the conservation of water instream to improve fish habitat. The irrigation water would come from groundwater, leaving more water instream for fish habitat. However, if

> wells are not well regulated, pump rates can significantly reduce the level of the local water table and create a deficit in the groundwater budget. Other indirect effects include significantly reduced risks of fish passage problems, injury, or death if the instream diversion is removed, and eliminating the need to periodically maintain an instream diversion system over the long term, which reduces the risk of ongoing disturbance to listed fish habitat… All new wells installed under this activity will obtain applicable permits from the appropriate state agency (NMFS 2002)."[28]

### *Water Rights Transfers:*

> **"**In overappropriated streams (*i.e.*, streams on which junior water users are sometimes precluded from diverting water due to lack of flow) with multiple water rights holders, the BPA should consider, especially with projects that would conserve more than 1 cfs of water, transferring the water rights to water saved to a state trust water system, or equivalent, for protection instream. Because many western streams are overappropriated in terms of water rights, another irrigator with a valid water right previously not being met can potentially take the water saved from proposed irrigation and water delivery/management actions. In order to counter this potential diminishment of the benefit to listed species, NOAA Fisheries is making this conservation recommendation."[29]

### *Point of Diversion Transfers:*

> **"**The BPA should, when consolidating diversions, move the new combined diversion to the most downstream point possible."[30]

## Mitigation of Upland Runoff and Sediment Sources

### *Conservation Farming on Drylands*

Development of conservation plans (aka Resource Management Systems) for dry croplands is covered in two separate biological opinions—the RMS BiOp and the HIP BiOp.

The RMS BiOp states:

> "…an RMS that is properly designed using salmon quality criteria and fully carried out with careful attention to the response of riparian and

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[28] NOAA Fisheries 2003 (HIP BiOp)

[29] NOAA Fisheries 2003 (HIP BiOp)

[30] NOAA Fisheries 2003 (HIP BiOp)

> aquatic habitats will reduce upland erosion and runoff, promote riparian succession, and help create and maintain the kinds of chemical and physical conditions in riparian and aquatic habitats that are necessary to recover ESA-listed salmon and steelhead populations. Moreover, if cooperators voluntarily apply salmon quality criteria and indicators (as applicable) to complete an RMS plan on land upslope of the action area, the effects are likely to be wholly beneficial for listed species."[31]

The HIP BiOp states:

> "Most of the direct effects of these activities will be limited to upland agricultural land and therefore will have no or negligible impact on listed species habitat. These agricultural practices will result in periodic disturbances to upland soils, although the amount of disturbance will not increase from the existing (no lands will be converted to agricultural use under this activity). When these techniques are used on or near a slope adjacent to stream habitat, erosion can contribute to increased stream turbidity, and filling of gravels with fine sediment. The implementation of no-till or minimal-till farming often requires farmers to use more fertilizers and herbicides than normal till farming. Minimizing the amount of sediment and nutrients lost from agricultural lands and entering stream systems will not be fully accomplished unless riparian buffer systems are in place directly adjacent to listed fish habitat.
>
> "The following conservation measures address the adverse effects discussed above:
>
> "Employ conservation tillage and residue management practices that leave 30% or more of the previous crop residue on the soil surface after planting, as feasible, to reduce erosion potential.
>
> "Implement these activities in combination with a riparian forest buffer (NRCS measure 391) (NRCS 2000e) wherever trees and/or shrubs can grow, or a riparian herbaceous cover (NRCS measure 390) (NRCS 1998) where analysis of available information (*e.g.*, historical accounts, photographs, or USDA Plant Association Groups) indicates that no trees or shrubs, including willow (*Salix spp.*), existed on the site within historic times. Installation and management of the full range of field and landscape buffers will be encouraged… as necessary to address small but unavoidable pollutant discharges associated with active agricultural operations, catastrophic pollution-associated episodic storm events, and other landscape level concerns.

[31] NOAA Fisheries 2004 (RMS BiOp)

> "Employ nutrient management practices to increase the efficiency of fertilizer inputs and decrease the transport of nutrients to ground and surface water. Nutrients will be applied at an agronomic rate.
>
> "Employ vegetation management practices, including nonchemical vegetation control measures, that will reduce losses dues to herbicide contamination during transport, handling, and use, and nonpoint pollution losses after use.[32]
>
> "Beyond the short-term detrimental effects of ground disturbance to plant and rotate crops, the indirect long-term effects will be beneficial to the farmer, the agricultural land, and to adjacent riparian and stream habitat... The retention of soil in upland habitats minimizes erosion into streams improving water quality for listed species (Kuo *et al.* 2001)."[33]

### *Road Maintenance and Decommissioning*

The HIP BiOp concluded that road maintenance and decommissioning would have long-term beneficial effects on listed fish species, as long as certain standards are met, which are outlined in detail in the HIP BiOp. Road maintenance and decommissioning activities included as part of the Fifteenmile Subbasin Plan will follow the guidelines described in the HIP BiOp. Extensive asphalt laying during wet periods is not included under the HIP BiOp.

> "Beneficial effects occur where road maintenance reduces the potential for catastrophic erosion and delivery of large amounts of sediment to stream channels. Severe erosion is almost inevitable if roads are not regularly maintained, and thus regular maintenance is a high priority (NMFS 1999f). Effects of proper road maintenance activities also include the reduction of human disturbance on unstable or sensitive sites…
>
> "The proposed road decommissioning activities will obliterate roads that are no longer needed, *e.g.*, logging roads. Water bars will be installed, road surfaces will be insloped or outsloped, asphalt and gravel will be removed from road surfaces, culverts and bridges will be altered or removed, streambanks will be recontoured at stream crossings, cross drains installed, fill or sidecast will be removed, road prism reshaped, sediment catch basins created, all surfaces will be revegetated to reduce surface erosion of bare soils, surface drainage patterns will be recreated, and dissipaters, chutes or rock will be placed at remaining culvert outlets.

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[32] Take of ESA-listed species caused by any aspect of pesticide use is not included in the HIP consultation and must be evaluated in an individual consultation if it is funded by BPA.

[33] NOAA Fisheries 2003 (HIP BiOp)

> Work may require the use of heavy equipment, power tools, and/or hand crews.
>
> "The following potential effects to listed species and their habitats associated with road decommissioning activities - compaction of soil and disturbance of streambeds resulting in sedimentation, increased water turbidity, and increased flows and stream energy; fuel and other contamination from spills or use of heavy equipment in water or riparian areas; sedimentation and contamination from discharge of construction water; stress to fish from capture and release from coffered areas during isolation of instream work areas, noise, and avoidance behavior; and changes in flows - are addressed under the general construction section (2.2.1.1). The road decommissioning activities will incorporate the conservation measures for general construction as applicable….
>
> "Road obliteration and decommissioning should be even more beneficial than road and culvert upgrades in that all or nearly all of the hydrologic and sediment regime effects of the roads would be removed. Long-term beneficial effects will result from these activities including rehabilitation of hydrologic functions, reduced risk of washouts and landslides, and reduction of sediment delivery to streams. In the long term, these projects will tend to rehabilitate habitat substrate by reducing the risk of sediment delivery to streams and restore fish passage by correcting fish barriers caused by roads. Road decommissioning projects will also tend to rehabilitate hydrology by reducing peak flows and reducing the drainage network. Watershed conditions will also be improved as road densities are reduced and riparian reserves are rehabilitated. These projects may also potentially improve floodplain connectivity (NMFS 1999d).
>
> "Additional effects of road decommissioning activities include reconnecting natural habitats and the exclusion of human disturbance. Decommissioning a road allows for the recolonization of native flora and fauna, increasing the total amount of space available for fish and wildlife, and decreasing the amount of human traffic originally responsible for habitat disturbances. Consequently, native plant communities can reestablish and move towards more properly functioning habitats for fish."[34]

## Removal of Passage Barriers

Removal of passage barriers is addressed by the HIP BiOp.

> "The following potential effects to listed species and their habitats associated with bridge, culvert, and ford activities - exposure of bare soil

[34] NOAA Fisheries 2003 (HIP BiOp)

> and reduction or elimination of large woody debris, shade, slope and bank stability, and sediment filtering habitat functions due to removal of vegetation; compaction of soil and disturbance of streambeds resulting in sedimentation, increased water turbidity, and increased flows and stream energy; fuel and other contamination from spills or use of heavy equipment in water or spills of wet concrete; sedimentation and contamination from discharge of construction water; stress to fish from capture and release from coffered areas during isolation of instream work areas, noise, and avoidance behavior; and changes in flows - are addressed under the general construction section (2.2.1.1). The bridge, culvert, and ford activities will incorporate the conservation measures for general construction as applicable.
>
> "Installation of a new culvert, bridge, or ford will require a certain amount of fill material around the structure. Excess fill material can reduce stream width, resulting in channel constriction. Channel constriction can increase streamflow velocity, effectively blocking fish passage and potentially scouring redd habitat. Further increased streamflow can reduce the amount of holding pools."[35]

The potential negative effects described above can be mitigated using techniques described in detail in the HIP BiOp.

> "Beneficial effects of the proposed activities include habitat connectivity and increases in fish populations. Improved fish passage provides access to upstream spawning and rearing habitat for fish species. Access can lead to increased spawning and rearing success and can increase numbers and health of individual fish and populations (NMFS 2001i). Additionally, the removal of impassable barriers will enable the movement of fish and drift of aquatic insects, and greatly improve biotic linkages and increase genetic exchange (WDFW 1999, NMFS 2001).
>
> "The installation of properly designed culverts will increase the fluvial transport of sediment important in the formation of diverse habitats. Such culverts also will enable additional recruitment of debris to downstream reaches when compared to current conditions. Allowing debris (including plant material and substrate) to pass through culverts also encourages LWD recruitment and natural fluvial deposition at downstream locations (restoration of LWD and substrate indicators). These processes create rearing and spawning habitat that is essential to listed species. Additionally, the use of properly designed culverts will reduce the probability of catastrophic damage to aquatic habitats that is often associated with undersized culverts (*e.g.*, during extreme natural events,

[35] NOAA Fisheries 2003 (HIP BiOp)

> debris accumulation, beaver dams). The installation of such culverts also should increase the stability of the streambed (NMFS 2001).
>
> "Overall, the improvement in baseline passage conditions will contribute to increased survival and recovery of listed species. The improvement in passage conditions for salmonids provides an immediate benefit that is likely to increase the numbers of fish moving upstream and downstream from portions of stream that previously were inaccessible. The increased accessibility to diverse habitats fosters the development and maintenance of locally adapted subpopulations, and may reduce the likelihood of extinction for endangered species. When sufficient freshwater habitat diversity exists, single species of salmonids may exhibit wide variation in life history and morphometric traits (*e.g.,* Blair *et al.* 1993). These traits are often unique to a specific geographic location and are referred to as locally adapted traits. Locally adapted subpopulations maintain reserves of genetic information that allow salmonids to recolonize disturbed areas and adapt to environmental changes (Milner and Baily 1989)."[36]

The HIP BiOp does not cover the following:

- Culverts with widths less than bankfull width.
- Culverts with widths less than 6 feet in fish-bearing streams.
- Embedded culverts in a slope greater than 6%.
- Modifying an existing culvert in place.
- A new bridge pier or abutment below the bankfull elevation, or in an active channel migration zone.[37]
- A new bridge approach within the Federal Emergency Management Agency (FEMA) designated floodway that will require embankment fills that significantly impair floodplain function.
- Baffled culvert or fishway.

## Irrigated Cropland and Orchards

At the request of the soil and water conservation districts of three counties in North Central Oregon, NRCS will initiate Section 7 consultation with NOAA Fisheries to develop a programmatic Biological Opinion regarding resource management systems in orchards and other irrigated agriculture in Wasco County, Sherman County and Gilliam County.

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[36] NOAA Fisheries 2003 (HIP BiOp)

[37] "Bankfull elevation" means the bank height inundated by an approximately 1.2 to 1.5 year (maximum) average recurrence interval.

### Groundwater Conservation

If no action is taken to stabilize the aquifers in the Mosier Valley, then dropping aquifer levels may lead to reduced stream flows and warmer summer water temperatures in Mosier Creek. This will negatively affect cutthroat trout in Mosier Creek, as well as steelhead and coho in the mouth of Mosier Creek.

Alternatively, stabilizing the aquifers might have beneficial effects, depending on the specific actions proposed and on any mitigation actions proposed. Actions intended to save water, such as conversion to microsprinklers and drip systems are covered by the HIP BiOp and adequately described previously in this document. Other actions involving changing points of diversion or changing water sources will probably require consultation with NOAA Fisheries.

### Off-channel Water Storage

Off-channel water storage is not covered by any programmatic biological opinion. Such projects would require case-by-case consultation with NOAA Fisheries and US Fish and Wildlife Service.

## 5.5.2. Consistency with the Clean Water Act, Total Maximum Daily Loads and Existing Water Quality Management Plans

Implementation of the Clean Water Act in Oregon is primarily the responsibility of Oregon Department of Environmental Quality. Development and implementation of water quality management plans for agriculture is delegated to the Oregon Department of Agriculture by Oregon Senate Bill 1010.

The following statement was provided by Bonnie Lamb, Oregon Department of Environmental Quality Natural Resources Specialist for Central Oregon:

> "In the Fifteenmile Subbasin the Federal Clean Water Act is implemented in large part through the State's preparation of water quality standards, Total Maximum Daily Loads (TMDLs) and TMDL implementation processes of designated management agencies. The Oregon Department of Environmental Quality (ODEQ) has identified stream segments in the Fifteenmile, Threemile, Mill, Chenowith, Mosier and Rock Creek Watersheds as water quality limited for temperature. In addition, stream segments in the Fifteenmile Creek Watershed have been identified as water quality limited for sedimentation. ODEQ plans to develop TMDLs for both temperature and sedimentation in the Fifteenmile Subbasin. Completion of TMDLs is slated for the end of 2004, although modeling is currently only in the early stages.
>
> "Based on temperature TMDLs done elsewhere in the state, it is anticipated that modeling will indicate that with human warming minimized, river temperatures will still exceed biologically-based

> temperature thresholds that are developed to protect salmonid rearing and/or spawning. In this situation, the standard defaults to a natural heating condition – i.e., minimization of human stressors, such as vegetation removal and channel modifications. It is likely that numeric goals for shading and possibly channel width will be produced and incorporated into the TMDL. Many of the riparian/floodplain restoration strategies described in the management plan appear to be the type of management activities which will likely address TMDL load allocations.
>
> "Based on sedimentation TMDLs done elsewhere in the state, such as the Umatilla Basin, it is anticipated that TMDL load allocations will target the reduction of erosion from upland and streambank conditions. Many of the restoration strategies identified in the Management Plan – such as riparian/floodplain restoration, streambank bioengineering, no-till conversion, and road maintenance or obliteration – appear to be the types of management activities which will likely address TDML load allocations.
>
> "The implementation of the TMDL process occurs through management planning - typically refinements of existing plans or programs, such as the Agricultural Water Quality Management Area Plans (SB 1010), the Oregon Forest Practices Act, County Comprehensive plans, and Federal policies/plans on Forest Service lands. These plans vary from voluntary to proscriptive (though all should have reasonable assurance of implementation), and management oversight is normally conducted through the local, state or federal land use authority. Initiative-based restoration/protection and public funding dovetails with TMDL implementation and is an important implementing mechanism. Subbasin Planning is recognized as a key effort that supports TMDL implementation, and will be recognized in the TMDL water quality management planning process.
>
> "This document recognizes that both the Subbasin Planning and TMDL processes are adaptive in nature. Once TMDLs are established for the Subbasin Planning area, the Plan will be re-evaluated on some designated time-frame to incorporate new findings and ensure consistency with TMDLs and/or new 303(d) listings. It should also be noted that the findings of the Subbasin Planning process will be utilized in the TMDL process."[38]

The following statement was provided by Ellen Hammond, Water Quality Planner for Oregon Department of Agriculture:

[38] Bonnie Lamb, Oregon DEQ, May 17th, 2004

> "The Lower Deschutes Agricultural Water Quality Management Area Plan (AgWQMAP) was developed to 'prevent or control water pollution from agricultural activities and to achieve applicable water quality standards.' "The AgWQMAP is expected to serve as ag's water quality management plan for sediment and temperature TMDL's being developed by DEQ for the Fifteenmile Subbasin.
>
> "The AgWQMAP has four objectives: 1) control soil erosion on uplands, 2) achieve stable streambanks, 3) keep sediment and other pollutants out of streams and 4) provide adequate riparian vegetation for streambank stability and stream shading. Oregon Administrative Rules OAR 603-095-0640 help implement these objectives.
>
> "The restoration strategies in this Subbasin Plan will help meet these objectives. Riparian buffers will help stabilize streambanks, filter out sediment from overland flows, and moderate solar heating of streams. Management activities, such as reduced tillage, that will help moderate peak flows will also reduce soil erosion and sediment transport to streams."[39]

[39] Ellen Hammond, Oregon Department of Agriculture Water Quality Planner, 5/14/04

## 5.6. Research, Monitoring and Evaluation

This section of the management plan will be split into five sections: Fifteenmile Watershed, Mill Creek, Mosier Creek, Other Streams and Wildlife. The watersheds are **addressed in their order of priority** for protection and restoration of the focal species. Wildlife is given its own section, because wildlife populations are not restricted by watershed lines. Therefore, wildlife monitoring applies to the entire watershed. Upland habitat conditions will be addressed by proposed wildlife monitoring methods.

### 5.6.1. Fifteenmile Watershed

Most of the research and monitoring that has been done in the Fifteenmile Subbasin has been done in Fifteenmile Watershed. Nevertheless, a number of unanswered questions remain, even regarding those subjects that have been studied in the past.

#### Water Quality

The critical water quality parameters identified in EDT are high and low flows, sedimentation, temperature, habitat quantity and quality and channel stability.

##### *Flows*

Flows are a critical factor in the restoration of Fifteenmile Watershed. Peak flows are linked to streambank erosion, bed scour, sedimentation, loss of riparian vegetation, loss of floodplain interaction, and other factors. Low flows a re linked to high temperatures, loss of habitat quantity and quality, concentration of pollutants, and other factors. A gain in low flows and a reduction of peak flows associated with a given level of precipitation will be one of the strongest indicators of improved overall watershed health, and will most likely correspond to increased smolt production.

Flows were monitored sporadically by the US Geological Survey from 1918 to 1984. Seven separate gauging stations were established and used at four points on Fifteenmile Creek, two points on Eightmile and one point on Fivemile Creek. The longest continuous record was from the station on Fifteenmile near Rice (RM 20), which was in use from 1946 to 1953 and again from 1970 to 1984.

Priority should be given to establishing flow monitoring on Fifteenmile Creek near the mouth and above Dufur, and on Ramsey Creek, Eightmile Creek and Fivemile Creek near their mouths. This can be done relatively inexpensively by taking advantage of the IFPnet weather stations. These stations are located throughout the subbasin. Their data is sent via telemetry to the offices of Wy'East Resource Conservation and Development Board, where it is made available to the public via the internet. These stations already collect rainfall and other weather data. Water depth sensors could be installed at newly establishing gauging stations and wired to the nearest weather station. With development of a rating curve based on the cross section of the channel, stream height can be converted to stream flow. Stream flow information could not only be logged

continuously through the year, but could be made available to researchers, regulators, fisheries managers and the public via the internet.

### *Sedimentation*

Sediment is another environmental parameter linked to poor water quality and reduced spawning success. Sedimentation has long been considered a serious problem in Fifteenmile, based on observation of high turbidity following spring runoff events. The existing Aquatic Inventory Project used ocular estimates of the substrate. Ocular estimates are highly subjective, and tend to overestimate larger substrates, such as gravel and cobble that are easier to see. Based on these estimates, fine sediment would not be considered a problem in Fifteenmile Watershed. However, in 1994 and 2000, the Forest Service conducted Wolman Pebble Counts at 30 sites throughout Fifteenmile, Eightmile, Fivemile and Ramsey Creeks. Wolman pebble counts are more objective, but also tend to biased toward larger substrates. The Forest Service data showed that sediment of less than 6mm in size constituted more than 30% of the substrate at 10 sites in year 2000. Sediment varied considerably between adjacent sites. Data is lacking for Dry Creek and for the forks of Fivemile Creek.

With the adoption of no-till farming and the establishment of riparian buffers, sedimentation is expected to become less of a problem. Whereas in the past, sediment originated from the entire watershed, future sedimentation events are expected to be more of a point-source issue. This theory must be tested by regularly repeating Wolman pebble counts throughout the watershed. This work could be efficiently accomplished by combining the task with the ongoing stream temperature monitoring efforts of the Forest Service, ODFW and SWCD. This would yield annual pebble count data for 25 sites in Fifteenmile Creek, 5 sites on Ramsey Creek, 2 sites on Cedar Creek, 12 sites in Eightmile Creek, 4 sites in Fivemile and 3 sites in Dry Creek. These sites must be visited twice a year to install and collect temperature loggers. At the same time, agency personnel could conduct pebble counts.

### *Stream Temperature*

Stream temperature is closely linked to stream flow, though it is also modified by riparian vegetation, floodplain and groundwater interactions. Like stream flows, summer water temperature is a strong indicator of the overall health of the watershed.

Summer stream temperatures have been extensively monitored in Fifteenmile Watershed, both with electronic data loggers and with an aerial infrared survey. Data loggers are installed annually at 25 sites in Fifteenmile Creek, 5 sites on Ramsey Creek, 2 sites on Cedar Creek, 12 sites in Eightmile Creek, 4 sites in Fivemile and 3 sites in Dry Creek. Trend analysis is tricky, as long-term trends are masked by annual variations in weather.

Temperature logging must continue to document any long-term year-to-year trends in the stream temperature in response to restoration. Priority should be given to continuing the cooperative efforts of the Forest Service, Soil and Water Conservation District and Oregon Department of Fish and Wildlife in monitoring stream temperatures throughout

the summer rearing/irrigation season. Within ten years, statistical analysis should be applied to the data to isolate any trends independent of air temperature or stream flow.

### *Habitat Quality and Quantity*

Existing data regarding habitat quantity, quality and channel stability in the Fifteenmile Subbasin is mostly based on AIP and Forest Service habitat surveys. These surveys were all conducted in the last four years, providing relatively complete habitat information throughout the watershed. The only major geographic gaps are Fivemile Creek outside of the National Forest and Dry Creek. These gaps should be filled within the next three years in order to incorporate up-to-date information in the next round of subbasin planning.

Aquatic inventories should be conducted throughout the watershed in the next six to nine years in order to record any changes to habitat over that time and to document those changes in the 2013 iteration of the Fifteenmile Subbasin Plan. ODFW AIP methodology should be used, with the modification that Wolman pebble counts should be used in place of ocular estimates of substrate.

### *Channel Stability*

Channel stability was one of the major environmental factors affecting the modeled steelhead population in EDT. Of all the conclusions of the Fifteenmile Subbasin Assessment, the conclusions regarding channel stability are perhaps the most uncertain. EDT's estimates of channel stability are primarily driven by input regarding on bed scour. No data exists on bed scour in Fifteenmile Watershed. The estimates input to the model were based on consultation with Mark Kreiter, USFS Hydrologist. The Shear stress equation (62.4 x depth (ft) x slope) was applied to reaches to determine the size of substrate particles moved. Ratings were based on the size of particle that would move at peak flow. Assumptions were made that if only particles less than .02" would move at peak flow then little bedscour will occur and that boulder (>11.9") movement would likely result in a correspondingly high bedscour.

Based on the above assumptions, channel stability is a major mortality factor during egg incubation and remains a mortality factor all the way through age 2+ migration. This indicates a need to research bed scour in Fifteenmile Watershed and find out the true severity of this issue.

A literature search would reveal methods of studying bed scour. *Information Structure of EDT* lists two references used by Mobrand Biometrics to develop their bed scour ratings.[40]

[40] Mobrand Biometrics website: http://www.mobrand.com/MBI/library.html References listed are Gordon et. al. (1992) and Platts et. al (1983).

### *Pesticides and other Chemical Pollutants*

Pesticides were not identified by EDT as a major factor affecting the steelhead population in Fifteenmile Creek. Organophosphate pesticides have been found in Mill Creek and Hood River at levels above the State acute toxicity standard. The acreage of orchards in the Fifteenmile Watershed is expanding. One sample was collected in Fifteenmile Creek in 2003. That sample tested positive for malathion. Therefore, a pesticide monitoring program in Fifteenmile Creek, Eightmile Creek and Fivemile Creek would be prudent. This program could be an expansion of the existing DEQ study on Mill Creek, and would follow the quality assurance/control protocol of that study.

## Steelhead in Fifteenmile

The picture that we have of the current steelhead population in Fifteenmile Watershed is incomplete. Quantitative data on life history, abundance, and genetic structure of the population is lacking. While the Fifteenmile winter steelhead represent the easternmost edge of the winter steelhead range in the Columbia Basin, very little is known about their genetic structure, population, or their relationship to other Columbia Basin steelhead. Spawning surveys have been conducted for many years, but only beginning in 2003 was the entire watershed surveyed systematically. Juvenile migrant counts have been conducted sporadically since 1998. There has never been any attempt to count the number of returning adults. Consequently, the smolt-to-adult return ratio is unknown, as is the ratio of spawners to redds. In order to monitor progress toward both smolt production and escapement, it will be necessary to expand the current monitoring activities.

The ideal system would consist of the following elements:

- An adult fish trap set up between the mouth of Fifteenmile and the confluence with Eightmile. A subsample of fish captured at this site could be radio-tagged to further refine estimates of spawning distribution. Fixed station telemetry sites could be established throughout the basin to monitor fish distribution.
- Juvenile traps set up at the current site near the mouth of Fifteenmile, in Eightmile Creek near the mouth, and in Fifteenmile above Eightmile. Passive Integrated Transponder (PIT) tags could be inserted into a subsample of downstream migrant fish to better understand downstream travel times, survival to Bonneville, and aid in smolt-to-adult survival estimates.
- Continue redd counts using the 2003 protocol.
- Conduct genetic analysis of adult steelhead returning to Fifteenmile Creek. Results from this study would determine the genetic contribution from resident rainbow trout to anadromous steelhead. In addition, result could be used to examine the relationship between Fifteenmile Creek steelhead, and neighboring populations.

The system described above would allow a count of returning adults, wild steelhead versus hatchery strays, spawning ground escapement, adults-to-redds ratio, juvenile migration rates, smolt production from the two major tributaries, egg-to-smolt ratios, and

smolt-to-adult return ratios. This level of monitoring, sustained over a period of fifteen years, would provide a relatively complete picture of the Fifteenmile winter steelhead population.

Possible site for an adult fish trap are limited in the lower subbasin, due to the limited availability of public lands and suitable trapping sites. Potential trapping sites, however could be constructed at the fish ladder in Seufert Falls or at an exiting irrigation diversion upstream. A trapping facility would need to be constructed so that it could withstand the relatively high and variable flows that occur during the steelhead migration period, and capture all migrating fish without failure.

Juvenile monitoring in the tributaries could rely on 5' screw traps deployed at the potential sites in both Fifteenmile and Eightmile Creeks.

## Lamprey in Fifteenmile

Lamprey are present in Fifteenmile Creek. However little is known about species composition, abundance and distribution. Tribal harvest occurs at Suefert Falls but harvest data is non-existent. Because lamprey numbers are declining throughout the Columbia Basin, Fifteenmile Creek may be an important spawning tributary for these fish. In order to obtain basic life-history information from which an effective management plan can be formulated for lamprey the following management / research actions are recommended:

1. Determine lamprey species composition and distribution within the watershed.
2. Determine adult escapement and harvest rate.
3. Determine critical spawning and over-wintering habitat.

The methods used in the Deschutes sub-basin by the CTWSRO through BPA funded project #2002-016-00 may be used in Fifteenmile Creek for priority research items 1 and 2. Adult lamprey should be fitted with radio tags to determine adult spawning areas and migration timing for research item 3.

## Resident Rainbow-type Trout in Fifteenmile

Three questions remain a high priority regarding the resident rainbow-type trout in Fifteenmile:

- What is the ecological relationship between the steelhead and resident populations (i.e. competitive, correlated, independent…)?
- What is the genetic relationship between the steelhead and resident populations? Do these two populations interbreed?
- What is the range of resident rainbow-type trout? Are there reaches in Fifteenmile Watershed that steelhead do not use that should be managed for rainbow-type fish?

Each of these questions is relevant to the protection and recovery plans of the listed steelhead. Management goals for resident rainbow-type trout can not be set until the relationships between the resident and anadromous forms of *O. mykiss* are understood.

Existing genetic data suggests that the resident and anadromous populations may be genetically dissimilar.[41] Results are not yet conclusive. Implementing a study to examine the genetics structure of Fifteenmile Creek steelhead and resident trout, would provide needed information on the contribution of resident to the anadromous form.

## 5.6.2. Mill Creek Watershed

Mill Creek is the highest priority stream to research and monitor in The Dalles area. Steelhead spawn in this watershed as far as twenty miles upstream of the mouth. Mill Creek might contribute significantly to the genetic and life-history diversity of the Fifteenmile winter steelhead population. Coho and Chinook have also been noted in Mill Creek. Yet the habitat has not been characterized, spawning reaches have not been determined except on the National Forest, escapement, smolt production and spawning levels are all unknown. Similar monitoring studies as those described for Fifteenmile Creek should be deployed in Mill Creek to answer critical uncertainties regarding this segment of the population.

### Water Quality

Current water quality monitoring in Mill Creek Watershed includes the DEQ pesticide monitoring conducted as part of the Integrated Fruit Production program, temperature monitoring by the SWCD, and drinking water quality monitoring at the Wick's Water Treatment Plan on South Fork Mill Creek.

The City of The Dalles monitors streamflow on South Fork Mill Creek at Wick's Water Treatment Plant. Stream flows have never been monitored on the North Fork or mainstem of Mill Creek.

To develop a good picture of habitat conditions for salmonids, the following studies are needed:

- Aquatic Habitat Inventories using ODFW protocols with Wolman pebble counts; Parts of South Fork Mill Creek are pristine enough to serve as reference reaches for other streams at the same elevation and in the same ecological zone.
- Continued pesticide monitoring using the DEQ Quality Assurance/Control Plan;
- Continued temperature monitoring at existing sites on the mainstem, and on South Fork and North Fork Mill Creek;

[41] IC-TRT 2003

- Establishment of streamflow gauges on mainstem Mill Creek and North Fork Mill Creek. As in Fifteenmile, with minor modifications, these sites can be electronically monitored using the existing IFPnet weather station network.

## Steelhead in Mill Creek

No steelhead population data is available for Mill Creek—no counts of either adults, juveniles or redds. The upper distribution has been determined, but the extent of utilization of the lower watershed is still not known. The following monitoring plan components would provide quantitative estimates and qualitative information regarding the Mill Creek winter steelhead run:

- One 5' juvenile trap on lower mainstem Mill Creek;
- Redd counts following the sampling protocol currently in use in Fifteenmile Watershed;
- Adult trapping using a weir at an existing diversion on mainstem Mill Creek.
- Genetic sampling should be conducted to determine the genetic structure and relationship between Mill Creek, Fifteenmile and other nearby populations.

The adult trapping at the water treatment plant will allow the development of a spawner-to-redd ratio, which can be used to estimate the total adult abundance of the whole watershed.

Monitoring as outlined above would continue for a minimum of eight years in order to estimate smolt-to-adult returns for Mill Creek and determine if they are similar to Fifteenmile. Redd counts would continue beyond that in order to monitor year-to-year abundance.

When genetic sampling is conducted in Fifteenmile, it should also be conducted in Mill Creek to determine whether the two runs are a single population or are somewhat separate.

## Cutthroat in Mill Creek

The South Fork Mill Creek watershed is inaccessible to steelhead and protected by the City of The Dalles and the US Forest Service for water quality. South Fork was identified through the Qualitative Habitat Analysis as a high priority for protection for resident cutthroat trout. Cutthroat have been sampled from Crow Creek Reservoir, and from the watershed above the dam. Body condition and size were small compared to cutthroats found in more productive waters. [42] Populations have not been estimated. Cutthroat are also present in unknown numbers in North Fork Mill Creek.

Monitoring of the cutthroat population in South Fork Mill Creek would aim to estimate the population density and spawning range. Establishing representative index reaches

[42] Wasco Co. SWCD 2002a.

that could be electrofished on a repeated interval would provide a method to study population structure, abundance and life history. PIT tags could be inserted in a representative sample of fish to monitor migration, growth and abundance.

### 5.6.3. Mosier Creek

Mosier Creek Watershed was identified by the Qualitative Habitat Analysis as the highest priority for restoration among resident fish streams in the Fifteenmile Subbasin. Mosier Creek is home to a resident cutthroat population. The issues of concern in the Mosier Watershed are:

Little information exist on the life history or abundance of Mosier Creek cutthroat. Establishing representative index reaches that could be electrofished on repeated interval, would provide a methodology to monitor population structure, abundance and obtain life history information. PIT tags could be inserted into a representative sample of fish to monitor, migration, growth, and abundance.

Likely pesticide contamination—Mosier Creek has not been tested for organophosphate pesticides. However, orchard management in Mosier Watershed is similar to that in Mill Creek. Therefore, it is likely that organophosphate pesticides will show up in the water at approximately the same times and same rates that they appear in Mill Creek. Mosier Creek should be included in the DEQ sampling program currently being implemented in Mill Creek.

Aquatic habitat inventories following the ODFW protocol would provide a baseline to identify and quantify future changes to the condition of the creek.

Sedimentation and erosion from the road network—Mosier Creek Road follows Mosier Creek for the lower ten miles of stream. West Fork Mosier Creek and Dry Creek are also paralleled and crossed by roads. Sedimentation may be an issue at localized points. Wolman pebble counts near road junctions would identify trouble spots.

Summer stream temperature—Mosier Creek is listed on the Oregon 303(d) list of Water Quality Limited Waterbodies for high summer stream temperatures. Restoration of stream temperature and stream flows will be closely related. Efforts to improve irrigation efficiency and stabilize groundwater levels may lead to improvements in flows and temperatures. Continued temperature monitoring will be necessary to document such results.

Groundwater Overdraft—The interaction between the falling aquifers and the stream is unknown. Further overdraft of the aquifers may pose a risk both the resident cutthroat and to the steelhead that spawn below Pocket Falls. Mosier Watershed Council has been considering proposals from the US Geological Survey and from private contractors to develop an overall water budget for the aquifers that describes the natural flows between the aquifers, the creek and the Columbia River, artificial flows between aquifers created by leaky well shafts, the annual recharge rate, and the rate of withdrawal through wells. The overall objective of the proposed study is to advance the scientific understanding of

the hydrology of the basin and use that understanding to develop a set of tools that can be used to evaluate the sustainable yield of the ground-water resource. Some of the key scientific questions to be addressed include:

- What are the boundaries to the ground-water system?
- What are the hydrologic inputs and outputs to and from the ground-water system and how have they changed since development began?
- What was the nature of flow between basalt aquifers under natural conditions and how has that been affected by pumping? By co-mingling wells?
- To what extent can water-level declines be attributed to pumping? Co-mingling wells? Climatic variations?

The major findings of the study, description of the data, and documentation of the model will be published in a USGS Scientific Investigations Report. A project web site will be created to disseminate information on the goals and approach of the study, as well as data and reports. Project staff will meet with the Mosier Watershed Council at regular intervals to convey progress, preliminary results, and plans. The study will take 2.5 to 3 years from inception to publication of the final report. Preliminary budget estimates are $400-$500,000. USGS will provide 50% of the project funds. Bonneville Power Administration is a potential source for the matching funds.

### 5.6.4. Other Streams in Fifteenmile Subbasin

The three remaining streams in the Fifteenmile Subbasin provide smaller amounts of habitat, but may have key roles to play in protection and restoration of focal species.

Rock Creek (west of Mosier) is identified as a protection priority for cutthroat above Rock Creek Falls. In addition, it provides potential steelhead habitat downstream of the Falls, some of which is in need of restoration. Rock Creek is listed on the Oregon 303(d) list of Water Quality Limited Waterbodies for high summer stream temperatures. Rock Creek runs subsurface in the summer due to heavy gravel inputs from a nearby gravel pit. Now that the gravel pit is no longer active, creek flows may be recovering slowly over time. Monitoring needed in Rock Creek to establish a baseline includes:

- Aquatic habitat inventory following the ODFW protocol, both above and below the Falls;
- Stream temperature logging, at least two sites;
- Flow monitoring, at least one site; plus monitoring of location where the stream goes to subsurface flow during the summer;
- Cutthroat density and distribution above the falls;
- steelhead redd surveys below the Falls.

Threemile Creek is identified as a restoration priority for steelhead. Issues in Threemile Creek include loss of aquatic habitat, passage issues, temperatures and pesticide contamination. Monitoring for these parameters should consist of:

- Passage—After the I84 culvert is replaced with a fish passable structure, observers should track the spawning steelhead to determine the extent of

utilization of Threemile Creek. Any passage barriers should be noted and prioritized for replacement;

- Aquatic habitat inventory following ODFW protocols but including Wolman pebble counts;
- Stream temperatures should be monitored with a single temperature logger in the lower reaches of the stream;
- Pesticides should be sampled following the DEQ protocol on Mill Creek

Chenowith Creek provides one to two miles of potential spawning habitat. It is unknown to what extent this habitat is used. At a minimum, Chenowith Creek should be monitored with the following techniques:

- Pesticide sampling following the DEQ protocol;
- Spawning surveys to determine the extent of use by steelhead.

## 5.6.5. Monitoring Terrestrial Habitat and Wildlife Populations

### Terrestrial Habitat Monitoring

#### *General Recommendations*

The following monitoring strategies are excerpted from Altman and Homes (2000) and from Altman (2000). Some of these strategies could be implemented on an ecoregion or province scale, rather than individual subbasins.

- Study the role of fire, mowing, thinning and other management treatments to maintain/improve habitat quality.
- Establish permanent roadside and off-road census stations to monitor focal species population and habitat changes.
- Conduct community-level ecologic research.
- Develop "scorecards" for each habitat type for government and nongovernment use in prioritizing and evaluating habitat for landbirds. The scorecard should provide guidelines for rating the habitat at various scales (local, landscape). These could be used not only to evaluate conservation projects, but also for assessing the impacts of proposed development.
- Coordinate research activities between government and private entities.

#### *Recommended Monitoring for Modifications of Critical Habitat*

- Record the number of acres improved for the shrub-steppe, pine/oak and mixed conifer vegetation zones annually.
- Establish permanent photo points and vegetation transects within the shrub-steppe, pine/oak and mixed conifer zones. Use the National Resource Inventory (NRI) plots if located within each of these zones.
- Establish effectiveness monitoring for 10 percent of the habitat improvement projects.

## Population Monitoring

Monitoring is currently conducted in the Fifteenmile Subbasin for deer, elk, antelope and upland game birds. Current monitoring efforts by ODFW regarding the seven focal species are summarized below:[43]

Mountain Quail:

- ODFW does annual upland brood counts
- All sightings and observations are recorded and reported to ODWF.

Spotted Owl:

- USFS records all sightings.
- USFS surveyed the subbasin for spotted owls in 1991-1996. Spotted owl activity centers were established in 1994.
- USFS does long term population monitoring and demographic studies within several designated areas throughout the spotted owls' range in Oregon, Washington and California.

Grey Squirrel:

- No surveys conducted

Brewer's Sparrow:

- No surveys conducted through The Dalles ODFW office.
- US Fish and Wildlife Service's Breeding Bird Survey routes (BBS) are run annually within the Columbia Basin Region.

Loggerhead Shrike:

- Upland brood counts
- Fall raptor counts
- Winter waterfowl surveys
- All individual staff sightings recorded
- US Fish and Wildlife Service's Breeding Bird Survey routes (BBS) are run annually within the Columbia Basin Region.

Blacktail and Mule deer monitoring:

- Fall herd composition- conducted by air from helicopter and from the ground.
- Spring trend counts- conducted by helicopter, fixed-wing, on foot and from vehicle.

Beaver:

- No surveys conducted, given reports through damage complaint process.
- Annual trapping survey records for Wasco County are available.

### *Recommended Monitoring for Mountain Quail*

- Continue current monitoring.

[43] Jeremy Thompson, ODFW, pers. comm.. 5/18/2004

- Establish photo points and vegetation transects within riparian areas that have been rehabilitated. Record shrub species, amount and utilization by quail.
- Establish population survey routes in areas that have quail re-introductions.

### *Recommended Monitoring for Spotted Owl*

- Resurvey spotted owl locations within the subbasin over the next 5-10 years.
- Record spotted owl habitat changes over the next ten years.
- Record all barred owl sites within the subbasin.

### *Recommended Monitoring for Grey Squirrel*

- Establish some long term photo points and vegetation transects within the pine/oak vegetation zone.
- Establish several long-term nest site areas using the Washington Department of Fish and Wildlife protocol within the subbasin.

### *Recommended Monitoring for Brewer's Sparrow*

- Establish photo points and vegetation transects within riparian areas that have been rehabilitated.
- Establish a BBS route within the shrub-steppe habitat in the subbasin.

### *Recommended Monitoring for Loggerhead Shrike*

- Establish photo points and vegetation transects within riparian areas that have been rehabilitated.
- Establish a BBS route within the shrub-steppe habitat in the subbasin.

### *Recommended Monitoring for Deer*

- Continue fall herd composition- conducted by air from helicopter and from the ground.
- Continue spring trend counts- conducted by helicopter, fixed-wing, on foot and from vehicle.

### *Recommended Monitoring for Beaver*

- Count the number of beaver dams/by reach while doing fish spawning surveys to use as a population indicator.
- Establish photo points and vegetation transects within riparian areas that have been rehabilitated. Record shrub species, tree species and utilization by beavers.

## Data and Information Archive

### *Quality Assurance/Quality Control*

Each of the agencies participating in the Fifteenmile Coordinating Group has their own set of stringent quality assurance and control measures. Each agency also has its own set

of standards against which the condition of the natural resources is measured. The challenge has always been in translating between these standards. The challenge in the future should be to choose by consensus the most appropriate standards for measuring the health of the Fifteenmile Subbasin. One approach might be to specifically focus on collecting information in a format compatible with EDT. This would provide standardization and would make it easier to complete a future subbasin assessment using that tool. Using EDT again in three years would make it easier to compare overall progress over the three year period. Greater focus should be placed on this challenge when the Fifteenmile Subbasin Plan is updated in three years.

In order to meet the requirements of the Clean Water Act, all water quality monitoring should meet Oregon DEQ standards for quality assurance and control.

#### *Data Management and Analysis*

Much of the information used to complete the Fifteenmile Subbasin Assessment was gathered from unpublished reports that were tracked down through personal contact with local managers. Had it not been for the Subbasin Planning Process, this information would have been unknown to most of the natural resource managers in the subbasin.

In order to make best use of the information gathered under this plan, it should be a requirement that the results of all monitoring projects undertaken in the Fifteenmile Subbasin and funded by BPA should be made readily available to the partners involved in the development of this program (as listed in section 2.2.—List of Participants). This includes most of the local management agencies, as well as NOAA Fisheries and US Fish and Wildlife Service. These reports will be stored on the Streamnet website, in the Fifteenmile Subbasin folder: (ftp://ftp.streamnet.org/pub/streamnet/SubPlanning/ColumbiaGorge/Fifteenmile/).

Agencies will be encouraged to file reports from monitoring efforts not funded by BPA on the Streamnet website as well. For instance, TMDL monitoring efforts by Oregon DEQ will be invaluable to updating the Fifteenmile Subbasin Plan in 3-5 years. Wildlife population data collected by ODFW or Forest Service will be necessary to provide more in depth wildlife planning in future subbasin plans.

Reports with text and graphics should be stored as .pdf files for easy download. More in-depth geographic databases should be stored as ArcView shapefiles.

## 5.6.3. Evaluation

### Scientific Evaluation—Strengths and Weaknesses of Available Information

The Fifteenmile Subbasin Plan is intended to be reviewed and updated every three years as part of the Northwest Power and Conservation Council's Rolling Review Process. Therefore, research and monitoring results will be reviewed with every round by the Independent Scientific Review Team, as well as other agencies, such as NOAA Fisheries

and the Columbia Basin Fish and Wildlife Authority. This will provide the independent review—the view from a distance—needed for objective evaluation of the scientific strengths and weaknesses.

### Decision-making Evaluation—Who should respond and What is the response to changes in ecological indicators?

When it comes to natural resource management, Fifteenmile Subbasin is divided into many overlapping jurisdictions. Less than half of the subbasin could be assigned to a single responsible lead agency. Responsibility for reacting to changes in ecological indicators could be broken roughly into three geographic areas:

1. The Mount Hood National Forest is clearly under the jurisdiction of the US Forest Service. Many of the priority protection reaches are located on the National Forest. Other agencies may provide support for certain projects. For instance, Wasco Co. SWCD and NRCS might provide engineering assistance for ditch piping efforts, regardless of whether the ditch is on public or private lands.

2. South Fork Mill Creek serves as the municipal watershed for the City of The Dalles. The Dalles Public Works Department, in cooperation with the US Forest Service, and the few private landowners, manages this land. South Fork Mill Creek is a priority protection area.

3. The rest of the subbasin is mostly privately owned. The exceptions are some tracts of BLM land, some Special Management Areas in the Columbia Gorge National Scenic Area, which are managed by the US Forest Service, and a few parcels owned by the State, Tribes, County and City. Most of the priority restoration reaches are located in this part of the subbasin. Responses to changes in ecological indicators in this part of the subbasin will require a coordinated response by ODFW, Wasco Co. SWCD, Oregon Department of Environmental Quality, Oregon Department of Agriculture, Oregon Department of Forestry and others.

### Public Evaluation—Review and Comment Plan

The three watershed councils of the Fifteenmile Subbasin—Fifteenmile Watershed Council, The Dalles Area Watershed Council and Mosier Watershed Council—provide the forums necessary for public review and comment on the Fifteenmile Subbasin Plan. As these forums have performed this function in the development of the subbasin plan, so they can provide the same level of pubic review to the implementation and evaluation of the Subbasin Plan.

Fifteenmile and Mosier Watershed Councils meet quarterly, while The Dalles Area Watershed Council meets seven times per year. Each of these councils can meet more often when an issue becomes urgent or needs more discussion. All members of the public are welcome to attend and participate in watershed council discussions. Agendas

and minutes are circulated through direct mail to over 120 individuals. Meetings and agenda items are announced ahead of time through local media.

Typically, results of water quality monitoring have been reported to the watershed councils on an annual basis by DEQ, Wasco Co. SWCD, ODFW and USFS. In preparation for future rounds of subbasin planning, the watershed councils will look at all water quality and population monitoring as a whole every three years, one year in advance of future subbasin plan updates. The watershed councils will consider the questions, "Has the Subbasin Plan been effective, according to the monitoring data, and how can we be more effective in the future?" Their response will be collected by the SWCD and will help provide a direction for subbasin plan updates.

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