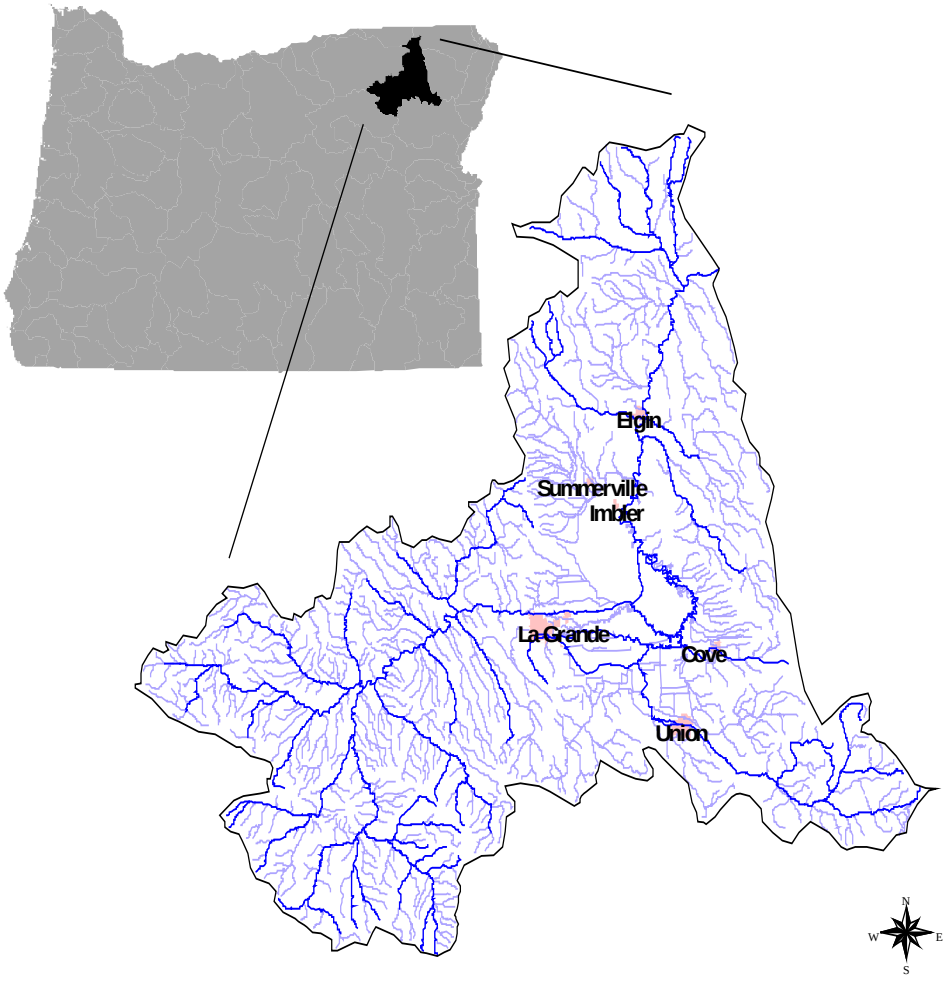
UPPER GRANDE RONDE RIVER SUBBASIN WATER QUALITY MANAGEMENT PLAN



Prepared by
Grande Ronde Water Quality Committee

TABLE OF CONTENTS

Acronyms Used in This Document

ASQ	Allowable Sale Quantity
AWQM	Agricultural Water Quality Management (program or Act)
AWQMA	Agricultural Water Quality Management Area (Plan)
BLM	Bureau of Land Management
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CAFO	Confined Animal Feeding Operation
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQ	Department of Environmental Quality (Oregon)
DLCD	Department of Land Conservation and Development
DMA	Designated Management Agency
DO	Dissolved Oxygen (D.O.)
DOGAMI	Department of Geology and Mineral Industries
DSL	Division of State Lands
ECA	Equivalent Clearcut Area
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQC	Environmental Quality Commission
FPA	Forest Practices Act
GRMWP	Grande Ronde Model Watershed Program
GRWQC	Grande Ronde Water Quality Committee
ICASD	Island City Area Sanitation District
LA	Load Allocation
LAC	Local Advisory Committee
LWD	Large Woody Debris
MAO	Mutual Agreement and Order
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System (permit)
NPS	Nonpoint Source
NRCS	Natural Resource Conservation Service
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OEDD	Oregon Economic Development Department

O/G	Oil and Grease
O&M	Operation and Maintenance (plan)
OPSW	Oregon Plan for Salmon and Watersheds
ORS	Oregon Revised Statute
OSMB	Oregon State Marine Board
PLFN	Private Lands Forest Network
RHCAs	Riparian Habitat Conservation Areas
RMO	Riparian Management Objective
S&Gs	Standards and Guides
SMU	Streamside Management Unit
SWCD	Soil and Water Conservation District
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UPRR	Union Pacific Rail Road
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USWCD	Union Soil and Water Conservation District
WLA	Waste Load Allocation
WPCF	Water Pollution Control Facility (permit)
WQL	Water Quality Limited
WQMP	Water Quality Management Plan
WQS	Water Quality Standard
WWTP	Wastewater Treatment Plant

Introduction

Clean Water Act, 303(d) List, TMDLs, and WQMPs.

Section 303(d) of the 1972 federal Clean Water Act (CWA) as amended requires states to develop a list of rivers, streams and lakes that cannot meet water quality standards without application of additional pollution controls beyond the existing requirements on industrial sources and sewage treatment plants. Waters that need this additional help are referred to as "water quality limited" (WQL). Water quality limited waterbodies must be identified by the Environmental Protection Agency (EPA) or by a state agency which has been delegated this responsibility by EPA. In Oregon, this responsibility rests with the Department of Environmental Quality (DEQ). The DEQ updates the list of water quality limited waters every two years. The list is referred to as the 303(d) list. The CWA section 303 further requires that Total Maximum Daily Loads (TMDLs) be developed for all waters on the 303(d) list. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. A Water Quality Management Plan (WQMP) is developed to describe a strategy for reducing water pollution to the level of the TMDL, which will restore the water quality and result in compliance with the water quality standards. In this way, the designated beneficial uses of the water will be protected for all citizens.

Environmental Quality Commission Action

In the Upper Grande Ronde River Subbasin, portions of the Grande Ronde River, Catherine Creek, and their tributaries have been listed on Oregon's 303(d) list for many years. This subbasin includes all streams that flow into the Grande Ronde River above the confluence with the Wallowa River at Rondowa. Extensive water quality monitoring and analysis in the early 1990s began to define the subbasin's water quality problems and causes. Monitoring has continued and in recent months extensive additional data analysis has been done. In light of this information the Environmental Quality Commission (the citizen board that oversees DEQ) adopted a new administrative rule (OAR 340-041-0745) in October 1997. The rule was intended to bring the waters of the Upper Grande Ronde River Subbasin into compliance with the state water quality standards for dissolved oxygen, pH, temperature, and bacteria by requiring development of water quality management plans and establishment of in-stream concentration limits on certain pollutants. The rule also directed the DEQ to work with a local advisory committee to develop a WQMP that would describe a process and time frame for controlling nonpoint source pollution that was contributing to the water quality standard violations in the subbasin. This Water Quality Management Plan has been developed in response to that rule.

Committee & Workgroup Organization & Function & Membership

DEQ staff worked closely with the Grande Ronde Model Watershed Program to establish the Grande Ronde Water Quality Committee. The Committee held its first meeting in December of 1997. The Committee, chaired by Jerry Young, included representatives of all stakeholder groups that potentially would be affected by the implementation of a water quality management plan. There was considerable overlap in membership of the Committee and the board of the Grande Ronde Model Watershed Program. This was done to further insure cooperation with the watershed council in developing the WQMP. The Model Watershed also provided staff support to the Committee. In addition to the advisory committee members, agency advisors were identified from all interested federal and state agencies. The committee charge and list of members is provided below:

Grande Ronde Water Quality Committee

Committee Charge: The Committee will assist and advise the Department of Environmental Quality and Grande Ronde Model Watershed Program in the development of a comprehensive water quality management plan for the Upper Grande Ronde River Subbasin.

Committee Members:

Name	Interest
Gerald Young	Committee Chair
Glen Hogue	Municipal
Bob Messinger	Industry/Commercial Timber (GRMW Board)
Richard Comstock	Transportation
Dale Counsell	Grazing (Union SWCD & GRMW Board)
Ross Bingaman	Crop agriculture
Rick George	Tribal (GRMW Board)
Steve McClure	Union County (GRMW Board)
John Herbst	Small woodlands
David Axelrod	Environmental
Gary Hathaway	Recreation (served until he moved out of the area)
Paula Moisio	Business
Sandy Roth	Public
Ron Dake	Public

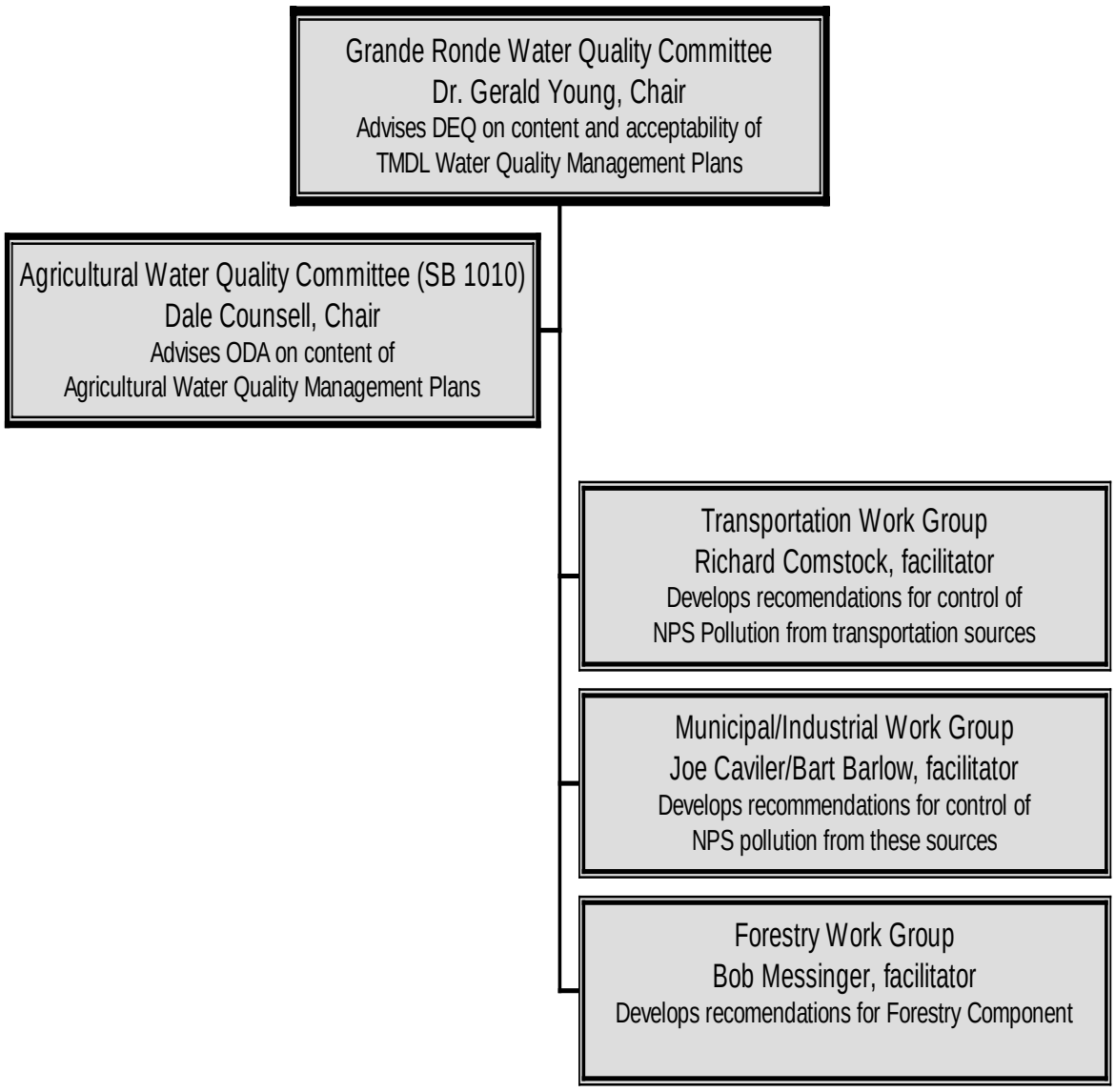
Agency Ad Hoc:

Agency	Name
Oregon Dept. Environmental Quality	Mitch Wolgamott
Oregon Dept. Agriculture	Ken Diebel
Oregon Dept. Forestry	Tim Keith
Oregon Dept. Fish & Wildlife	Jeff Zakel
Oregon Water Resources Dept.	Rick Lusk
Oregon Dept. Transportation	Mike Buchanan
Grande Ronde Model Watershed	Lyle Kuchenbecker
US Environmental Protection Agency	Christine Kelly
USDA Forest Service	Bob Rainville
USDA Natural Resource Conservation Service	Mike Burton

The Committee met approximately monthly from December 1997 through November 1999 during the development of the water quality management plan. In between full committee meetings, various work groups met to develop recommendations on specific source categories or other subjects as needed. There were four formal work groups: Transportation, Municipal/Industrial, Forestry, and Agriculture (the agriculture group is synonymous with the Agriculture Water Quality Advisory Committee or SB 1010 Committee). An organization chart of the Grande Ronde Water Quality Committee is provided in Figure 1 on Page 9. Other groups met on an ad hoc basis to formulate recommendations for the Committee to consider related to technical issues, stream flow, public involvement, funding, etc.

Figure 1.

Grand Ronde TMDL Committee Organization



Water Quality Management Plan Guidance

In November of 1997 DEQ issued a guidance document that described the basic elements needed in a Water Quality Management Plan. The elements are:

1. Condition Assessment
2. Goals and Objectives
3. Management Measures
4. Timeline for Implementation
5. Identification of Responsible Participants
6. Reasonable Assurance of Implementation
7. Monitoring and Evaluation
8. Public Involvement
9. Maintenance of Effort Over Time
10. Cost and Funding

This Upper Grande Ronde River Subbasin Water Quality Management Plan document is organized around those ten plan elements and is intended to fulfill the requirement for a management plan contained in OAR 340-041-0745.

Element 1: Condition Assessment and Problem Description

Geographic Region of Interest

The Upper Grande Ronde River Subbasin includes the river, all of its tributaries, and all lands that drain to the river or its tributaries upstream of the confluence of the Wallowa River at Rondowa. This is an area of approximately 1,640 square miles. The Subbasin is located within the Blue Mountain ecoregion and is characterized by a semi-arid climate (Bach, 1995). It is bordered to the west and northwest by the Blue Mountains, by the Elkhorn Range to the southwest, and the Wallowa Mountains to the east and southeast. Elevation ranges from approximately 7,800 feet down to 2,300 feet. The headwater areas are characterized by rugged mountains and steep slopes which give way to the relatively flat, 360 square mile Grande Ronde Valley.

The climate is characterized by warm dry summers and cold moist winters. Elevations below 3,000 feet have average annual precipitation of from 12 -25 inches occurring mainly as rain or rapidly melting snow. Between 3,000 and 5,000 feet average annual precipitation ranges from 20 to 50 inches occurring as a mixture of rain and snow. Above 5,000 feet there is greater than 50 inches annual precipitation primarily in the form of snow. In the mid-elevation zone (3,000-5,000 feet) rain on snow often causes large runoff events which increase peak flows causing erosion which leads to sedimentation in streams. Management activities in this zone are of particular concern because of this potential for runoff and sediment producing events (Bach, 1995).

Approximately 53 percent of the land in the Subbasin is privately owned – this includes almost all of the Grande Ronde Valley. Private ownership is located predominately along the valley bottoms and mouths of streams. Predominant private land uses are agriculture and livestock management. There are a few large private timberlands, which tend to be at higher elevations. Forty six percent of the Subbasin is publicly owned and managed mostly by the USDA Forest Service. There is a small amount of land managed by USDI Bureau of Land Management. The public lands are located primarily along headwaters of streams in timbered mountainous terrain. These lands are managed for multiple use including water quality, timber production, livestock management, wildlife and recreation. Prior to European settlement Native Americans of the Cayuse, Umatilla, Walla Walla, and Nez Perce tribes utilized the entire subbasin. These tribes continue to hold treaty rights to harvest fish, wildlife and plants at usual and accustomed places in the subbasin.

The Upper Grande Ronde Subbasin is located almost entirely within Union County; small portions of the subbasin are in Umatilla and Baker counties (Bach, 1995). According to the Oregon Blue Book (1999-2000 edition) Union County has a population of 24,400 most of whom reside with in the Grande Ronde Valley in the population centers of La Grande (12,795), Island City (920), Union (1,990), Elgin (1,770), Cove (625), Imbler (325), Summerville (150). There are 1,092 farms in the county (average 473 acres/unit). Approximately 144,000 acres of the valley are designated as cropland; 49,000 acres designated as irrigated land, with 42,000 acres in irrigated crops (Bach, 1995).

Target Identification:

Beneficial Uses, Water Quality Standards and Criteria

The Oregon DEQ's water quality program is designed to protect designated beneficial uses of the State's waters. The designated beneficial uses of the waters of the Grande Ronde Basin are identified in Oregon Administrative Rules (OAR 340-41-722). The uses found to be most at risk in the Upper Grande Ronde Subbasin are aquatic life and aesthetic quality (DEQ, 1997). Both have been identified as "not supported." Other affected uses are anadromous fish passage and salmonid fish rearing. Salmonid species of concern in the Upper Grande Ronde Subbasin include anadromous populations of chinook salmon and steelhead, and resident bull trout. When water quality standards are not being met, and are not expected to be met with technology based controls on point sources alone, then the Clean Water Act requires the stream to be identified as water quality limited.

Oregon's 1998 303(d) List of Water Quality Limited Waterbodies identifies nine parameters of concern in the Upper Grande Ronde Subbasin. These are: Algae, bacteria, dissolved oxygen, flow modification, habitat modification, nutrients, pH, sedimentation, and temperature. The relevant water quality standards and criteria for listing are included in the 303(d) list (DEQ, 1998). All of these concerns exist within the Grande Ronde Valley portion of the subbasin. Three of these nine concerns – temperature, sediment, and habitat modification – are widespread outside the Valley.

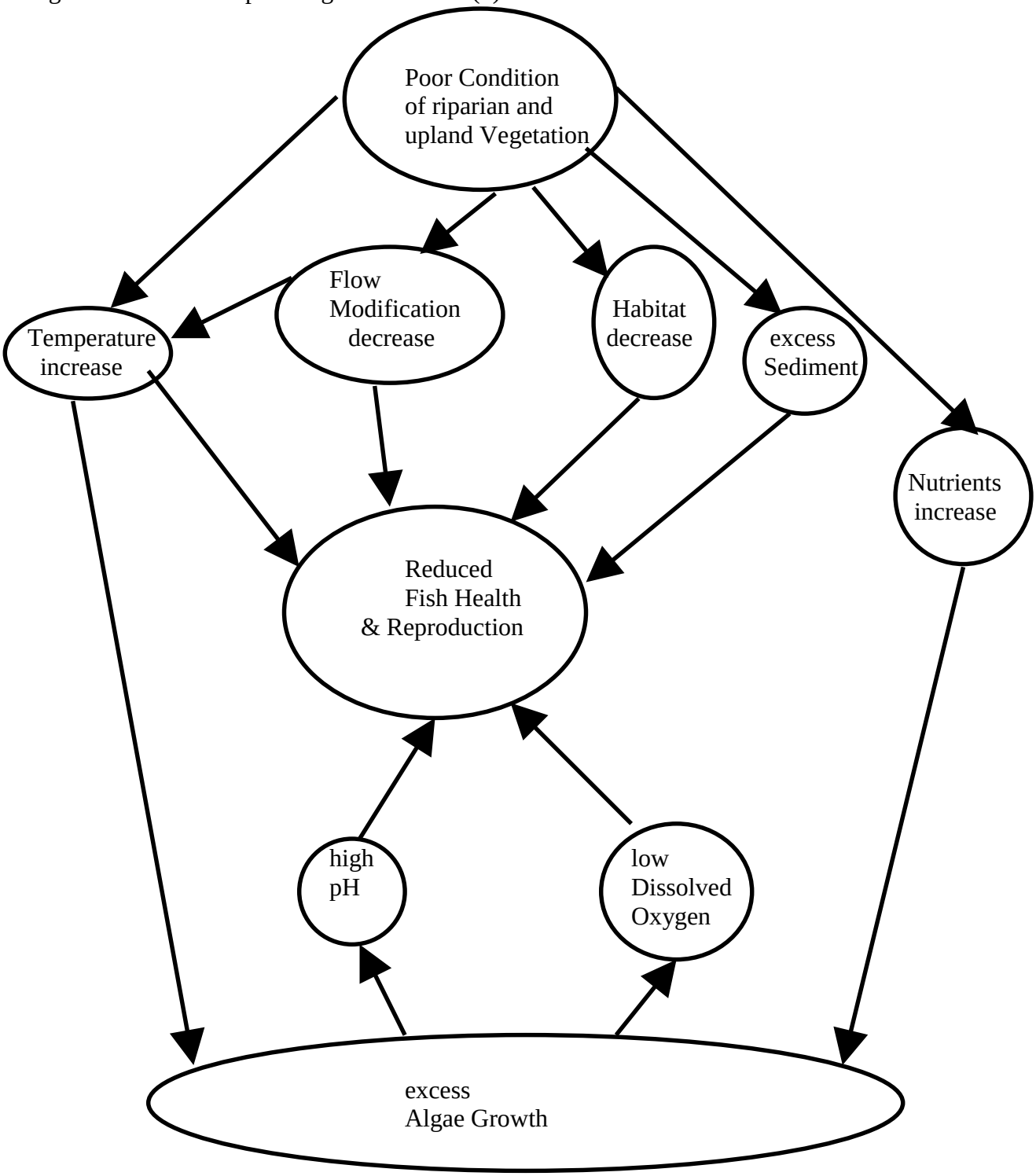
There are approximately 45 stream segments included on the 303(d) List for one or more of the nine parameters, out of a total of about 70 identified segments in the subbasin. Many additional stream segments were considered for listing but not added to the 303(d) list because of lack of supporting data. Additional segments are expected to be shown out of compliance with standards as more information is gathered. The number of segments listed for each parameter are provided in Table 1.

Table 1	
PARAMETER	# SEGMENTS
Temperature	36
Sedimentation	20
Habitat modification	18
PH	5
Algae	3
Nutrients	3
Flow modification	3
Dissolved oxygen	2
Bacteria	1

It might seem a daunting task to address nine parameters of concern on 45 stream segments with one management plan but these are not wholly independent parameters and segments. When looking at Table 1 two observations stand out. One, temperature, sediment and habitat modification parameters are identified on many segments spread throughout the subbasin. Two, the remaining parameters, pH, algae, nutrient, flow modification, dissolved oxygen, and bacteria, are relatively rarely identified. Identification of these parameters is almost entirely restricted to the main stem of the Grande Ronde River and main stem of Catherine Creek within the Grande Ronde Valley. Pollutants affecting these parameters can come from upstream and tributary sources, but the actual violations of standards or criteria for that group of parameters occurs mainly in the valley. This means we can divide the violations into two categories, those that occur throughout the subbasin and those that occur only, or primarily, in the valley.

It is also important to recognize the relationships between the parameters as shown in Figure 2 on Page 14. Management decisions that affect riparian and upland vegetative condition will have a corresponding affect, either directly or indirectly, on all of the parameters of concern and on the beneficial use. Therefore, practices that improve vegetative conditions, while not the only solutions of importance, are high priorities for improving water quality in the subbasin.

Figure 2. Relationship of Vegetation to 303(d) Listed Parameters and to Fish Health



The three parameters commonly listed throughout the Subbasin – habitat modification, sediment and temperature – can all be improved through management decisions that would lead to improving vegetation condition. So each parameter does not need to be addressed separately. In general, solutions that involve stabilizing slopes and stream banks, narrowing and deepening channels (decreasing width to depth ratio), and increasing shade by restoring woody vegetation in areas where it has been removed (primarily in riparian areas) will lead to improvement in habitat, sediment loss and temperature. Reducing sediment from roads, or intercepting it before it reaches a stream, is also an approach with large potential benefits.

Unique features in the Valley must be considered when evaluating water quality. The Valley form is flat and wide, offering an unconstrained area for low velocity channel development with significant sediment deposition. As a result, a large floodplain has developed where soils are much deeper than in other parts of the subbasin. The stable channel configuration in this valley form is expected to have high sinuosity (Khan 1971). With this combination of valley and channel form, the potential for erosion and down cutting is high when banks are destabilized or streams are artificially straightened. In addition, there are a number of land management activities and pollution sources that are unique to the Valley including population centers with both residential and commercial areas, sewage treatment plants, and industrial sources. The river and most of the tributaries in the valley have been channelized and riparian vegetation altered to some extent. The State Ditch reduced channel length through the Valley by almost 37 miles and provides an example of the results of channel straightening and down cutting. The land has been highly developed for agriculture and livestock management, which are now the predominant land uses in the Grande Ronde Valley. This relatively high level of human population and land development means that there are many more potential sources of pollution in the valley than in the rest of the subbasin.

The three basin-wide parameters of concern, temperature, sediment, and habitat, appear to have similar causes and solutions in the valley as compared to the rest of the subbasin with the exception of sediment; because of the lesser slopes, sediment originating from outside the riparian areas might be less of an issue. The principal cause of the dissolved oxygen and pH water quality standard violations is excess periphyton algae production (DEQ, 1997). The rate of algae production is regulated by the availability of sunlight, temperature, nutrients, and hydraulic sloughing (related to flow). The amount of sunlight reaching the algae and the water temperature are related to the stream's width to depth ratio and to riparian vegetation issues raised previously. Dissolved oxygen and pH would be expected to improve with implementation of the same practices that would be used to improve sediment, habitat and temperature.

Nutrients (nitrogen and phosphorus) are more complicated. Point sources (sewage treatment plants and industrial plants) can be significant sources of nutrient. In addition, nutrients often enter water attached to soil particles and fine organic matter that washes off adjacent land. Therefore bank stability and riparian vegetation are again important. Transport of sediment and dissolved nutrients via roadside ditches, drainage ditches, and stormwater drains is also important. Dissolved nutrients move easily into surface waters via shallow groundwater and drain tiles. Several studies have shown that healthy riparian areas with deep rooted woody

vegetation such as trees and shrubs intercept significant amounts of nutrients and prevent them from reaching surface waters (Hill, 1996, Verchot, 1997). Fertilizer management (both on agricultural fields and on often heavily fertilized lawns and urban gardens), cover crops, soil disturbance, and irrigation management have an impact on the nutrient load.

By providing dilution and increased moisture, increased late season flow would improve almost all of the 303(d) listed parameters -- temperature, habitat modification, pH, algae, nutrients, dissolved oxygen, and bacteria.

Current Conditions

There have been numerous assessment studies conducted in the Upper Grande Ronde Subbasin. Several of these are summarized here to provide an overview of conditions in the subbasin (Bach, 1995; BLM, 1993; Clearwater BioStudies, 1993; Morbrand Biometrics, 1997; DEQ, 1997; NRCS/USFS/ Union SWCD, 1997; USFS, 1994). Only those portions of the assessments relevant to the parameters listed in Oregon's 1998 303(d) List of Water Quality Limited Waterbodies are discussed here. More detailed discussions of climate, geology, topography, vegetation, ecology and human uses can be found in the referenced documents. Detailed discussions of the voluminous water quality monitoring data available in the subbasin can be found in the following two documents: Grande Ronde River Basin Water Quality Technical Assessment – Temperature (DEQ, May 1998) and Grande Ronde River Basin Water Quality Technical Assessment (Overview of Water Quality Conditions) (DEQ, May 1998.)

General Basin-wide Conditions

While not the only issue, riparian habitat degradation is the most serious problem in the basin and improving these riparian areas will improve temperature, stability, sediment, other water quality factors and habitat (Clearwater BioStudies, 1993; Bureau of Land Management, 1993; Chen, 1996). Elevated water temperatures occur throughout the Upper Grande Ronde Subbasin (Bach, 1995). Maximum water temperatures in the main-stem river are often observed upstream of the valley floor. Temperature studies specific to this subbasin have shown there are management strategies that will slow the rate of stream warming (Chen, 1996; NRCS/USFS/ Union SWCD, 1997). Slowing the rate of water warming will push the point at which maximum temperatures occur further downstream, adding many miles of fish habitat. These strategies would include the use of stream-side vegetation to shield the water from solar radiation and provide thermal insulation particularly on smaller streams. It has been demonstrated that weather cycles alone cannot explain the persistent warm water temperatures in the subbasin (Chen, 1996). Improved riparian vegetation along smaller order streams will dramatically reduce the daily maximum stream temperature. Significant, but not as dramatic, reductions could also be expected on the wider main stem river (Chen, 1996, NRCS/Union SWCD, 1997)

Upper Watershed Conditions

For the purpose of this discussion, the upper watershed refers to the drainage area above City of La Grande and for Catherine Creek, above the City of Union.

Aquatic life and salmonid fish spawning and rearing are the beneficial uses of most concern in the upper watershed. The primary 303(d) listed parameters affecting those uses are temperature, sediment and habitat.

Most streams on the upper Grande Ronde and on Catherine Creek in the upper watershed have quality that is low relative to reference conditions for five habitat measures: shade, bank stability, sediment, pool frequency, and woody debris (Clearwater BioStudies, 1995). Reference condition is the environmental state against which current measured conditions are compared. It is based on stream or riparian values considered essential to productive aquatic systems as described in Clearwater BioStudies, 1995. Upstream of the City of La Grande, stream shade is below reference conditions along 71 percent of stream miles surveyed. Fine sediment is too high compared to reference conditions along 70 percent of miles surveyed. Bank stability is below reference condition along 57 percent of stream miles surveyed. Habitat complexity is also below desired levels along the majority of stream miles surveyed. The majority of these stream miles are affected by either grazing, fire, roads, railroad grades, past mining, or a combination (USFS, 1994). The most affected reaches, at present, are located in large meadow systems high in the watershed. The forest service concluded that this has led to unstable banks, higher width to depth ratios and lower water tables than would naturally occur. Bank stability, which is related to vegetation cover, has a large effect on erosion and channel condition. Most streams in the upper watershed are below desired stability levels. The percentage of young hardwoods is high, however, and most streams seem to be in a recovery phase. Large woody debris is generally lacking (USFS, 1994).
Each of eight subwatersheds have more than seven miles of streams with soils that have high or very high erosion hazard ratings: Grande Ronde upstream of the junction of State Highway 244 and the Grande Ronde River Road, Lower Fly Creek, Little Fly Creek, Grande Ronde from East Fork to headwater, Lower Meadow Creek, Dark Canyon Creek, Bear Creek, and Middle Meadow Creek (USFS, 1994). These areas have the potential to produce sheet and rill erosion. Special precautions may be needed in these areas when harvesting timber and grazing.

High stream temperatures are seen throughout the area (USFS, 1994). Meadow Creek has high mean weekly average temperatures. This is related to the fact that thirty two percent of stream reaches in the Meadow Creek drainage are estimated to have poor stream shade. Burnt Corral Creek, where 87 percent of the stream has fair to good stream shade, was lower in temperature compared to Waucup Creek which has 100 percent poor shade. Lower Fly Creek, which is 100 percent poorly shaded, has the highest temperatures in the area. Clear Creek, with 100 percent fair to good shade, has the coolest temperatures. This pattern of higher stream temperatures associated with poor shading appears to be consistent.

The capability of Sheep Creek, a major salmon producing tributary, to support spring chinook has been sharply reduced as a result of increased water temperature and sediment (Morbrand Biometrics, 1997).

Some factors limiting salmon production in different stream segments in the upper watershed are as follows (Clearwater BioStudies, 1993):

Grande Ronde River
- La Grande to Meadow Creek
  - Substandard riparian conditions, high temperature, lack of complexity, icing during winter, localized sediment problems.
- Meadow Creek to Vey Meadows
  - Substandard riparian conditions, high temperature, lack of complexity, fine sediment, streambank erosion, icing during winter.
- Vey Meadows to Headwaters
  - Substandard riparian conditions, high temperatures, fine sediment, streambank erosion, lack of complexity, icing.

Catherine Creek
- Union to State Park
  - Low flow, high temperature, lack of pools, locally substandard riparian, local streambank erosion.
- State Park to North and South Forks
  - Locally substandard riparian conditions, fine sediment, reduced complexity.
- Headwaters
  - fine sediment, streambank erosion, local substandard riparian conditions, loss of pools.

Grande Ronde Valley downstream to Rondowa

For the purpose of this discussion, the Grande Ronde Valley refers to lands draining to the Grande Ronde River and its tributaries downstream of (and including) the Cities of La Grande and Union to Rinehart.

The capacity of the mainstem Grande Ronde River to support spring chinook has been greatly reduced compared to historic conditions. This reduction is most severe within the Grande Ronde Valley (Morbrand Biometrics, 1997). Water quality changes, as well as habitat and flow factors, have contributed to this reduction. The salmon producing capacity of Catherine Creek has also been severely reduced, especially in the lower 40 miles. Temperature and sediment are the primary water quality parameters responsible for this reduction.

Stream gauge data from the US Geological Survey gage at the City of La Grande suggests a shift over time toward a greater proportion of annual runoff in late winter and early spring (Clearwater

BioStudies, 1993). Low summer flows are, at times, made worse by irrigation water withdrawals. The more severe low flow problems occur in Catherine Creek below Union and in the Grande Ronde between the City of La Grande and Rondowa.

Stream channelization, including the State Ditch, has degraded habitat quality, reduced vegetation, and increased water temperature (BLM, 1993). Channelization has also contributed to lowering stream quality for other water quality parameters. Most significant are increased turbidity, low dissolved oxygen, bacteria, nutrients and dissolved solids. Turbidity levels are higher than can be attributed to natural erosion. Runoff from urban, agricultural, and forest areas are the primary sources of nonpoint pollutants. Timber harvest activities, logging roads, channelization, and over-grazed riparian areas on both public and private land continue to cause accelerated erosion and silt loading. Bank stability and sediment problems occur throughout the valley – particularly along the State Ditch (NRCS/USFS/Union SWCD, 1997).

It has been known for many years that pH problems occur in the Grande Ronde Valley particularly in the river from the City of La Grande downstream to Imbler and in Catherine Creek from the City of Union downstream to the Grande Ronde River (Bach, 1995). Some violations of the pH standard do occur upstream of La Grande and downstream of Imbler but the relative frequency and magnitude of problems is less. Dissolved oxygen problems also occur in the valley between La Grande and Rhinehart. Both dissolved oxygen and pH have large daily fluctuations indicating that the problems are related to excessive growth of algae (DEQ, 1997; Bach, 1995). Excess algae growth is related to availability of excess nutrients as well as high temperatures. Nutrient loads in the valley come from sewage treatment plants and nonpoint runoff from both urban and agricultural sources. Studies have shown that both the point source loads and nonpoint source loads will need to be reduced to control algae growth (DEQ, 1997).

The potential for the nutrient nitrate to leach to deep groundwater under the valley floor has been shown to be low (NRCS/USFS/ Union SWCD, 1997). The same study showed, however, that shallow groundwater is at high risk of nitrate leaching in average and dry years and very high risk in wet years. This suggests that in some cases current practices pose a potential threat of contaminating shallow groundwater with nutrients. DEQ sampling of shallow ground water seeps along the riverbank have demonstrated that nutrients enter the Grande Ronde River via shallow ground water in the valley.

Factors limiting salmon production for different stream segments in the Grande Ronde Valley and downstream are as follows (Clearwater Biostudies, 1993):

Grande Ronde River

Rondowa to Elgin

Low flows, high temperature, lack of riparian veg. & shade, sediment, nutrients, bacteria.

Elgin to La Grande

Low flows, substandard riparian conditions, channelization, high temperature, high pH, sediment.

Catherine Creek

Mouth to Union

substandard riparian conditions, low flow, high temperature, lack of pools, poor water quality, streambank erosion

The Grande Ronde Cooperative River Basin Study (USDA, NRCS/USFS/Union SWCD, 1997) identified goals for improving conditions in the Grande Ronde Valley. These include; reduce sedimentation and enhance the riparian habitat of the State Ditch; and stabilize stream banks to decrease erosion and enhance riparian function throughout the valley.

Existing Sources of Water Pollution

The Upper Grande Ronde Subbasin has a long history of land management and development beginning in the 1860s (Gildemeister, 1999). This has resulted in degradation of watershed condition and water quality leading to the current conditions described above. Water quality in the Grande Ronde Valley is affected by both point source and nonpoint sources of pollution. Point sources include municipal sewage treatment plants and industries. Nonpoint sources include non-permitted urban storm drain discharges and both surface and subsurface runoff from agriculture, forestry and urban activities.

Point Sources

Permitted point sources in the Grande Ronde River Basin are regulated by either individual or general National Pollutant Discharge Elimination System (NPDES) permits or by Water Pollution Control Facilities (WPCF) permits. WPCF permits do not allow direct wastewater discharge to surface waters. The City of La Grande wastewater treatment plant (WWTP) is the only major NPDES permitted point source discharging to surface water in the Grande Ronde Valley. In addition, there are five minor point source permits: The City of Union WWTP, Boise Cascade (2 plants), Fleetwood Travel Trailers, and Union Pacific Railroad. There are no permitted point sources discharging effluent upstream of the Grande Ronde Valley.

The WWTPs for the cities of La Grande and Union have been shown to be major contributors of nutrients to the Grande Ronde River and Catherine Creek, respectively (ODEQ, 1997). In the case of the La Grande WWTP, violations of water quality standards for pH occur upstream of the effluent discharge, but violations are much more severe and frequent downstream of the outfall as a result of the nutrient load contributed by the plant. In the case of Union, violations of standards for dissolved oxygen and pH are generally not seen above the treatment plant discharge. Violations begin to occur immediately below the discharge and continue all the way to the confluence with the Grande Ronde. The Boise Cascade Particle Board plant has been

shown to be a minor, but not insignificant, contributor to nutrients in the Grande Ronde River. The volume of the discharge is small, but the concentration of nutrients can be quite high. So the discharge does contribute to the water quality violations.

Nonpoint Sources

Because of their diffuse nature, nonpoint source loads are more difficult to quantify. But mechanisms by which land management activities cause increased nutrient and sediment loads, increased water temperature, and habitat loss are documented in the scientific literature. A thorough review of nonpoint source pollution, by source category (urban, agriculture, forestry) and practices to reduce this pollution can be found in Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters, EPA Office of Water, January 1993, publication #840-B-92-002 (available on the internet at www.epa.gov/owow/nps/mmgi/). This document also includes extensive reference lists for each source category.

Water quality in the Upper Grande Ronde Subbasin is affected by a variety of nonpoint sources including: timber harvesting, livestock grazing, crop agriculture, road construction and maintenance, rural residential development, and urban runoff. Natural disturbance processes such as wildfire, severe flood events, insect and other disease infestation of forests, can also have negative effects on water quality.

Nonpoint source nutrient loads have a significant effect on water quality in the Upper Grande Ronde River subbasin (DEQ, 1997). Evidence includes documented pH standard violations upstream of any point source discharge, measurement of high nutrient concentrations in shallow groundwater seeps entering the river, and measurement of high nutrient concentrations in shallow wells near surface waters. Mass balance modeling indicates that about 50% of nutrient loads in the river from upstream of La Grande to Pierce Lane originate within the study reach. Direct documentation of nonpoint source (NPS) effects downstream of the City of Union treatment plant discharge on Catherine Creek is more difficult because of the effects of the effluent discharges. However, the existence of nonpoint source inputs is clear and existing data indicates that water quality standards for dissolved oxygen and pH will not be achieved, even if point source loads are eliminated, unless nonpoint source loads are also reduced.

Nonpoint source discharges in the Grande Ronde Valley come from a variety of rural and urban sources. Some best management practices to reduce this nonpoint source discharge have been identified and/or implemented. Not all nonpoint sources, however, have been identified or addressed. Potential sources include erosion; removal of vegetative cover (especially deep-rooted, woody vegetation which can stabilize stream banks and intercept nutrients mobilized in groundwater); bacteria and nutrients from animal and/or failing septic sources; excess fertilizers; and runoff from roads.

Stream temperature has been extensively studied in the Upper Grande Ronde Subbasin. Practices that reduce the amount of solar energy striking the water, reduce the width to depth ratio, and increase flow will result in cooler stream temperature (Chen et.al., 1998)

Loading Capacity and Load Allocations

According to federal regulations for implementing the Clean Water Act, loading capacity is the greatest amount of pollution loading that a stream can receive without violating a water quality standard (40 CFR 130). The load allocation is the portion of the loading capacity that is attributed to nonpoint source pollution and natural background sources. A waste load allocation is the portion of a stream's loading capacity that is attributed to point sources. In order for EPA to approve a Total Maximum Daily Load (TMDL) the loading capacity, load allocations and waste load allocations must be calculated. As will be seen under Element 3: Management Measures, point source contributions will be effectively eliminated from the waters of the Upper Grande Ronde River Subbasin during the season of concern. This means that waste load allocations are not necessary. Therefore, **it is the purpose and major goal of this Water Quality Management Plan to strive to meet the load allocations and thereby achieve the water quality standards.**

The details, derivations, and justifications of the Loading Capacities (LC) and Load Allocations (LAs), as well as margin of safety and other required TMDL components, are contained in the report Upper Grande Ronde River Sub-Basin Total Maximum Daily Load (TMDL) (Oregon Department of Environmental Quality, 1999).

Temperature

Stream temperature is an expression of heat energy per unit volume (e.g. Btu/ft^3). In the absence of heated point source discharges, humans influence stream temperature when land management activities cause an increase in the amount of solar radiation reaching and warming the stream. The pollutant in this case is solar energy. Providing a load allocation in terms of energy input (Btu) would, however, provide little guidance on land management activities that are needed to improve water quality. In such cases, federal regulations allow the use of "other appropriate measures" (or surrogates) to define load allocations. In this Water Quality Management Plan the surrogate used to address excess heat energy is effective shade. Other surrogates that affect energy loads and are themselves affected by human activity are also included as will be seen.

The analysis used to calculate the loading capacity and load allocations is dependent on the laws of thermodynamics. The five thermodynamic processes that govern energy transfer in streams are: solar radiation, convection (movement of energy between air and water), evaporation, conduction (movement of energy between stream bed and water), and long wave radiation. In addition, stream flow, stream width and depth, and ground water entering the stream will all have an effect on stream temperature. All of these processes and factors have been considered in the analytical approach and determination of load allocations. For a detailed explanation of the analysis see DEQ, 1999. In simplified terms, the analysis is based on the following:

1. Stream temperature rises above natural conditions as a result of increased solar radiation.
2. Solar radiation increases when percent shade decreases.
3. Percent shade decreases when riparian vegetation is removed.

4. Removal of riparian vegetation contributes to stream bank and hill slope failures. Roads also contribute to these failures.
5. Bank and slope failures contribute sediment to streams and increase the width depth ratio.
6. Solar radiation increases when streams become wider and shallower (creating a larger surface area exposed to the sun in relation to volume – higher width depth ratio).

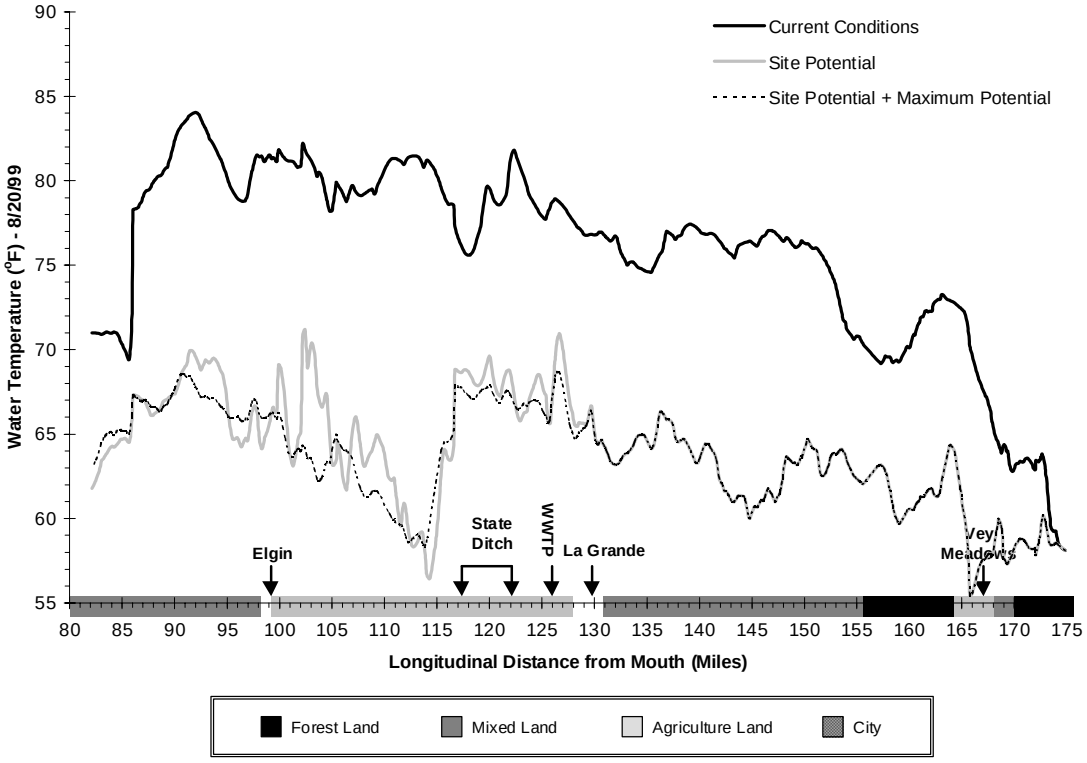
The analysis demonstrates: The more woody, tall riparian vegetation the lower the solar radiation and sediment reaching the stream. The result is, the lower the solar radiation and sediment reaching the stream the lower the stream temperature.

To comply with the water quality standard for temperature the WQMP needs to strive for improved riparian vegetation that will increase effective shade and decrease solar radiation.

Ditching or channelizing streams can "disconnect" the steam from its flood plain. This can lead to less storage and slow release of cool groundwater that would moderate maximum stream temperatures. Therefore, "reconnection" or protection of a stream's connection with its flood plain will also be important in addressing the water quality standard for temperature.

Figure 3 compares the current Grande Ronde River temperatures with the river temperatures that would result if the river is restored to site potential conditions. For more information on the technical analysis see Upper Grande Ronde River Sub-Basin Total Maximum Daily Load (TMDL), ODEQ, 1999.

Figure 3. Grande Ronde River Temperatures at Current Conditions and Site Potential



Temperature Allocations/Wasteload Allocations

A *Load Allocation* (LA) is the amount of pollutant that nonpoint sources can attribute to the stream without exceeding state water quality standards. The table below lists the LAs assigned for temperature for the Upper Grande Ronde according to landuse.

Load Allocations (Nonpoint Sources)	
Land Use	Distributed Radiant Energy Load Capacity
Natural Sources	100%
Agriculture	0%
Forestry	0%
Urban	0%

A *Waste Load Allocation* (WLA) is the amount of pollutant that a point source can attribute to the stream without violating water quality criteria. The WLAs for the Upper Grande Ronde sub-basin are as follows:

Waste Load Allocation*: No measurable increase over site potential water temperatures.*

Surrogate Measures

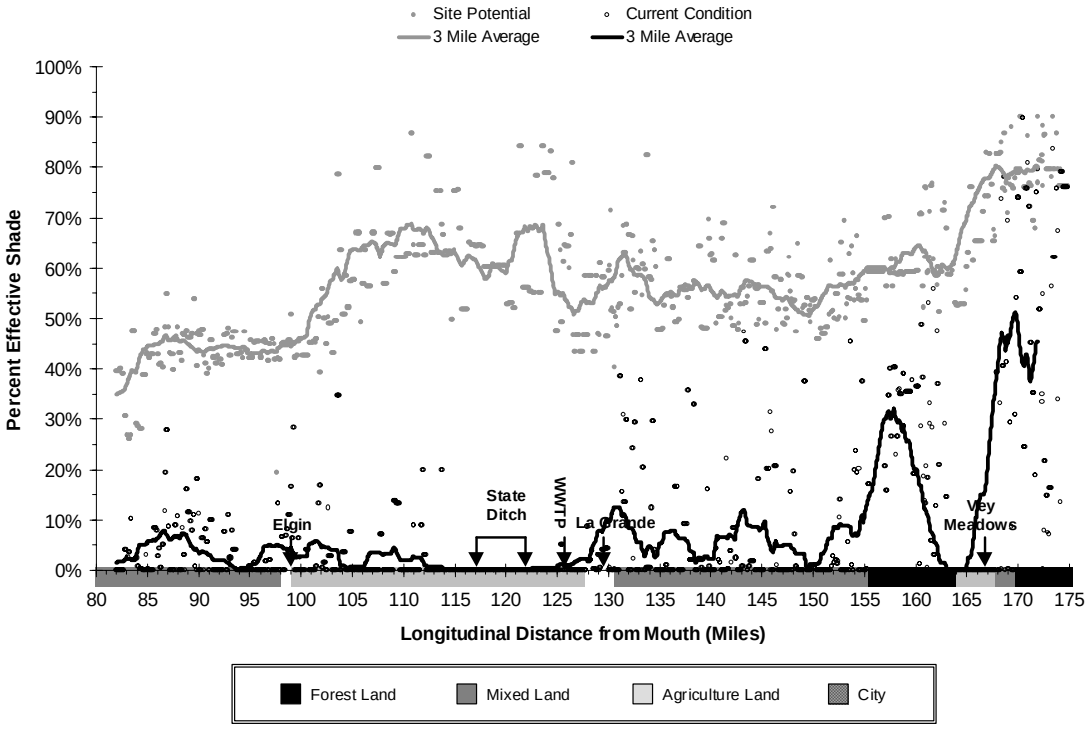
The Upper Grande Ronde sub-basin TMDL incorporates measures other than "*daily loads*" to fulfill requirements of §303(d). Although a loading capacity for heat energy is derived [e.g. Langleys per day], it is of limited value in guiding management activities needed to solve identified water quality problems. In addition to heat energy loads, the Upper Grande Ronde sub-basin TMDL allocates "*other appropriate measures*" (or surrogates measures) as provided under EPA regulations [40 CFR 130.2(i)].
The *Report of Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program"* (EPA, 1998) offers a discussion on the use of surrogate measures for TMDL development. The FACA Report states:

> *"When the impairment is tied to a pollutant for which a numeric criterion is not possible, or where the impairment is identified but cannot be attributed to a single traditional "pollutant," the state should try to identify another (surrogate) environmental indicator that can be used to develop a quantified TMDL, using numeric analytical techniques where they are available, and best professional judgment (BPJ) where they are not. The criterion must be designed to meet water quality standards, including the waterbody's designated uses. The use of BPJ does not imply lack of rigor; it should make use of the "best" scientific information available, and should be conducted by "professionals." When BPJ is used, care should be taken to document all assumptions, and BPJ-based decisions should be clearly explained to the public at the earliest possible stage."*

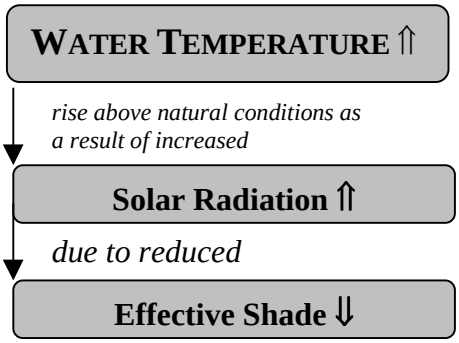
If they are used, surrogate environmental indicators should be clearly related to the water quality standard that the TMDL is designed to achieve. Use of a surrogate environmental parameter should require additional post-implementation verification that attainment of the surrogate parameter results in elimination of the impairment. If not, a procedure should be in place to modify the surrogate parameter or to select a different or additional surrogate parameter and to impose additional remedial measures to eliminate the impairment."

As mentioned above, a loading capacity of Langleys per day is not very useful in guiding nonpoint source management practices. Percent effective shade is a surrogate measure that can be calculated directly from the loading capacity. Additionally, percent effective shade is simple to quantify in the field or through mathematical calculations. Figure 4 (Page 28) displays the percent effective shade values that correspond to the current condition and the loading capacity (i.e., site potential).

Figure 4. Percent Effective Shade Surrogate Measures[1]



As discussed, water temperature warms as a result of increased solar radiation loads. A loading capacity for heat energy (i.e., incoming solar radiation) can be used to define a reduction target that forms the basis for identifying a surrogate. The specific surrogate used is percent effective shade (expressed as the percent reduction in potential solar radiation load delivered to the water surface). Effective solar loading directly (linearly) translates the solar radiation to loading capacity. Decreased effective shade levels result from the lack of adequate riparian vegetation available to reduce sunlight (i.e., incoming solar radiation). The definition of effective shade allows direct measurement of the solar loading capacity.



Because factors that affect water temperature are interrelated, the surrogate measure (percent effective shade) relies on restoring/protecting riparian vegetation to increase stream surface shade levels, reduce stream bank erosion, and stabilize channels. Likewise, narrower channels

[1] See Upper Grande Ronde River Sub-basin Total Maximum Daily Load (TMDL), **Appendix A** for information regarding derivation of effective shade values.

still require riparian vegetation to provide channel stability and shade, thus reducing heat loads (unless confined by canyon walls or shaded by topography). Effective shade screens the water's surface from direct rays of the sun. Highly shaded streams often experience cooler stream temperatures due to reduced input of solar energy (Brown,1969; Beschta et al., 1987; Holaday, 1992; Li et al., 1994).

Over the years, the term shade has been used in several contexts, including its components such as shade angle or shade density. For purposes of this TMDL, shade is defined as the percent reduction of potential solar radiation load delivered to the water surface. Thus, the role of effective shade in this TMDL is to prevent or reduce heating by solar radiation and serve as a linear translator to the solar loading capacities.

Site potential effective shade and solar radiation loading were simulated for various bankfull widths and vegetative buffer widths for different physiographic units. Site potential vegetation is assumed to correlate to the late seral/staged indigenous riparian vegetation communities detailed in Upper Grande Ronde River Sub-Basin Total Maximum Daily Load (TMDL), **Appendix A** (DEQ, 1999). Using riparian vegetation height, width and density estimates, it is possible to estimate the *potential effective shade* and daily solar radiation loading for all bankfull width and stream orientation combinations. **Figures 6, 7, 8 and 9** illustrate the simulated percent effective shade and solar radiation loading that may potentially occur in the Upper Grande Ronde sub-basin. The effective shade curves are useful for determining the potential effective shade at a given bankfull channel width for each physiographic unit. A summary of the surrogate measures follows.

Surrogate Measure #1: Along the Grande Ronde mainstem attain site potential effective shade levels specified in Figure 4 (Page 28) between Tanner Gulch and the Wallowa River confluence.

Surrogate Measure #2: Along tributaries attain site potential effective shade levels provided in **Figures 6, 7, 8,** and **9** for the appropriate physiographic unit (listed in **Figure 5**). Shade curves are provided

Figure 5. Physiographic Units of the Upper Grande Ronde Sub-Basin

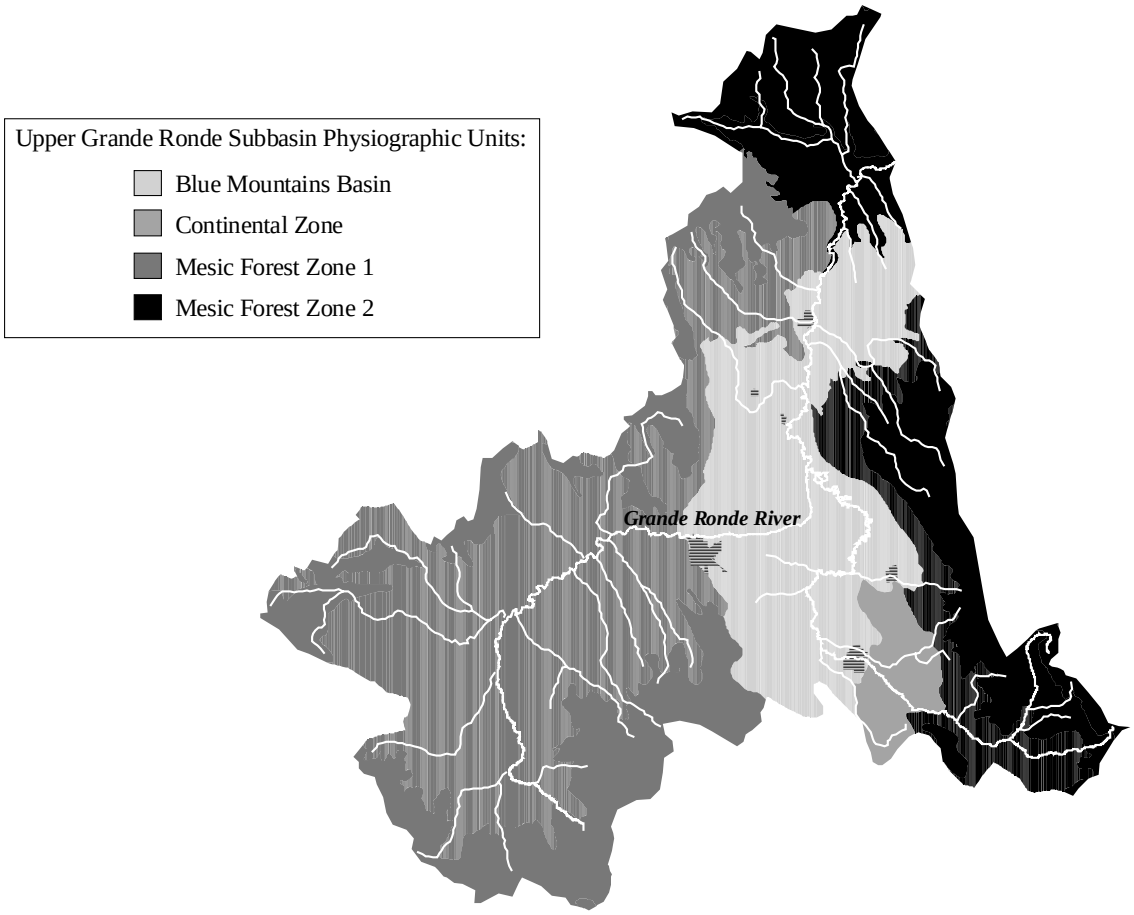


Figure 6. Continental Zone/Blue Mountain Basin Zone Effective Shade Curves

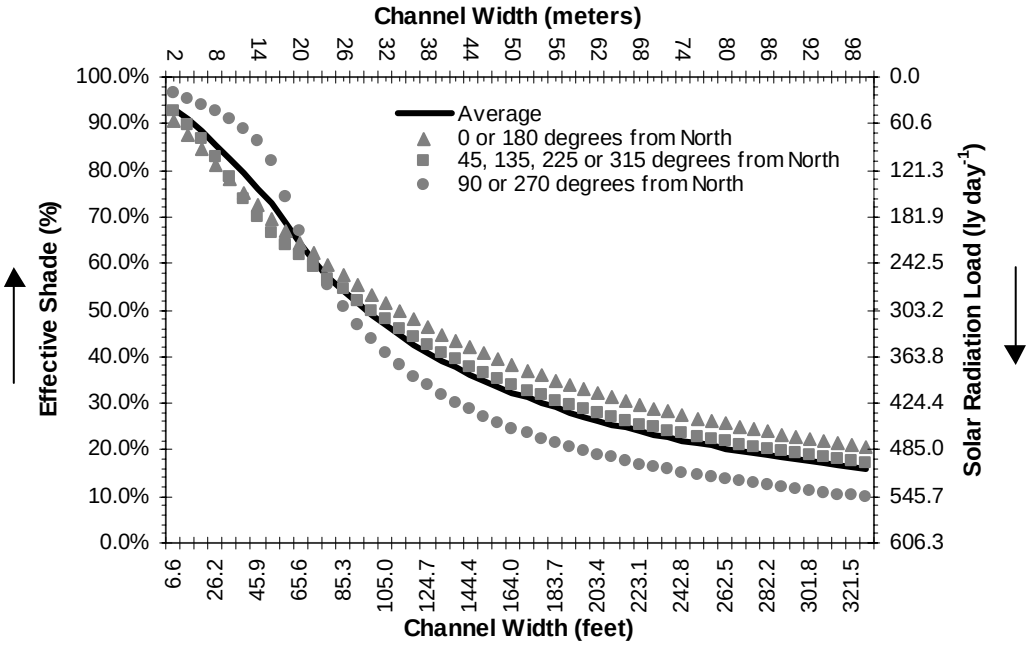


Figure 7. Mesic Forest Zone 1 (*Below 4,800 Feet*) Effective Shade Curves

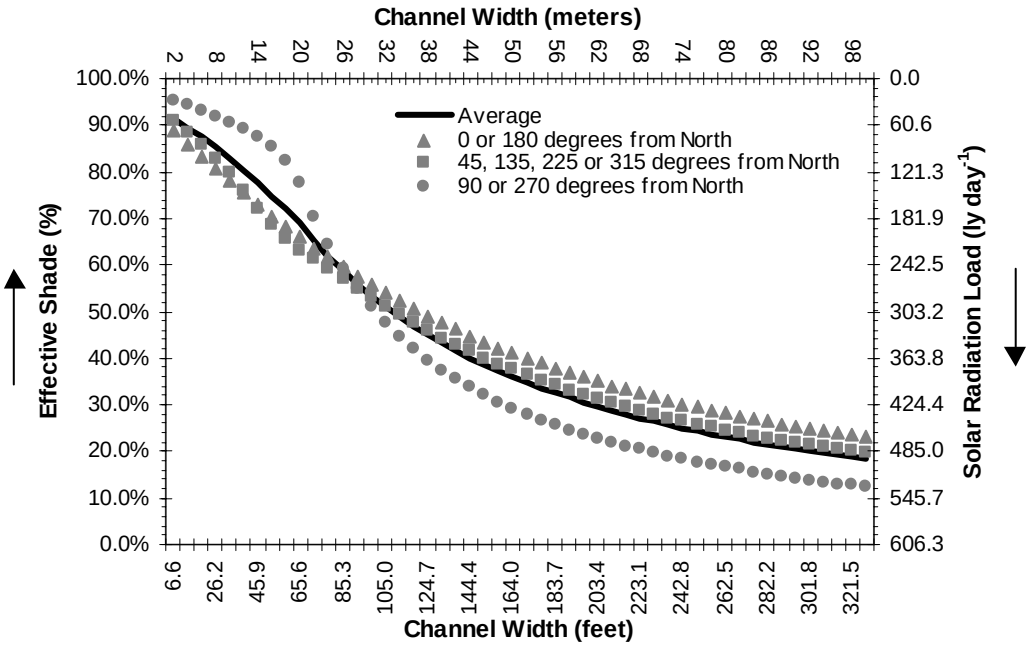


Figure 8. Mesic Forest Zone 1 (*Above 4,800 Feet*) Effective Shade Curves

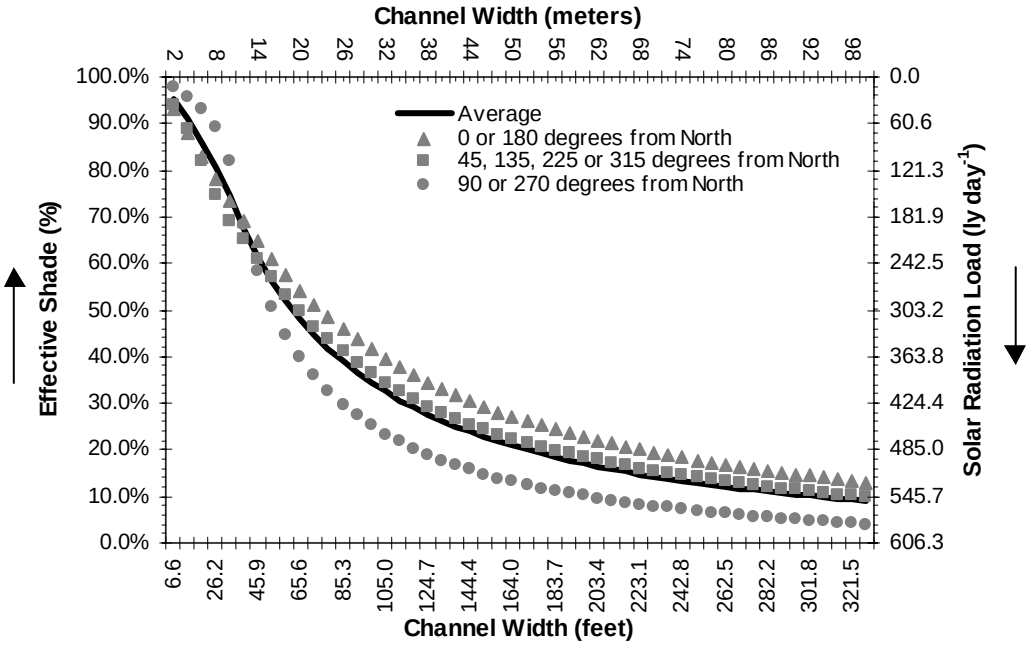
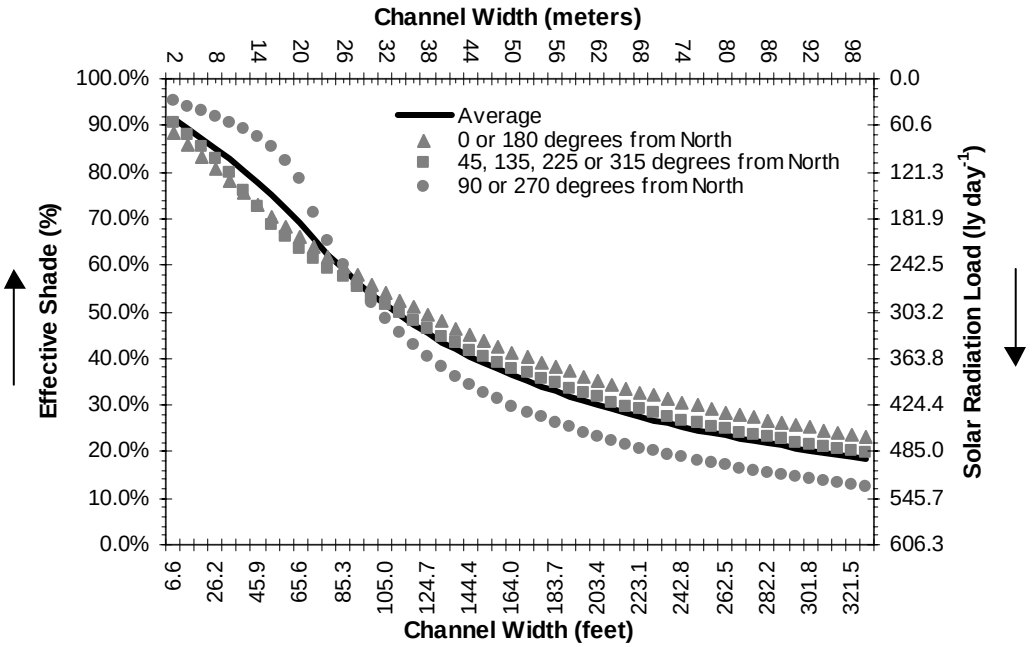


Figure 9. Mesic Forest Zone 2 (*Below 4,800 Feet*) Effective Shade Curves



Surrogate Measure #3: Grande Ronde mainstem bankfull channel widths should be reduced to values listed in the table below (when these values are exceeded) via restoration.

Grande Ronde River Channel Width Reductions	
Grande Ronde Mainstem Reaches	Maximum Bankfull Channel Width
Tanner Gulch Sheep Cr. Confluences	65 feet
Sheep Cr. to Fly Cr. Confluences	82 feet
Fly Cr. to Indian Cr. Confluences	98 feet
Indian Cr. to Lookingglass Cr. Confluences	115 feet
Lookingglass Cr. Wallowa R. Confluences	131 feet

Surrogate Measure #4: Increase sinuosity in unconfined channels until either sinuosity equals 1.7 or the wetted width to depth ratio is 20 or less. Unconfined channels were identified by McIntosh (1996) and confirmed with valley morphology mapping by surface slopes derived from DEMs.

Grande Ronde River Unconfined Channels	
Grande Ronde Mainstem Reaches	Distance from Mouth (miles)
Vey Meadow	169.2 to 163.8
Upstream Meadow Cr.	154.0 to 150.9
Downstream Beaver Cr.	149.3 to 146.7
Upstream Jordan Cr.	144.8 to 142.4
Downstream Jordan Cr.	140.6 to 140.0
Upstream Five Points Cr.	138.3 to 136.5
Grande Ronde Valley	130.8 to 104.4
Lower Valley	102.6 to 95.1

Surrogate Measure #5: Where width to depth ratios are greater than 30, decrease wetted widths by 2% increments until width to depth ratios equal 30.

Surrogate Measure #6: Where feasible, maintain/increase instream flows during critical temperature periods (July through September).

Dissolved Oxygen, pH, Nutrients and Algae Growth

Dissolved oxygen (DO), pH, nutrients and excess algae growth are all identified as individual concerns on the 303(d) List. They do not, however, represent separate, independent problems but are best thought of as one issue (as discussed previously). Nutrients, when available in excess, spur excess algae growth which in turn causes violations of water quality standards for

dissolved oxygen and pH. Algae growth is also affected by water temperature and availability of sunlight so the factors discussed under temperature above also play a role in controlling algae growth. All of these factors have been considered in the analytical approach and determination of LAs. For a detailed explanation of the analysis see Upper Grande Ronde River Total Maximum Daily Load (TMDL), Appendix B (DEQ, 1999). In simplified terms, the analysis is based on the following:

1. D.O. & pH problems are caused by algae growth. (This problem is confirmed by the daily pattern of DO and pH fluctuation. This phenomenon cannot be explained by alkaline soils.)

2. Algae growth rate is affected by nutrient concentration, temperature and light availability.

3. Nutrient concentration is affected by input, uptake, and dilution.

4. Dilution is directly related to flow.

5. Water temperature is affected by:
   - solar radiation
   - long wave radiation
   - convection (to or from air)
   - evaporation
   - conduction (to or from stream bed)

   Of these, the one most affected by human activity is solar radiation reaching surface. Cool groundwater inflow can also effect stream temperature and human activities that result in disconnecting streams from their flood plain can reduce the groundwater inflow.

6. Light availability is affected by shade.

Therefore: The lower the nutrient concentration the lower the algae growth and better D.O. and pH.
In addition: The greater the dilution (volume, flow) the lower the nutrient concentration.
Improved nutrient management techniques also will lower nutrient concentration.

The lower the light availability the lower the algae growth and better the D.O. and pH.
The greater the shade the lower the light availability.
Narrow and deep water columns (low width to depth ratio) also lower the light availability to algae attached to the stream bottom.

The lower the temperature the lower the algae growth and the better the D.O. and pH.
The lower the solar radiation reaching the surface the lower the water temperature
The greater the shade the lower the solar radiation reaching the surface.
Narrow stream channels result in less water surface area and lowers solar radiation.

To achieve the D.O. and pH standards we want to decrease nutrients, decrease available sunlight, and decrease temperature.

Increasing shade, flow and depth and decreasing stream width while improving nutrient management will decrease nutrients, decrease available sunlight, and decrease stream temperature and therefore will lead to improved D.O. and pH.

Nutrient Load Allocations

The following allocations are designed to achieve pH levels within the range 6.5 to 8.7 and DO concentrations greater than 6.5 mg/L. The pH target of 8.7 is more stringent than the maximum pH standard of 9.0 and provides an additional margin of safety. The DO target of 6.5 mg/L is more stringent than the minimum standard of 6.0 mg/L and also provides an additional margin of safety. Since the allocations are pH controlled, actual DO levels calculated by the model are significantly greater than 6.5 mg/L, when the target pH of 8.7 is met. Note also that the allocations will result in the 30-day average standard of 8.0 mg/L being met in all reaches.

Load allocations are in terms of percent reductions from current levels and are presented in the following table along with corresponding loading capacities.

Nutrient Allocations for Current Riparian Conditions - Grande Ronde River

Reaches	Milepoints	Nutrient Load Allocations (% Reductions)	Loading Capacities (Water Column Concentrations as Monthly Medians)	
			Dissolved Inorganic Nitrogen µg/L	Soluble Reactive Phosphorus µg/L
MS4	Headwaters–182.0	20%	16	10 (7.6)
MS5	182.0-173.0	50%	15	10 (4.75)
MS6	173.0-166.9	35%	23	10 (6.5)
MS7	166.9-160.1	20%	32	12 (12)
MS8	160.1-153.8	60%	26	12 (5.4)
MS9	153.8-State Ditch	>>70% (point source removal plus 60% reduction in NPS loads)	26	12 (5.4)
	State Ditch - Mouth	>>70% (point source removal plus 60% reduction in NPS loads)	26	12 (5.4)

While the above table presents nutrient load allocations and loading capacities for both nitrogen and phosphorus, only the nitrogen concentrations are directly significant. This is because the system is nitrogen limited (see Upper Grande Ronde River Sub-Basin Total Maximum Daily

Load (TMDL), **Appendix B** (DEQ, 1999)) and because the growth rate limitation due to nutrients is controlled by the nutrient in lowest supply relative to algal cellular requirements. However, to derive the loading capacity concentrations the same percent reductions required for nitrogen have been applied to phosphorus. This is because the same measures that reduce nitrogen are likely to provide similar reductions in phosphorus. In addition, in low nitrogen, high phosphorus aquatic environments, nitrogen fixing bluegreen algae (cyanobacteria) can become established. Since natural phosphorus loads result in a baseline below which concentrations will not fall, no matter what control measures are employed, loading capacities are set to reasonable baseline levels. These are the Soluble Reactive Phosphorus concentrations shown in the table. The numbers shown in parenthesis are the current observed concentrations reduced by the same percentage required for dissolved inorganic nitrogen. These are provided for informational purposes only.

Catherine Creek is also listed for DO and pH due to excessive periphyton activity. Explicit modeling was not performed for Catherine Creek. However, in the valley Catherine Creek has similar characteristics as the Grande Ronde River and it receives similar nutrient loads. Therefore, the same allocations as the Grande Ronde in the valley have been applied to Catherine Creek in the valley, as shown in the following table.

Meadow Creek is another stream listed for pH. Meadow Creek is a tributary to the Grande Ronde, with its confluence at Grande Ronde River MP 180. It has similar characteristics and nutrient loads as the Grande Ronde in this area. Consequently, the same load allocations that apply to Grande Ronde MP 180 have been applied to Meadow Creek, as shown in the table.

Nutrient Allocations for Current Riparian Conditions - Catherine and Meadow Creeks

Reaches	Milepoints	Nutrient Load Allocations (% Reductions)	Loading Capacities (Water Column Concentrations as Monthly Medians)	
			Dissolved Inorganic Nitrogen µg/L	Soluble Reactive Phosphorus µg/L
Meadow Creek	Mouth to Headwaters	50%	15	10 (4.75)
Catherine Creek	Reaches listed for pH and DO (Mouth to Union Dam)	>>70% (point source removal plus 60% reduction in NPS loads)	26	12 (5.4)

Site Potential Scenario Nutrient Load Allocations and Loading Capacities

A scenario was modeled in which the potential natural vegetative community was established to its full height and density for a 100 ft distance from the stream for the entire system. For this site potential condition, the physiographic vegetative community as determined by **Figure 5**. The vegetation was modeled at it climax height.

Water quality analysis indicates that, if the potential natural community shade scenario is implemented, the 6.5 mg/L DO standard will be met in all reaches without additional nutrient reductions. The 8.7 pH standard would be met in most reaches above MP 160, except for reach MS5 (MP 182.0-173.0), for which a 25% reduction in nutrients would be needed. Below MP 160, significant nutrient reductions would still be needed. Nutrient load allocations for the potential natural community scenario are provided in the following table.

Nutrient Allocations for Potential Natural Riparian Community - Grande Ronde River

Reaches	Milepoints	Nutrient Load Allocations (% Reductions)	Loading Capacities (Water Column Concentrations as Monthly Medians)	
			Dissolved Inorganic Nitrogen µg/L	Soluble Reactive Phosphorus µg/L
MS4	Headwaters–182.0	0	20	10 (9.5)
MS5	182.0-173.0	25%	23	10 (7.1)
MS6	173.0-166.9	0%	35	10
MS7	166.9-160.1	0%	40	15
MS8	160.1-153.8	50%	33	15 (6.8)
MS9	153.8-State Ditch	>70% (point source removal plus 50% reduction in NPS loads)	33	15 (6.8)
	State Ditch – Mouth	>70% (point source removal plus 50% reduction in NPS loads)	33	15 (6.8)

As for the current riparian condition scenario, the table presents nutrient load allocations and loading capacities for both nitrogen and phosphorus, even though the nitrogen concentrations are the only concentrations that are directly significant. Since natural phosphorus loads result in a baseline below which concentrations will not fall, no matter what control measures are employed, loading capacities are set to reasonable baseline levels. These are the Soluble Reactive Phosphorus concentrations shown in the table. The numbers shown in parenthesis are the current observed concentrations reduced by the same percentage required for dissolved inorganic nitrogen. These are provided for informational purposes only.

Load allocations for Meadow Creek and Catherine Creek for the potential natural riparian community scenario are presented in the following table.

Nutrient Allocations for Potential Natural Riparian Community - Catherine and Meadow Creeks

Reaches	Milepoints	Nutrient Load Allocations (% Reductions)	Loading Capacities (Water Column Concentrations as Monthly Medians)	
			Dissolved Inorganic Nitrogen µg/L	Soluble Reactive Phosphorus µg/L
Meadow Creek	Mouth to Headwaters	25%	23	10 (7.1)
Catherine Creek	Reaches listed for pH and DO (Mouth to Union Dam)	>70% (point source removal plus 50% reduction in NPS loads)	33	15 (6.8)

Priorities

It is important to the successful implementation of any water quality management plan to set both geographic and management practice priorities. This priority setting helps the parties responsible for implementing the plan direct limited resources to the locations (geographic priorities) and project types (management practice categories) that will be most likely to produce the desired improving trend in water quality. As discussed previously under Current Conditions, numerous assessment studies have been done in the Upper Grande Ronde Subbasin. Many of these studies have identified priorities and similar priorities repeatedly rise to the top. Using information from these studies and U.S. Forest Service methodology for prioritizing sub-watersheds, the following priorities have been established for the Upper Grande Ronde Subbasin Water Quality Management Plan. These priorities represent a good first step. They may, however, be adjusted, as new information becomes available especially as a result of implementation of the Blue Mountain National Demonstration Area. This new Federal/State initiative is just beginning detailed priority setting that will encompass the entire Grande Ronde Basin. The following priorities were identified during the development of this WQMP (priorities will be reassessed on a yearly basis and updated as new information is brought forward as indicated in Element 9: Maintenance of Effort over Time.

There are several general, overriding, points that overlay all priorities:

- Setting both geographic and management category priorities is important to the successful implementation of the water quality management plan.
- All things being equal, implementation should begin in headwaters and work down. It is recognized, however, that some problems need to be addressed in downstream areas that are unrelated to upstream conditions. These should be addressed immediately - not delayed until up-stream concerns are addressed. This is particularly true of the Grande Ronde River, Willow Creek, and Catherine Creek in the Valley.
- Riparian Areas are high priority.

- Priorities should be set first at watershed scale, then prioritize sub-watersheds within the watershed.
- Areas with High Quality Water & Habitat should be protected where ever they are found.

With these points in mind the following priorities have been established. Management categories with the most potential to result in relatively quick, short-term improvements in water quality are considered high priorities for implementation (should be focused on first). Management categories that will help improve water quality but will take longer to see results are identified as medium priorities.

Geographic priorities were set using a high, medium, low rating in four categories: 1) 303(d) listing and problem locations (headwater or down-stream); 2) Benefit to endangered fish; 3) Cost efficiency of potential projects; 4) Are there willing landowners/partners. Information contained in previously published assessment documents was considered in establishing priorities. Efforts should be focused on High priority watersheds first. Likewise, within watersheds, sub-watersheds with high priority should be addressed before sub-watersheds with lower priority. The geographic priorities reflect areas where action is needed to improve water quality. It is understood that high quality areas should be protected where ever they are found regardless of the ranking in the priorities for action list.

When opportunities present themselves to do good projects outside of priority areas decisions to proceed should be made on a case by case basis. But the intent here is that agencies, cities, and the county should focus their project solicitation efforts on high priority management categories and high priority geographic areas.

What follows are the identified priorities for implementation of the Water Quality Management Plan:

Management Category Priority Areas

High Priority

- Riparian Vegetation (restore to site capability)
  - use active restoration, plant and manage
  - improve conditions over time, move toward site capability
  - include management, improvement, or removal of problem roads
  - manage or remove any existing disturbances

- Improve In-stream Flow
  - irrigation water management, improve efficiency
  - leave a portion of conserved water in the stream
  - augment stream flow

- Stream Channel/Morphology Improvement
  - improve width to depth ratios
  - increase channel stability (both horizontal and vertical)

Medium Priority

- Flood Plain Reconnection
  - attenuation of high flows
  - leads to improved conditions for riparian vegetation
  - manage/improve problem roads

- Groundwater Connection/Storage
  - increase groundwater storage for late season flow

- Upland Vegetation Improvements
  - forest stand structure improvements
  - range/agriculture land improvements

Geographic Priority Areas -- Watershed Scale

Watershed	Temperature	Sediment	Flow
Lookingglass	L[1]	L	L
Lower Grande Ronde	L	L	L
Willow/Philips	H	H	H
Indian/Clark	M	M[2]	M
Catherine Crk	H	H	H
Beaver	M	M	L[3]
GRR Valley	H	H	H
Ladd Crk	H	H	H
Upper Grande Ronde	H	H	H[4]
Meadow Crk	H	H	H[4]
Spring/Five Pts.	H	M	M

[1]Lookingglass is listed for temperature because of Bull trout (50 degree criterion).
[2]Clark Crk. probably should be "high" for sediment but the watershed as a whole is medium.
[3]There is potential for flow being important because of the reservoir.
[4]Lost wet meadow/ground water storage & possible shift in spring runoff.

Geographic Priority Areas for Action -- Sub-Watershed Scale

In the list below, **bold** type indicates the highest priorities. High priority watersheds, and the high priority sub-watersheds within them, are in **bold** type. Medium and low priority watersheds and all the sub-watersheds within them are in normal type.

Lookingglass Creek – Low Priority Watershed for treatment.
Existing high quality water and habitat should be protected.
Eagle Creek – Low
Lower Lookingglass Creek – High
Lower Jarboe Creek – High
Upper Jarboe Creek – Low
Lower Little Lookingglass Creek – Medium
Upper Little Lookingglass Creek – Medium
Lower Mottet Creek – Medium
Upper Mottet Creek – Low
Summer Creek – Low
Upper Lookingglass Creek – Medium

Lower Grande Ronde – Low Priority Watershed for treatment
Water quality improvements dependent on up-stream improvements
Cabin Creek – Low
Gordon Creek – High
Grande Ronde River, below Elgin to Rondowa – Low

Willow/Philips – High Priority Watershed for Treatment
Lower Phillips Creek – Low
Little Phillips Creek – Low
Middle Phillips Creek – Low
East Phillips Creek – Low
Upper Phillips Creek – Low
Lower Willow Creek – High
South Fork Willow Creek – High
Upper Willow Creek – High
Dry Creek – High

Indian/Clark – Medium Priority Watershed for treatment
Lower Clark Creek – High
North Fork Clark Creek – High
Upper Clark Creek – High
Lower Indian Creek – Medium
Little Indian Creek – Low (protect high quality water/habitat)
Upper Indian Creek – Low (protect high quality water/habitat)

Catherine Creek – High Priority Watershed for treatment

Catherine Creek Mile 0 to 9 – High
Mill Creek – Medium
Phys Slough – Medium
Catherine Creek Mile 9 to 15 – High
Lower Little Creek – High
Upper Little Creek – High
Pyles Creek – Medium
Catherine Creek Mile 15 to Little Catherine Creek – High
Little Catherine Creek – High
Catherine Creek, Little Catherine to Forks – High
South Fork Catherine Creek – Medium
Lower North Fork Catherine Creek – Medium
Middle fork Catherine Creek – Medium
Upper North Fork Catherine Creek – Medium
Catherine Creek in Old Grande Ronde River Channel – High
Eckesley Creek – Low
Murph Creek – Low

Beaver – Medium to Low Priority Watershed for treatment (protect high quality)

Lower Beaver Creek – Medium
Middle Beaver Creek – Medium
West Fork Beaver Creek – Low (protect)
Upper Beaver Creek – Low (protect)
Bear Creek – High
Jordan Creek – High
Whiskey Creek – High
Little Rock Creek – High
Rock Creek – High

Grande Ronde River in the Valley – High Priority Watershed for treatment

Grande Ronde River Mile 100 (Elgin to Willow Crk.) – High
Grande Ronde River Mile 107 (Willow Crk to State Ditch) – High
Grande Ronde River in State Ditch – High
Grande Ronde River Mile 151 (State Ditch to Ordell) – High
Wright Slough – High

Ladd Creek – High Priority Watershed for treatment

McAlister Slough – High
Lower Ladd Creek – Medium
Gekeler Slough – High
East fork Ladd Creek – Medium
Upper Ladd Creek – Medium
Spring Slough – High

Upper Grande Ronde River – High Priority Watershed for treatment

Grande Ronde River Mile 180 (Meadow Crk. to Fly Crk.) – High
Lower Fly Creek – High
Little Fly Creek – High
Upper Fly Creek – Low
Grande Ronde River Mile 185 (Fly Creek to Sheep Creek) – High
Lower Sheep Creek – High
Chicken/Dry Creeks – Low/Medium
Upper Sheep Creek – Low
Grande Ronde River Mile 194 (Sheep Crk to Muir Creek) – High
Limber Jim Creek -- Low (protect high quality water/habitat)
Clear Creek – Low (high for protection of high quality water/habitat)
Grande Ronde River Mile 203 (East Fork to headwaters) –
Low in headwaters, High in mine tailing area.

Meadow Creek – High Priority Watershed for treatment

Lower Meadow Creek – High
Dark Canyon – High (lower portion)
Lower McCoy Creek (includes McIntyre Crk.) – High
Upper McCoy Creek – High
Marley Creek – Low
Burnt Coral Creek – Low
Bear Creek – Medium
Middle Meadow Creek – High
Waucup Creek – Medium
Upper Meadow Creak – High

Spring/Five Points Creeks – Medium Priority for treatment

Grande Ronde River Mile 160 (Ordell to Hilgard) – Low
Lower Five Points Creek – Medium
Upper Five Points Creek – Low (High for protection)
Pelican Creek – Medium
California Gultch – Medium
Grande Ronde River Mile 165 (Hilgard to Meadow Creek) – High
Spring Creek -- Medium

References for Element 1:

Bach, L., 1995, River Basin Assessment Upper/Middle Grande Ronde River & Catherine Creek. Oregon Department of Environmental Quality & Oregon Watershed Health Program.

Beschta, R.L., R.E Bilby, G.W. Brown, L.B. Holtby, and T.D. Hofstra. 1987. Stream temperature and aquatic habitat: Fisheries and forestry interactions. Pp. 191-232. In: E.O. Salo and T.W. Cindy (eds), Streamside Management: Forestry and Fishery Interactions. University of Washington, Institute of Forest Resources, Contribution No. 57. 471 pp.

Brown, G.W. 1969. Predicting temperatures of small streams. Water Resour. Res. 5(1):68-75.

Bureau of Land Management, Baker Resource Area, Vale District. 1993. Biological Evaluation ESA Section 7 Consultation.

Chen, Y.D.,et.al., 1998, Stream Temperature Simulation of Forested Riparian Areas: I. Watershed-Scale Model Development, J. Enviro. Engineering, 124(4): 304-315.

Chen, Y.D., et.al., 1998, Stream Temperature Simulation of Forested Riparian Areas: II. Model Application, J. Enviro. Engineering, 124(4): 316 - 328.

Chen, D., 1996, University of Georgia, Athens., Hydrologic and Water Quality Modeling for Aquatic Ecosystem Protection and Restoration in Forest Watersheds: A Case Study of Stream Temperature in the Upper Grande Ronde River, Oregon.

Clearwater BioStudies, Inc., 1993, Stream and Riparian Conditions in the Grande Ronde Basin, Final Report.

EPA, 1998, Report of Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program.

Gildemeister, 1999, The Grande Ronde Watershed History Report, Confederated Tribes of the Umatilla Indian Reservation.

Hill, A. R., 1996, Nitrate Removal in Stream Riparian Zones. J Environ. Qual. 25:743-755.

Holaday, S.A. 1992. Summertime water temperature trends in Steamboat Cr. Basin, Umpqua National Forest. Master's Thesis. Department of Forest Engineering, Oregon State University, Corvallis, Oregon.

Li, H.W., G.L. Lamberti, T.N. Pearsons, C.K.Tait, J.L. Li, and J.C. Bickhouse. 1994. Cumalitive effects of riparian disturbance along high desert trout streams of the John Day Basin, Oregon. Am. Fish Soc. 123:627-640.

McIntosh, B.A. 1995 Historical changes in stream habitats in the Columbia River Basin. PhD. Dissertation. Oregon State University. Corvallis, Oregon.

Morbrand Biometrics, 1997, Application of the Ecosystem Diagnosis and Treatment Method to the Grande Ronde Model Watershed Project.

Oregon Administrative Rules Chapter 340, Division 41, Section 722.

Oregon Department of Environmental Quality, 1999, Upper Grande Ronde River Sub-Basin Temperature Total Maximum Daily Load (TMDL).

Oregon Department of Environmental Quality, 1998, Oregon's 1998 Section 303(d) List of Water Quality Limited Waterbodies, Oregon's Criteria For Listing Water bodies & Basin Maps.

Oregon Department of Environmental Quality, 1998, Grande Ronde River Basin Water Quality Technical Assessment – Temperature.

Oregon Department of Environmental Quality, 1998, Grande Ronde River Basin Technical Assessment (Overview of Water Quality Conditions).

Oregon Department of Environmental Quality, 1997, Water Quality Report – Grande Ronde River.

USDA Natural Resource Conservation Service, U.S. Forest Service, Union Soil and Water Conservation Service, 1997, Grande Ronde River Cooperative River Basin Study Union County, Oregon.

US Forest Service., 1994, Upper Grande Ronde Watershed Analysis.

Verchot, L.V., et.al., 1997. Nitrogen Cycling in Piedmont Vegetated Filter Zones: II. Subsurface Nitrate Removal. J. Environ. Qual. 26:337-347.

Element 2: Goals and Objectives

The over-arching goal of the of the Upper Grande Ronde River Subbasin Water Quality Management Plan is **to protect the beneficial uses of the waters of the subbasin by implementing management measures to protect existing high quality waters and to improve water quality of impaired waters to the point that state water quality standards are met. The purpose of this Water Quality Management Plan is to strive to meet the load allocations and thereby achieve the water quality standards.** A number of goals and associated objectives follow that will help to insure success of the management plan.

Goal 1: Implementation of management measures that will lead to achievement of the load allocations associated with the temperature, dissolved oxygen, and pH. (note: it is anticipated that achievement of this goal will lead to attainment of not only the temperature, dissolved oxygen and pH standards but also the water quality standards for sediment and bacteria).

- Objective 1.1: Eliminate the following point source discharges of nutrients during summer.
  City of La Grande WWTP design plans and specifications complete by. by 2/01.
  Construction complete by 12/31/02.
  City of Union WWTP eliminate summer discharge by 12/31/02.
  Boise Cascade Particle Board Facility eliminate summer discharge.

- Objective 1.2: Reduce NPS pollution contributions from transportation sources by controlling sediment for road construction and maintenance through the use of BMPs identified in Element 3.2.
  Union County will establish a committee that will 1) identify and inventory road related problems in subbasin by 01/01, 2) assign priorities to problems by 12/01, 3) oversee implementation of solutions 2001-2005.

- Objective 1.3: Reduce NPS pollution contributions from residential and commercial development through the use of management measures identified in Element 3.2.
  Union County and City of La Grande will lead a coordinated review of relevant ordinances, codes, policies that will 1) identify the relevant ordinances, etc., by 6/00, 2) identify gaps in coverage by 9/00, 3) identify model ordinances by 12/00, 4) seek adoption of revisions to existing or new ordinances by appropriate body (county government and city councils) by 10/01, oversee implementation of measures 2001-2005.

- Objective 1.4: Reduce NPS pollution contributions from public lands through use of management measures identified in Element 3.2.
  USFS will implement PACFISH Riparian Habitat Conservation Areas and Standards and Guides for Key Watersheds as well as other identified BMPs and management measures.

- Objective 1.5: Reduce NPS pollution contributions from private forest lands by continued implementation of state forest practice rules as discussed in Element 3.2. ODF and DEQ will evaluate existing rule adequacy through a series of evaluations. A joint shade study will be completed by June of 2000. The final report of ODF Forest Practice Advisory Committee will be completed by Spring 2000. Information from the ad hoc committee advisory process is currently planned for presentation to the Board of Forestry in April 2000. Information from these efforts, along with other relevant information provided by DEQ and ODF, will be considered in determining the adequacy of current forest practices for the Upper Grande Ronde Subbasin, as described in Element 3.2.

- Objective 1.6: Reduce NPS pollution from agricultural sources by implementation of the agricultural water quality management area plan for the Upper Grande Ronde River Subbasin as described in Element 3.2.
  ODA and DEQ will evaluate the AWQMA Plan and Rules to determine if there is reasonable assurance of achieving the Load Allocations in the Upper Grande Ronde River Subbasin as described in Element 3.2 through implementation of the AWQMA Plan and Rules.

Goal 2: Facilitate maintenance of effort over time.

- Objective 2.1: Union county will establish a committee to regularly review the status of implementation of this Water Quality Management Plan as described in Element 9 of the plan. This committee will be established by fall 2000.

Goal 3: Encourage continuing availability of financial and technical assistance for implementation of water quality improvement and point and nonpoint source pollution control in the subbasin.

- Objective 3.1 The review committee (described in Element 9) will determine status of funding programs and encourage Union County, cities in the Subbasin, Union SWCD, and Grande Ronde Model Watershed Program to aggressively lobby for continued funding from appropriate state and federal agencies. This will be done at least annually.

Goal 4: Encourage public education on nonpoint source pollution control in the subbasin.

- Objective 4.1 The review Committee (described in Element 9) will annually review the status of public involvement and education strategies described in Element 8. Responsible agencies will be encouraged to deliver appropriate education and involvement products.

Additional goals and objectives identified by the core work groups (transportation, municipal/industrial, forestry and agriculture) for their interest area purposes are as follows:

Transportation

GOAL: The goal is to maintain water quality for the beneficial uses that are currently impacted by transportation practices and provide ongoing water quality protection for the future.

OBJECTIVES:

- Implement road maintenance and construction activities that will protect vegetation and water quality.
- Assess future drainage designs to accommodate fish passage.
- Implement a road right-of-way work schedule to accommodate in-stream work windows.
- Implement an evaluation of the road system to identify erosion problems and prioritize corrective efforts.
- Provide BMP's and/or guidelines for road construction/location to emphasize water quality.

Municipal Industrial

GOAL: The goal is to maintain water quality for the beneficial uses that are currently impacted by municipal public works practices and private development and facility maintenance and provide ongoing water quality protection for the future.

OBJECTIVES:

- Implement planning, maintenance and construction activities that will protect vegetation and water quality.
- Assess future drainage designs to accommodate fish passage.
- Implement a drainage system work schedule to accommodate in-stream work windows.
- Provide BMP's and/or guidelines for public and private construction/location to emphasize water quality.

Forestry

GOAL: The goal of the forestry component of the Grande Ronde Water Quality Management Plan is compliance of water quality standards for forest operations.

OBJECTIVES (ODF):

- Improve bank stability.
- Maintain desired riparian conditions.

Agriculture

GOALS: Protect economic viability
Sustain and/or improve water quality by:
- Reducing soil erosion from agricultural land in the basin
- Improve bank stability
- Improving riparian conditions
- Improving nutrient, animal waste, and irrigation management

Preserve private property rights
Promote landowner stewardship by encouraging the adoption of BMPs
Increase public awareness and understanding of agriculture's contributions to improving water quality through coordinated watershed outreach activities
Pursue funding for private landowners to implement water quality improvement projects
Participate in a monitoring program

Element 3: Management Measures

3.1 Point Sources

There are 21 permitted point sources that potentially could contribute to water pollution in the Grande Ronde River or Catherine Creek. Five of these are agricultural operations that have Confined Animal Feeding Operation (CAFO) permits and are regulated by the Oregon Department of Agriculture. Of the remaining 16 point sources only three discharge directly to surface waters and all three of these will eliminate their discharges as a result of implementing this Water Quality Management Plan. The contents of the facilities plans for the control of these three point sources are briefly summarized below:

3.1.1 Direct Discharges (to be eliminated during season of concern)

- City of La Grande Wastewater Treatment Plant

The plant performance is regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued by the DEQ. To begin implementing the TMDLs to improve pH and DO problems in the Grande Ronde River, DEQ issued a new, more restrictive, permit in February of 1998. It was recognized that the City would not have the capability of meeting the new permit requirements. As a result, DEQ concurrently issued a Mutual Agreement and Order (MAO) that established interim limits for the wastewater treatment plant until improvements can be constructed. The MAO also established a compliance schedule for construction of the necessary improvements. Construction is to be completed by the end of 2002.

The City of La Grande currently has three options for disposal/reuse of treated wastewater: 1) Discharge to the Grande Ronde River, 2) reuse in Ladd Marsh wetland ponds (in cooperation with Oregon Department of Fish and Wildlife (ODFW)), or 3) reuse by irrigation on ODFW grain crops for wildlife forage. In the 1980s, some wastewater was irrigated on local farmland under agreement with local farmers. The current reuse options are not capable of taking all of the treated wastewater produced. As a result, the majority of wastewater flow is discharged to the Grande Ronde River. The discharge point is five miles from the treatment plant at Pierce Road. During summer low flow months this discharge is generally in the 1 to 1.5 cfs range. The discharge can be a significant portion of the river flow in late summer. The treated wastewater is high in nutrient concentration and contributes to the excessive algae growth that results in DO and pH water quality standard violations. To comply with the TMDL and this Water Quality Management Plan the city will eliminate this summertime discharge. The wastewater treatment plant will no longer be a contributor to summer season water quality problems.

Permit requirements: The City of La Grande's NPDES permit states that during the months of June and July discharge to the river is allowed only when the flow of the river is greater than 200 cfs. During August and September, no discharge is allowed. In October, discharge cannot resume until there have been seven consecutive days when the pH of the river has remained

below 9.0. From November through May, discharge is allowed. During the periods when discharge is allowed, the permit also specifies effluent limits on biological oxygen demand (BOD), total suspended solids (TSS), ammonia, pH, chlorine, and bacteria. Finally, the permit specifies requirements for monitoring of both influent and effluent for a variety of parameters and monitoring of the river, when discharging, for pH, flow and temperature.

In order to meet the requirements of the permit and eliminate the city's point source contribution to water quality standards violations, the City of La Grande will significantly expand its existing irrigation reuse system, construct two new 30-acre lagoons for wastewater storage, construct improvements to the main trunk line, and implement a long-term collection system rehabilitation and replacement program. Design plans and specifications are to be completed by December 2000. Construction and compliance with all permit requirements is to be complete by December 31, 2002. Estimated cost for the wastewater system improvements is $13,563,000 (City of La Grande, Oregon, Wastewater Facilities Plan, 1998).

- City of Union Wastewater Treatment Plant

The City of Union wastewater treatment plant currently discharges to Catherine Creek. As with the City of La Grande, Union's treatment plant performance is regulated under a NPDES permit issued by the DEQ. To implement the TMDLs and improve water quality to meet dissolved oxygen and pH standards, the permit requirements have been revised and the City will eliminate summertime discharge. Permit requirements for effluent quality, monitoring and no discharge periods will be very similar to La Grande's requirements discussed above except that the beginning of the no discharge period will be based on Catherine Creek flow. Discharge will not be allowed in June and July unless the flow of Catherine Creek is greater than 15 cfs. No discharge will be allowed in August and September.

In order to meet the requirements of its permit and eliminate summertime discharge, the City of Union will use treatment plant effluent to irrigate golf course fairways. This effort will involve the construction of an effluent pump station at the treatment plant to move effluent to the golf course, and construction of a storage pond and an irrigation pumping station at the golf course. Removal of the effluent from Catherine Creek will exacerbate low flows in the late summer because the discharge is a significant portion of late season stream flow. To partially mitigate this, the City has donated a portion of its municipal water right to in-stream flow. Estimated cost for the Union wastewater treatment plant improvements is $5,480,000 (City of Union, Oregon, Wastewater Facilities Plan Update 1997, Revised September 30, 1998).

- Boise Cascade Particleboard Facility, Island City

Since 1983, the Boise Cascade Particleboard Facility has discharged storm water, boiler blowdown and non-contact cooling water to the Grande Ronde River under NPDES General permits. Contact wastewater has been disposed of on-site in lined evaporation ponds. Because Boise Cascade discharges to the Grande Ronde River, the company was required to develop a facility plan in conjunction with the TMDL.

In 1997, Boise Cascade submitted a facility plan with the following goals: 1) Reduce usage of city water for industrial purposes; 2) Eliminate discharge of non-contact wastewater and storm water to the Grande Ronde River during low stream flow periods and minimize flows and mass loads of constituents on a year round basis; 3) Reuse and/or recycle non-contact wastewater to the extent it is cost effective; 4) Enhance area wetland/wildlife habitat by recycling non-contact wastewater and storm water through a constructed wetland; and 5) Recycle process (contact) wastewater through vegetative and wetland/wildlife habitat enhancement.

To implement the plan, Boise Cascade is in the process of constructing a two-acre wetland/wildlife enhancement and cooling water recirculation system pond. During low stream flow periods, boiler blowdown, non-contact cooling water and storm water will pass through the existing retention, overflow and discharge (ROD) pond to the constructed wetland. During the balance of the year, boiler blowdown, non-contact cooling water and storm water that are in excess of ROD/wetland capacity will pass through the ROD pond and discharge to the River. Roof wash water and blowpipe water will be directed to the ROD only when there is no discharge to the River.

The company has completed construction of a two-acre, two-cell, HDPE lined pond for process (contact) wastewater. During the non-growing season, wet electrostatic precipitator (an air emission control) wastewater, resin tank cleanup, laboratory wastewater, and air compressor condensate will be directed to the HDPE lined pond for storage. During the growing season, the waste streams will be irrigated on the wetland and ROD dikes. Roof wash water and blowpipe water will be stored in the HDPE lined pond when the ROD is discharging to the River.

Other improvements include: 1) Abandonment of the lined sewage lagoons, which were used for the process wastewater prior to construction of the HDPE lined pond; 2) Construction of a lift station and irrigation system; 3) Elimination of chip washing wastewater; and, 4) Construction of a storm water bypass pipeline. Estimated cost of the improvements is $480,000 (Boise Cascade 7/2/97 letter to Ed Liggett, regarding Water Management System Upgrade, Particleboard Facility).

3.1.2 Other Permitted Point Sources

The thirteen remaining point sources in the Upper Grande Ronde Subbasin are briefly discussed below:

Boise Cascade Saw Mill – La Grande: The company holds permits for boiler blowdown and storm water. Both are discharged to an irrigation ditch. The company is in the process of upgrading operations that will result in low energy reuse of process water to sprinkle log yards and improve control of storm water to reduce sediment and nutrients. Estimated cost of upgrades is $230,000. The company plans to apply for an individual permit to consolidate the general permits.

Boise Cascade Plywood – Elgin: The company holds an individual NPDES permit. Under the permit, the company discharges storm water, non-contact cooling water, and French drain wastewater from the log deck to Phillips Creek during wet weather months and extreme storm events. During dry low flow months the wastewater/storm water is piped to a pond with process wastewater and sprinkled on the log deck. Upgrades include installation of a new log deck sprinkling system that will require less water usage, storm water control improvements, and oil/water separators. Boise Cascade is spending approximately $380,000 to upgrade the wastewater system.

Hampton's Asphalt -- Island City: The company operates a hot mix asphalt plant under the Water Pollution Control Facilities (WPCF) General Permit for Sand & Gravel operations. The permit provides for disposal of air scrubber wastewater by evaporation, seepage, or reuse. At the Hampton facility, wastewater is reused after suspended sediment is allowed to settle in a settling basin. The permit requires routine inspections of the wastewater control structures.

RDMac -- Island City: The company operates a sand and gravel facility under an individual WPCF permit, which expired December 1998. They operate ponds for disposal of gravel washing wastewater and concrete mixer washout. Turbidity and total dissolved solids (TDS) are the parameters of concern at sand and gravel facilities. The draft permit renewal provides for routine groundwater monitoring and inspection of wastewater control structures. Within the year, RDMac plans to close the operation in Island City and relocate to a site near the La Grande Airport. For closure, the company will be required to monitor the Island City site until the wastewater ponds are no longer turbid. At the new site, the company will apply for the WPCF General Permit for Sand & Gravel operations. The WPCF General Permit prohibits discharge to surface waters and requires that all wastewater be controlled by settling, recirculation, seepage, irrigation or utilization for dust control. The permit requires routine inspection of dikes, containment systems, and pond freeboard.

Alpine Timber -- Island City: The facility has been operating under an individual WPCF permit. During the permit renewal process, DEQ recommended that the facility apply for coverage under the WPCF General Permit for Sand & Gravel operations. The WPCF General Permit provides for wastewater disposal by evaporation, seepage, re-use and irrigation. Discharge to surface waters is prohibited and adjacent streams (Grande Ronde River) must be routinely inspected for seepage from the facility.

City of Elgin Wastewater Treatment Plant: The City utilizes a lagoon system for wastewater treatment discharging effluent to the Grande Ronde River November through May with land application from June through October. Because the City of Elgin does not discharge to the river during the months of concern for water quality, they will not be required to limit nutrients in their effluent.

City of Cove Wastewater Treatment Plant: The City currently treats wastewater in a lagoon system with land application during the summer months. The facility does not discharge effluent to surface water during any season.

Two Permitted Domestic Evaporative Lagoon Systems:

One owned by Barreto Manufacturing and Taggeras Farms, is located east of Ladd Creek and east of Hwy. 203. The lagoon is used to treat domestic wastewater. The integrity of the lagoon is in question as a result of historic lack of maintenance. The permit expired in June of 1999. Rather than conduct a wastewater facility evaluation, the owners intend to replace the lagoon with an on-site, sand filter, septic system.

Hot Lake RV Park operates an evaporative lagoon system east of Ladd Creek and east of Hwy 203, near the old Hot Lake Hotel. The permit for this facility expired in 1992. Integrity of the lagoon is in question as a result of historic lack of maintenance. Civil penalties have been assessed as a result of operating the system without a permit. The DEQ is in the process of negotiating a Mutual Agreement and Order that will include interim discharge limitations, a facility evaluation including a lagoon leak test, and a compliance schedule for obtaining a valid permit.

Oregon Department of Fish and Wildlife Fish Hatchery on Lookingglass Creek: This facility has a series of raceways that receive a continual flow of water from Lookingglass Creek. Fish are raised and fed in the raceways. Water leaving the raceways empties directly into Lookingglass Creek via a gutter and chute. Water is directed to a settling pond during cleaning to reduce solids (metabolic waste products) prior to returning to Lookingglass Creek. There are limitations and monitoring requirements for suspended solids, settelable solids, and pH. Samples are taken at Lookingglass hatchery intake, outfall and settling pond. On a yearly basis, the settling pond is cleaned and all debris removed to an appropriate off hatchery site. In 1997 ODFW implemented a new feeding procedure that is dependent on water temperature (fish feed less in relatively warm water, more in cold). This resulted in using less feed and so a smaller amount of solids reaching Lookingglass Creek and a cost saving for ODFW. With changes in nutrition and closer scrutiny to hatchery operations under ESA rules, higher quality feed is used which results in less waste with fewer leftover pellets in the raceways.

Janus Industries, LLC: This is a bottled water facility located near the City of Union. The permit specifies land application of filter backwash water and operation of a holding tank for domestic wastewater. There is no discharge to surface water.

Stafford, Jeff: This permit is for a meat packing facility located near Elgin. Wastewater disposal is by an evaporative lagoon system with no direct discharge to surface water.

Ramsay Gerding Construction Company: This is a storm water permit for control of sediment and erosion during construction of the La Grande Convention Center.

Union Pacific Railroad Company (UPRR) – La Grande: UPRR has a permit to handle wastewater from locomotive and bulk fueling. The wastewater consists of rainwater mixed with petroleum products and solids. The wastewater is settled, oil is skimmed off and then the water is stored in a lagoon. Wastewater from the lagoon is land irrigated at agronomic rates. The

remainder of their site is graveled for infiltration and spills are cleaned up according to a spill response plan.

Fleetwood Travel Trailers of Oregon – Island City: Fleetwood's Storm Water permit controls storm water discharges through best management practices. The main contaminates are solids and wood waste. Runoff leaves the site only under an extreme storm event. Most of the time rain water either infiltrates or pools in swales in an area in the northeast corner of the site. BMPs include stormwater swales and covering storage and work areas to prevent contamination of stormwater.

Borden, Inc. – Island City: The company operates a synthetic resin manufacturing plant in Union County. Recycling of Borden's wastewater is regulated under the terms of a DEQ WPCF Permit. The plant was built in 1966 and produces both urea and phenolic resins which are used by other facilities in manufacturing plywood and particleboard. As a result, the process wastewater contains urea and phenolic compounds. The process wastewater, accidental spills and related cleanup waters, and storm water are recycled back into the production process. Prior to recycling, the process wastewater and spill water are stored in two engineered concrete basins. Cooling tower water, boiler blow down and domestic sewage are discharged to the Island City Area Sanitation District (ICASD) sanitary sewer system. Boiler blow down and cooling tower water can be land applied to agricultural land during the growing season.

Significant nitrate (NO_3-N) and total Kjeldahl nitrogen (TKN) contamination has been confirmed in the groundwater under the facility. This was documented in a permit evaluation dated 12/19/94. The contamination was determined to have resulted from past plant use of unlined ponds for wastewater storage and evaporation, as well as from recurring spills of urea in the urea unloading area. Borden has since abandoned and filled the seepage/evaporation ponds. They now send boiler blow down, domestic sewage and cooling tower water to the ICASD sanitary sewer system. In addition, they have graded and asphalt-lined the entire process area, including the urea unloading area. The equipment wash water, storm water runoff, accidental spills and related cleanup water and process leaks, are collected in drains and stored in lined containment areas for recycling.

Borden was required by the current WPCF permit to perform a preliminary assessment to address the existing groundwater contamination. However, Borden was unable to complete the assessment because they were denied assess to the adjacent property by the owner. Therefore, the preliminary assessment and other actions to address groundwater contamination are on hold pending access to the adjacent property.

3.2 Nonpoint Sources

The contribution of nonpoint source pollution to the water quality concerns in the Upper Grande Ronde River Subbasin and general categories of nonpoint sources was discussed under Element 1: Condition Assessment and Problem Description. The Grande Ronde Water Quality Committee has chosen to address nonpoint sources of pollution by lumping them into four broad categories:

Transportation, Municipal, Forestry, and Agriculture. Approaches and management measures for controlling pollution generated by each category are discussed separately.

3.2.1 Transportation Sources

The transportation recommendations apply to runoff, associated sediment, and other potential pollutants originating on, or resulting from, interstate highway I84, state highways, county roads, U.S. Forest Service roads, and private non-agricultural roads (including private forest roads). Agricultural roads are covered under the agriculture section.

The Transportation Workgroup considered the identified 303(d) listed parameters and evaluated the potential influence of roads on those parameters. It was determined that of the listed parameters the biggest direct effect of roads is on sediment. Because of the relationship of sediment to bank stability, width depth ratio, habitat and nutrients, control of sediment from roads will have indirect benefits for all the listed parameters. As a result, the transportation management measures focus largely, but not exclusively, on controlling sediment from road construction and maintenance (including roadside ditch maintenance). It is important to recognize that many of the transportation related practices will also have beneficial water quality effects by reducing other parameters that are not on the 303(d) list e.g. suspended solids, oil and grease, and deicing chemicals. The workgroup also thought it important to recognize that some areas along roadways support high quality natural areas, native fish and wildlife populations. In addition to addressing restoration and pollution reduction in degraded areas, these existing high quality areas will need protection and preservation as urbanization increases in the watershed.

Evaluation and Implementation of Transportation Practices

Many of the Best Management Practices discussed below are, and will continue to be, routinely implemented. There is a perception, however, that there are localized transportation related problems that are not currently being addressed due to either 1. Lack of knowledge of the problem, 2. Lack of prioritization of the problem, or 3. Lack of funding to address the problem. As a result, one of the most important components of the strategy to address transportation related sources is conducting an evaluation and implementation process. Union County will sponsor an application to fund a committee that will take the lead in establishing and coordinating a committee made up of at least, but not limited to, the following organizations: Union County, Oregon Department of Transportation, Oregon Department of Forestry, DEQ, USDA Forest Service – La Grande ranger District, City of La Grande, Grande Ronde Model Watershed Program. This group, within six months of implementation, will complete the following tasks:

1. Identify and inventory localized transportation related “hot spots” such as stream bank stability problems associated with roads, problem native surface roads that are major sediment sources, improperly sized or maintained culverts, roads that are seriously constraining a stream, etc.
2. Assign priorities to the situations identified in 1 based on professional judgment of the magnitude of effect on water quality. Complete by December 2000.
3. Identify solutions and make rough estimates of costs of correction of the problems.

4. To the extent possible, address the problems working from highest priority (most serious problem) to lowest.
5. For problems that cannot be addressed with existing road maintenance and construction funding, begin seeking other funds (OWEB, Bonneville Power Authority, etc,) again working in priority order.
6. Oversee implementation of solutions. 2000 –2005.

Best Management Practices (BMPs) for Transportation Sources

The agencies/entities with responsibilities for road construction, decommissioning, and/or maintenance will demonstrate that they are properly implementing BMPs so that contributions to identified water quality concerns of roads, their associated rights of way, and associated ditches are eliminated or controlled to the extent practicable**. It should be noted that the BMPs listed here are a sub-set of the BMPs discussed and recommended by the Transportation Workgroup.** These are the BMPs considered to be most relevant to the sediment, temperature, DO and pH water quality standards being addressed here. The complete workgroup recommendations can be seen in the Draft Transportation Work Group Water Quality Nonpoint Source Report that was presented to the Grande Ronde Water Quality Committee on September 17, 1998. The draft workgroup report was not intended to be a complete listing of all current or needed BMPs in the subbasin. Additional BMPs relating to specific activities can be found in the following documents:

- ODOT Maintenance Management System Water Quality & Habitat Guide
- ODF Forest Practice Administrative Rules
- USFS BMPs

The intent of this section is to insure that appropriate BMPs are being used throughout the subbasin. As indicated above, it is the responsibility of the appropriate agency/entity to demonstrate that adequate BMPs are in place. The following is a list of commonly accepted BMPs for roads:

Planning Practices

Activity Evaluation Process

Before any construction or maintenance activities occur the following questions should be answered and appropriate action should be taken:
Does the activity have potential to pollute a receiving stream?
How does it effect? Runoff, sediment, other pollutants?
What solutions can be employed to minimize effects?

Assessment Process – to be followed whenever there is a sensitive situation.

Assess situation considering: Topography (streams, drainage channel, wetlands, slope stability, etc.), materials being used (what's being used, how much, what's its potential effect?), Location for disposal of materials.

What type of resources will be affected? (Waters of the state, downs stream effects, fish, wildlife, habitat)
Contact and consult appropriate agencies. (ODFW, DEQ, DSL)
Proceed using input from appropriate agencies.

Construction and Maintenance Activities

a. CHIP SEALING/OIL MAT

Description: Apply liquid asphalt and cover with aggregate on sections of bituminous roadway surfaces to seal cracks, rejuvenate dry weathered areas, improve friction characteristics and prolong life of the surface.

Concerns: TSS, oil and grease (O/G), diesel, disposal of excess materials, and disposal of surplus liquid asphalt

Actions to improve practice:

① Use environmentally sensitive cleaning and releasing agents.
② Carry adequate supplies for small spill containment to ensure liquid asphalt does not reach receiving waters.
③ Work in dry weather.
④ Dispose of excess material in an approved manner and location.
⑤ Use heat source to heat and clean tack nozzles.

b. SHOULDER BLADING/REBUILDING

Description: Blading: Shoulder blading is the blading and shaping of unpaved shoulders and ditches to correct rutting, buildup of materials, excessive weed growth, and to maintain proper drainage.

Rebuilding: Restoration of unpaved sections by adding, reshaping, and compacting aggregate material, disposing of excess material, and/or pulling ditches. This activity is performed when blading cannot correct the problem due to the lack of material.

Concerns: Disposal of material and Total Suspended Solids (TSS)

Actions to improve practice:

① Blade in dry weather, but while moisture is still present in soil and aggregate. Evaluate specific areas for alternatives such as berming or paving shoulder.
② Dispose of excess material at an approved location.
③ Install erosion control devices to prevent materials entering water bodies.

④ Permanently stabilize disturbed soils using best management practices-seeding, plants, etc., depending on site locations, cost and effectiveness.

c. DITCH SHAPING AND CLEANING

Description: Machine cleaning and reshaping of ditches including loading, hauling and disposing of excess materials.

Concerns: TSS, Debris and disposal of material

Actions to improve practice
① Dispose of removed material at an approved location.
② Use erosion control devices when the potential exists to have sediment or other materials enter an aquatic system.
③ Reseed where appropriate for grade, slope, etc.
④ Perform work in optimum weather when possible.
⑤ Recycle excavated material.

d. CULVERT AND INLET CLEANING

Description: Cleaning of dirt and debris from culverts, siphons, box culverts, catch basins, drop inlets, and other minor drainage facilities to restore proper operation.

Concerns: TSS, O/G, Disposal or storage of material, Timing of activity

Actions to improve practice:
① Provide erosion/sediment control during culvert/trash rack cleaning.
② Communicate by letter to ODFW on cleaning schedule and methods to clean culverts/trash rack at least two weeks prior to cleaning in ODFW identified sensitive areas such as spawning grounds.
③ Dispose of materials at an identified location with proper erosion and sediment control measures.
④ Know and follow in-stream work windows for specific streams and systems.

Bridge, Culvert, and Inlet Cleaning:
① Remove material on structure by shovel and dispose of appropriately above flood plain.
② Clean regularly to minimize buildup.
③ Inspect and clean before winter season and prior to rainy season.

e. CULVERT AND INLET REPAIR/REPLACE

Description: Repair and/or replace culverts, siphons, box culverts, catch basins, and drop inlets to restore proper operation.

Concerns: TSS, debris, timing of work, proper culvert installation

Actions to improve practice:

① Perform activities during the ODFW in-stream work window, or as negotiated with ODFW when working in or near surface waters.
② Provide erosion/sediment control during culvert or inlet repair as appropriate.
③ Inspect and prioritize repairs.
④ Involve ODFW with planning and implementation of any in-channel or riparian area work that could affect habitat or channel characteristics. Obtain proper permits for in-stream construction.

f. CHANNEL MAINTENANCE

Description: Cleaning and repairing of drainage channels including hauling and placing of riprap to restore slope and grade.

Concerns: TSS, disposal of material, impacts to fish, channel morphology

Actions to improve practice:

① Perform activities during the ODFW in-stream work window, or as negotiated with ODFW when working in or near surface waters.
② Involve ODFW with planning and implementation of any in-channel or riparian area work that could affect habitat or channel characteristics.
③ Identify and stockpile clean rock sources.

g. MINOR SURFACE REPAIR

Description: Hand patching of intermittent potholes, small depressions, and edge breaks in the bituminous surfaces and shoulders with hot or cold mix material.

Concerns: TSS, O/G, diesel, disposal of materials and CSS1

Actions to improve practice:

① Eliminate diesel as a releasing or cleaning agent.
② Use Environmentally sensitive cleaning and releasing agents.
③ Carry supplies for small containment (diapers, kitty litter).
④ Work in dry weather.

h. MAJOR SURFACE REPAIR

Description: Major patching of distortions, rutting, and surface irregularities with plant mixed asphalt concrete material.

Concerns: TSS, O/G, diesel, disposal of material, grinder slurry, and CSS1

Actions to improve practice:

① Eliminate diesel as a releasing or cleaning agent.
② Use heat sources to heat and clean tack nozzles during operation.
③ Use environmentally sensitive releasing and cleaning agents.
④ Carry adequate supplies to keep materials out of water bodies (diapers, kitty litter, shovel, etc.).
⑤ Work in dry weather.

i. DEEP BASE PATCHING

Description: Deep base patching is performed by grinding and removing deteriorated surface and base material, and replacing it with asphalt mix. This process provides a structurally sound driving surface.

Concerns: TSS, O/G, diesel, and disposal of removed materials

Actions to improve practice:

① Eliminate diesel as a releasing or cleaning agent.
② Dispose of removed material at an approved location.
③ Use environmentally sensitive releasing agent.
④ Carry adequate supplies to contain small spills and to keep materials out of water bodies.
⑤ Recycle grindings - add to new asphalt or use a substitute for new aggregate.
⑥ Coordinate with other jobs to use material as fill.

j. PROFILING AND TEXTURING

Description: Road surfaces that have lost their design shape due to overlay, patching, slides and settlements, rutting, raveling, which are otherwise structurally sound may be reshaped by cold planing to improve the traverse and longitudinal profiles and to improve the ride and drainage. Extreme buildup of bituminous material over PCC pavements and bridge decks may require complete removal to restore cross slope on the highway and reduce loading on bridge decks. Utility cuts will generally require extensive repair. Installations such as manholes and

water valves will need to be adjusted to the new surface. All cracks in the PCC surface should be filled with a flexible sealant material.

Concerns: TSS, O/G, and material of disposal

Actions to improve practices:
① Use water to control dust.
② Dispose of materials in an approved manner at an approved location.

k. INLAY REPAIR (small and large)

Description: Cold planer removal and inlay paving with bituminous materials to correct local base failures, utility cuts, shoving, raveling, eliminate rutting and other surface irregularities to maintain a reasonable cross section and grade for drainage and rideability.

Concerns: TSS, O/G, disposal of material, and dust

Actions to improve practice:
① Eliminate diesel for use as releasing/cleaning agent.
② Use heat source to heat/clean tack nozzles.
③ Use environmentally sensitive releasing/cleaning agents.
④ Carry adequate supplies for spill containment to ensure spills/materials do not reach water bodies.
⑤ Dispose of debris material at an approved location.
⑥ Work in dry weather.

l. SWEEPING AND FLUSHING NON-PICKUP

Description: Sweeping and flushing of roadways, curbs, bikeways, bridge decks, and intersections to remove dirt, debris, and other loose materials. This activity pushes or flushes material to the side areas rather than picking it up and hauling it away.

Concerns: TSS, O/G, metals, and debris

Actions to improve practices:
① Use water when needed to reduce dust.
② Schedule sweeping during damp weather.
③ Use anti-icer to lessen sanding material where appropriate.
④ Remove sweepings within 25 feet of identified sensitive areas.

m. EROSION REPAIR

Description: Repairing damage caused by water or wind erosion including hauling and shaping of material to restore slope and grade. Restore vegetation for erosion control.

Concerns: TSS, and disposal of material

Actions to improve practices:

① Dispose of removed material at an approved location.
② Perform erosion control in a timely manner.
③ Seed and mulch susceptible areas with non-invasive species.
④ Install silt fences and other erosion control devices as appropriate.
⑤ Take precautionary measures on erodible areas.

n. OTHER DRAINAGE MAINTENANCE

Description: Miscellaneous maintenance activities to inspect and repair or restore the operation of drainage facilities.

Concerns: TSS, debris, and disposal of material

Actions to improve practices:

① Perform work during the ODFW in-stream work window, or as negotiated with ODFW in sensitive areas.
② Prioritize and treat sediment problems adjacent to significant aquatic resources including fish ladders, tidegates, trash racks.
③ Place removed material at an approved site, with appropriate erosion control.
④ When conditions allow, provide erosion control measures.

o . OTHER SHOULDER WORK

Description: Miscellaneous maintenance activities performed on shoulder surfaces that are not specifically listed as separate activities.

Concerns: TSS and others depending on activity

Actions to improve practices:

① Dispose of waste material at an approved location.
② Environmental concerns such as wetlands, erosion control, and waterway pollution are to be addressed in the performance of these activities and the disposal of waste material.

p. OTHER SURFACE MAINTENANCE

For BMPs relating to specific surface maintenance activities, refer to attachments A, B, and C, depending on the appropriate jurisdiction.

q. FENCE MAINTENANCE

Description: Repair and replace right-of-way and access control fence to restrict access, provide screening, and control livestock access. Includes fence inspection.

Concerns: TSS and litter

Actions to improve practice:
① Pick up litter.
② Use good housekeeping practices.

r. PAINT STRUCTURES

Description: Sandblasting, surface cleaning, and painting of structure elements.

Concerns: TSS, metals, and paint cleanup

Actions to improve practice:
① Remove steel rail and take to shop for rust removal and painting.
② Block bridge deck drains and route any water off structure to detention facility.
③ Eliminate use of lead based paints.

s. SNOW REMOVAL

Description: Removing snow, ice, and slush from the roadway and shoulders including ramps and intersections by plowing or blading.

Concerns: TSS, and debris

Actions to improve practice:
① Identify sensitive areas and educate crews on winter maintenance activity expectation.
② Develop winter maintenance plans for specific, sensitive areas.

③ When plowing next to a body of water, or on a structure that spans water, adjust speed to keep material out of waterway.
④ Educate staff on water quality issues.

t. EMERGENCY MAINTENANCE

Description: Emergency or extraordinary repair of damage to roadway, roadside, and structures resulting from storms, floods, wind, civil disorder, and other disasters.

Concerns: Incidental wetland impacts, riparian areas, and stream bed impacts

Actions to improve practices:
① Provide quick response and first inspection, notify appropriate resource staff.
② Repair any damage to fishery or water resources caused by response activities as opposed to damage caused by emergency action.
③ Remove all excess material to pre-approved disposal location.
④ Provide adequate erosion control or bank stabilization necessary to keep material from entering waterway.
⑤ Identify and plan for slide debris disposal sites.

u. SETTLEMENTS AND SLIDES

Description: Repairing roadway settlements and slides including loading, hauling, and placing of suitable materials.

Concerns: TSS, impacts to wetlands, and disposal of material

Actions to improve practice:
① Notify appropriate resource staff and agencies.
② Provide adequate erosion control and containment to eliminate sediment from entering waterway.
③ In coordination with ODFW, repair any damage caused by activities to water resources.
④ Avoid additional impacts to wetlands/streams.

v. ROADSIDE VEGETATION MAINTENANCE

Description: Mechanically mowing, trimming, removing/disposing of brush (ie, to restore sight distance, road safety), hand cutting, applying herbicide to eradicate, prevent, or retard growth of noxious weeds, brush and other undesirable vegetation.

Concerns: TSS, particle drift, residual effects in soil, post application impacts to human and animals, public perception, threatened and endangered species impacts, disposal of waste material, contamination from runoff, and dust

Actions to improve practice:

① Investigate mechanical means to reduce chemical use.
② Evaluate site (see Planning Practices; Assessment Process).
③ Minimize removal of vegetation.
④ Plant/re-seed area.
⑤ Public and staff education programs.
⑥ Emphasize, utilize and implement vegetation control policies, including noxious weeds.
⑦ Dispose of waste material according to DEQ's required procedure.
⑧ Dispose of debris material in an approved location.
⑨ When appropriate, designate "No Spray" zones.

Additional road related practices relevant to federal lands are included in the section on Federal Forest Lands.

3.2.2 Municipal Sources

It should be noted that the intent of the municipal category is to address nonpoint contributions of residential and commercial development that is not already subject to point source permits described previously. This applies to residential and commercial development regardless of whether the development is inside a defined, incorporated municipality. Incorporated areas are the responsibility of city government and the citizens within the particular city. Unincorporated areas are the responsibility of Union County and the citizens living within those areas. The ability of the responsible local government to address some of the management measures suggested will vary depending on staffing levels and applicable ordinances.

The effect of "urban" sources on water quality have been well documented in a number of sources including the Nationwide Urban Runoff Program. When land is developed for residential or commercial use pervious spaces, that would absorb precipitation, are converted into impervious surfaces resulting in increased runoff and pollutant loads (EPA, 1993). While development may enhance the use of property, it also changes the physical, chemical and biological characteristics of the land. Vegetation is removed and natural depressions that would temporarily and then slowly release runoff are lost. Also, as population increases or becomes denser there is a corresponding increase in human generated pollution that generally enters surface water without treatment. This pollution includes sediment and nutrients. The purpose of the municipal BMPs is to address and reduce these pollutant loads associated with residential and commercial development.

Only a very small portion of the storm water runoff from the City of La Grande drains directly into the Grande Ronde River. There is a limited amount of water quality data from the City's drainage system. However, periodic concentrations of relatively high measures of TSS, nitrogen, phosphorus and E. coli are known to occur. In addition to the Grande Ronde River, Mill Creek flows year round through the City and supports resident trout and possibly transient steelhead. Taylor Creek and Deal Creek are seasonal creeks in the City. The City's storm water system includes open channels, storm sewers, and drywells. There are no engineered detention structures in the City storm water system; but a small number of privately developed sites have small on-site storm water detention ponds. The City is now in the final stages of updating its Surface Water Master Plan. The City's present practices already include some of the BMPs in the planning, construction and maintenance phases of the Public Works Department. Also, the Public Works Department and the Community Development Department, in their site plan review process for private construction, have required some of the BMPs be incorporated in the private projects.

All runoff from the City of Union drains into Catherine Creek. The only storm sewers in Union are along the downtown portion of Highway 237 (Main Street). The remainder of the City stormwater drains to roadside ditches and periodic swales that ultimately empty into Catherine Creek. There is no drainage system master plan.

The Grande Ronde Valley floor is relatively flat with meandering waterways. Historically, much of the valley floor was wetlands. There is still a significant amount of wetlands but some are small and over time will be hard to maintain. Within limits, wetlands can provide significant water quality benefits. BMPs that are wetlands related might be easier to initiate and complete if the regulatory agencies were better prepared to deal with multipurpose, existing natural, and new engineered wetlands (especially those that involve recreational activities, storm water detention and treatment and supplemental flow from treated municipal wastewater). A local wetlands bank covering this TMDL area could provide significant additional incentives and flexibility for those parties that presently own wetlands, so that these owners might become supporters of local wetland projects.

Evaluation and Revision/Adoption of Relevant City & County Ordinances

Many of the Best Management Practices discussed below are already routinely being implemented and will continue to be. There is a perception, however, that there are remaining municipal source related problems that are not currently being addressed due to either: 1. Lack of knowledge of the problem, 2. Lack of ordinance structure to encourage implementation of the practices, or 3. Lack of funding to address the problem. As a result, one of the most important components of the strategy to address municipal sources is conducting an evaluation and implementation process to insure the BMPs are continued. The City of La Grande and Union County will take the lead in coordinating a review of existing city and county ordinances that relate to NPS pollution (e.g. landuse, building codes, planning, site review, construction, etc, related ordinances). After the review is completed and model ordinances or suggested revisions to existing ordinances are identified, Union County and the City of La Grande will seek to adopt

the recommended changes. Union County will then encourage the smaller cities in the valley to adopt ordinances that can be implemented with the limited staffing of the smaller cities. This review will include the following tasks:

1. Identify the relevant existing ordinances that may affect NPS pollution and, as necessary, identify suggested revisions to improve NPS pollution control. The "local implementation options" identified in the BMP list will be considered when completing this task and task 2. To be completed by June 2000.
2. Identify gaps in coverage of existing ordinances (e.g. are there mechanisms in place to control erosion form construction sites?, to encourage preservation of pervious surfaces and discourage creation of impervious surfaces when new development occurs?, to encourage retention on site of any increased stormwater runoff created by new development?, etc.). Complete by December 2000.
3. Identify model ordinances to address identified gaps. Complete by February 2001.
4. Carry out appropriate process and seek adoption of revisions or new ordinances by the appropriate governing body (County Commissioners or La Grande City Council). Complete by July 2001.
5. Complete the water quality portions of the City of La Grande's Surface Water Management Plan.
6. Oversee implementation of ordinances and encourage adoption of similar measures by smaller cities. 2001 –2005.

Best Management Practices for Urban Sources

Best Management Practices are site-specific applications of management techniques (e.g., stabilize stream banks, grade control, public education, etc.). These activities address site-specific problems and the overall watershed health. They are both structural (requiring construction) and non-structural (not requiring construction). This section is organized into the following three categories based on a project development viewpoint:

Planning Practices
Construction Activities
Maintenance Activities

New projects will go through all these phases whether they are a City or a private project.

Most of the BMPs listed under transportation should also be implemented by the cities but will not be repeated here. The list of BMPs that follows should be viewed as a dynamic list. While these are the practices currently recommended, better new ideas may come along as more people get involved in the process. The list is an abbreviated version of the BMPs identified by the Municipal Work Group. For more details see the Draft Municipal Work Group Water Quality Nonpoint Source Report.

For structural BMPs the two most prominent design criteria are to enhance capture of suspended solids, floating solids, and liquids. It should be relatively easy to properly dispose of the

collected material. Chemical or biological treatment processes are usually required to achieve significant reduction in dissolved pollutant materials in storm water. If the concentrations of relevant dissolved pollutants are not too large, the usual solution is some sort of natural wet process either in an engineered wastewater treatment facility or an engineered wetland. The following is a description of facility types.

PONDS AND MARSHES

a. WET PONDS

Description: Wet ponds appear as a depression that contains a permanent pool, often behind an existing road fill or constructed embankment. Wet ponds are deeper on the average than a wetland and typically larger than a sedimentation pond. Treatment occurs through a variety of natural physical, chemical, and biological processes in the aquatic environment. Since embankments/road fills are usually utilized to establish the ponding, wet ponds are generally deeper at one end (near the embankment) than at the upstream end. They can be on-stream or off-stream with the on-stream type involving simpler, functional operation. They can be conceptualized as being in-between a wetland and a sedimentation pond. Pre-treatment is recommended.

Parameters/Pollutants Potentially Addressed: Nitrogen, suspended sediments, metal, oil and grease (pre-treatment facilities are recommended to avoid oil and grease accumulations), BOD, bacteria and industrial chemicals in some cases (not generally recommended for industrial areas unless lining is provided).

Concept Variations: Ponded wetlands, sedimentation ponds, extended detention ponds and conjunctive use flood detention ponds are all variations of wet ponds. Extended detention ponds or other facilities that remain dry much of the time are the most noticeably different.

Maintenance Requirements: Wet pond maintenance includes periodic sediment removal; debris removal and cleaning particularly from trash racks; vegetation management around, and often within, the pond; periodic checks on hydraulic function; and periodic review of facility condition. During the first three years, maintenance inspection should occur at least quarterly but can be less frequent after three years.

Local Implementation Options: The implementation options include land use regulations which require wet ponds or variations for new developments; regional facilities specified and sized in surface water management/master plans; capital improvement plans; and design-construction standards for both private and public developments. Operation and maintenance programs are required, should be defined during the design and construction process, and should include an adequate budget. If a local jurisdiction has pond and marsh facilities, an integrated maintenance plan is highly recommended.

b. SEDIMENTATION PONDS

Description: During normal dry periods a sedimentation pond is usually a dry depression behind a road fill or constructed berm. Some are designed to provide a permanent, or semi-permanent, pool of water and resemble a wet pond, though they are usually smaller. During storm periods, particularly intermediate level storms, a sedimentation pond is designed to provide a quiescent pool where settling of sediments can occur. During base flow periods, low intensity storms and higher flood flows, sedimentation ponds are not designed to provide much settling. Sedimentation ponds can vary in size from one-fourth of an acre up to twenty or more acres depending on the drainage area served. One of the most common applications is at construction sites during and immediately following construction to intercept soil particles disturbed by the construction. However, they can also serve urban, agricultural or silvicultural areas effectively. In most cases, particularly for industrial and commercial areas, a pre-treatment unit such as an oil-water separator should precede a sedimentation pond and the pond should be lined. A sedimentation pond is similar to a wet pond but typically does not have a permanent pool. It is different from a sedimentation wetland or a ponded wetland because of an absence of, or less, wetland vegetation.

Parameters/Pollutants Potentially Addressed: If designed correctly sedimentation ponds can do an excellent job of removing suspended sediments and associated pollutants such as phosphorus and metals.

Concept Variations: Extended detention ponds are very similar to sedimentation ponds but cover a considerably larger area because of the storage volume needed to reduce peak flood flows. Wet ponds are usually larger but very similar to wet sedimentation ponds. Sedimentation wetlands are wet sedimentation ponds with wetland vegetation to provide additional sediment removal functions.

Maintenance Requirements: Sedimentation ponds require frequent periodic sediment removal, the cleaning and removing of debris, and periodic checks regarding facility condition and hydraulic function. The periodic checks should occur at least twice annually, quarterly is recommended. For new facilities, or the ones with high sediment loads, monthly inspections are advisable. Sedimentation ponds during the first few years of operation should be maintained two or three times per year and more often if construction areas are being served. After construction, or after the first two or three years some sedimentation ponds can be maintained on an annual basis and this should generally be done during the late spring or early fall depending on drainage area characteristics and runoff conditions.

Local Implementation Options: The primary local implementation options involve land use regulations, storm water management/master plans, capital improvement plans for public regional facilities and design-construction standards. An operation and maintenance (O&M) program for each facility is needed. If very many facilities are involved an integrated O&M plan should be developed.

c. CONSTRUCTED MARSH-WETLAND TREATMENT

Description: A well designed marsh-wetland treatment facility should look very much like a natural wetland. A forebay or pretreatment unit is necessary to help protect the wetland from excessive sediment loads and other pollutants. The edges and much of the shallow area support wetland vegetation and the center area is typically open water during much of the year. Size may range from less than half an acre up to thirty or more acres. Such facilities are generally used as regional facilities to serve developed urban or commercial areas. Construction areas normally contribute excessive sediment loadings to wetlands, and industrial runoff may contaminate the wetland and present difficult maintenance and disposal problems. Marsh wetland facilities are usually larger and shallower than wet ponds that serve a similar-sized drainage area, and have a permanent or seasonal water surface in contrast to sedimentation ponds, which are dry.

Parameters/Pollutants Potentially Addressed: Marsh-wetlands can remove several pollutants from stormwater, particularly those involving or attached to suspended sediments. Such facilities do a good job of removal of nitrogen, metals, BOD, bacterial and, if infiltration or soil sorption is involved, phosphorus. Oil and grease can also be effectively removed but can contaminate the wetland. Facilities should include a pre-treatment unit such as an oil-water separator. Industrial, agricultural and silvicultural chemicals can also be removed by wetlands, but wetland contamination, groundwater problems, and maintenance/disposal difficulties may result.

Concept Variations: Marsh-wetland facilities are very similar to wet ponds and can be integrated into conjunctive use flood detention ponds.

Maintenance Requirements: Maintenance requirements are relatively high and involve periodic sediment removal, debris removal, management of aquatic, riparian and landscape vegetation, and periodic reviews of the hydraulic function and facility condition. During the first three years, wetlands should be maintained quarterly with the frequency reduced after the first three years, if justified.

Local Implementation Options: Comprehensive plans can include regional wetland facilities and land use regulations can address the use of constructed wetlands in developing areas. A more detailed presentation of regional wetlands can be made in surface water management/master plans. Such facilities should also be included in capital improvement plans. Design and construction standards and operation and maintenance programs are required because of the complexity of this type of control measure.

d. EXTENDED DETENTION PONDS

Description: Extended detention ponds look very much like sedimentation ponds with the most notable difference being size. Detention ponds are usually larger, in some cases much larger, due to the area required to contain the flood water volume. The size of a detention pond is directly related to the magnitude of the design flood. During low intensity storm events, the lower part of an extended detention pond fills and provides for quiescent settling of sediments. During high flows a much larger area would be inundated. The ponds will reduce peak flows

and provide flood damage reductions. Extended detention ponds are generally regional public facilities serving relatively large areas since the complex design and O&M requirements are usually more involved than that justified for private construction. However, large planned unit developments may include extended detention ponds. While dry, extended detention pond areas can be used for recreational purposes such as picnicking.

Paramenters/Pollutants Potentially Addressed: The primary parameter involved is suspended sediments and attached pollutants such as phosphorus and metals.

Concept Variations: Extended detention ponds are very similar to sedimentation ponds.

Maintenance Requirements: Sediment removal, debris removal and cleaning, vegetation management and a periodic check of hydraulic function and facility condition are all required during maintenance. The frequency should be three or four times annually during the first two years and adjusted according to experience thereafter. Most extended detention ponds will require at least an annual maintenance under even the best conditions.

Local Implementation Options: The primary implementation options are surface water management/master plans and capital improvements plans since most facilities are regional and public in nature. They should be designated in a community's comprehensive plan and considered for new developments where appropriate through land use regulations. Design-construction standards are required since the facilities are moderately complex and the facilities should be integrated into the O&M work program.

e. COJUNCTIVE USE FLOOD DETENTION PONDS

Description: A conjunctive use flood detention pond is similar to an extended detention pond, but instead of a sedimentation pool for low intensity storms, a wetland treatment area is included in the lower portion of the site. It appears as a wetland behind a road fill or constructed berm with a relatively large normally dry area surrounding the wetland. It is the most complex type of runoff facility presented in this guidebook and in most cases such facilities are public and regional in nature. A well designed conjunctive use flood detention pond will be the largest type of pond-marsh facility due to the combination of the area required for flood detention with permanent wetland functions. A pre-treatment unit is recommended.

Paramenters/Pollutants Potentially Addressed: Suspended sediments and the associated pollutants such as phosphorus and metals are addressed with conjunctive use flood detention ponds. Some of nitrogen can be removed and BOD and bacteria should be reduced. Oil and grease is addressed, but such loading should be minimized by pre-treatment through an oil-water separator.

Concept Variations: An extended detention pond is similar but does not involve a wetland or permanent pool in the lower portion. The detention area will appear as a wetland, but will have a larger publicly owned area surrounding it to provide for the flood detention function.

Maintenance Requirements: These facilities require sediment and debris removal; cleaning; management of wetland, riparian, and landscape vegetation; and frequent checks on hydraulic function and facility condition. During the first three years, such facilities should be monitored. It may be necessary to generally maintain them on a quarterly basis during this period. Maintenance frequency can be reduced after the first three years based on actual facility experience.

Local Implementation Options: Since these facilities are large and complex and usually constructed by public agencies they should be identified in the jurisdiction's comprehensive plan and originate in surface water management/master plans. Capital improvement plans and budgets are also necessary as well as design and construction standards. Of all the facilities discussed, an integrated O&M plan and program are more important for this type of facility than any other.

PLANNING PRACTICES

For a city the Planning Phase begins with project conceptualization through the completion of design drawings, specifications, and administrative and contract documents. In the planning process the on-site activities involved need to be defined along with the types of materials handled so that a list of potential solid, liquid and gaseous wastes can be identified.

Herein, we are assuming that proper project analysis and design have been performed to adequately address on-site provisions for material handling and transportation off-site following the existing laws and guidelines. Storm water measures deal with accidents or short term departures from normal material handling procedures and for the normal range of residual materials that may enter the local waterways as a result of transport off-site via storm water runoff.

The basic premise posed to all activities is: Does the activity have potential to pollute a receiving stream? If yes: The answers to the following questions will help to define the criteria for an acceptable remedy (BMP).

What activity is to be performed?

How does it affect receiving waters?

a. runoff b. siltation c. pollutants

Solutions to minimize impacts. What tools do we need?

a. training/awareness b. erosion control devices c. other

Are practical changes available?

a. timing b. equipment c. other

Reasonable expectation to minimize pollution. How much can we spend?
a. dollars b. time

If the pollution risk is too high, the on-site activities, rather than the storm water design, may need to be modified.

MAINTENANCE PRACTICES

Sanding of roads during adverse winter weather is provided as needed. The material used is a small washed gravel, usually from RD Mac, whose source is river run pit. The total quantity put down in a year is about 300 tons; a maximum might be 800 tons.

The City of La Grande has three street cleaning vehicles. Two can sweep, vacuum and water wash; one can sweep and water wash. By policy, downtown streets are swept at least 18 times per year; in good weather, every other week. Downtown alleys are swept at least once each summer. All other streets that are paved and have curbs are swept at least three times per year. All other paved streets without curbs are cleaned with a water flusher at least once each summer. Current policy for catch basin cleaning is to clean one half of the City's catch basins in each year.

In planning the specific procedures and times for maintenance activities these are some of the criteria to be considered:

Rules and regulations
Safety/impact to roads
Habitat concern: water resources and fish
Seriousness of impact to resources – real vs. perceived
Can it be implemented? a. practicality b. acceptance c. political
Cost effectiveness: a. resources b. pollutant reduction/removal
Location (jurisdictional)
Geography (topography, terrain, water bodies)
Weather

ASSESSMENT PROCESS FOR MAINTENANCE STAFF

The assessment process was developed for maintenance staff to follow when there are sensitive situations or locations involved with the activities being performed. The recommendations in this document are to be used as a guide and implemented when the activity may affect water quality or riparian habitat.

Assess situation and consider:

Topography: streams, drainage channel, wetland, pond, stability of slopes.
Materials: what is being used, amount involved, will material have an impact (turbidity, leaching)

Location for disposal of materials
Type of lands or resources affected:
Natural waters vs. drainage facility
What bodies of water could be affected (downstream)?
Is wildlife present? Will habitat be affected?
Do other agencies have interests or concerns?
Contact and consult with appropriate staff .
Proceed if directed using any input from agencies.
Review project. Gather information from on-site crew.

CONSTRUCTION ACTIVITIES

Present State and Federal Law requires all construction projects on a site over five acres to have an approved Erosion Control Plan. Information available on the EPA Phase II Storm Water Program indicates that the site size limit will be reduced to one acre. The City of La Grande and Union will incorporate into their construction permitting process the requirement for a contractor to demonstrate that he has submitted an Erosion Control Plan to DEQ for their approval before his construction activity can effect a site larger than the current State size limit.

The City employees involved with field checking the conformance of construction with standard required permits will be trained to monitor the construction site Erosion Control Plan measures and performance. Some cases of poor housekeeping of materials (for example, non-pollutants) can be handled under a City's nuisance control authority.

3.2.3 Forestry Sources

Federal Forest Lands

All management activities on federal lands managed by the U.S. Forest Service (USFS) in the Upper Grande Ronde Subbasin must follow standards and guidelines (S&Gs) as listed in the respective Forest Land Use and Management Plans (LRMPs), as amended, for the Wallowa-Whitman and Umatilla National Forests. Additionally, transportation management activities will use Best Management Practices (BMPs) as defined in various Federal and State laws such as the Implementation Plan for 208 (Water Pollution Control Act, PL 92-500, as amended). Specific Stand Management Unit (SMU) Constraints and Mitigation Measures identified in the Wallowa-Whitman NF Watershed Management Handbook are used when various situations are encountered during project layout.

A significant LRMP amendment affecting USFS land management was the implementation of interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California; otherwise known as PACFISH (USFS 1995).

This amendment added further protection to anadromous fish and their habitat following their listing under the Federal Endangered Species Act (ESA).

Other sources of guidance for managing the National Forests are derived from the USFSs obligations under ESA. Because the Forest manages ESA listed species and critical habitat, any activity the Forest authorizes is reviewed by the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), or both. On-going Forest actions and LRMPs are also reviewed by NMFS and/or FWS whenever a new species receives Federal listing status under ESA as in the case of the recent Bulltrout and Steelhead listings (NMFS, FWS 1998). After review of proposed actions, management guidance to the USFS can be either Conservation Recommendations or non-discretionary Terms and Conditions when a Biological Opinion is issued by the regulatory agencies.

A. PACFISH

The PACFISH revision to the National Forest LRMP's provides interim direction for establishment and management of Riparian Habitat Conservation Areas (RHCAs) and S&Gs for Key Watersheds. All National Forest watersheds in the Grande Ronde River Basin have been designated as Key Watersheds. The PACFISH RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by: (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality. Interim buffer widths are described as follows:

1. Fish-bearing streams: Includes the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge; or to the outer edges of the 100-year floodplain; or to the outer edges of riparian vegetation; or to the distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.

2. Permanently flowing non-fish bearing streams: Includes the stream and the areas of the active stream channel of the 100-year flood plain; or a distance equal to the height of one site-potential tree; or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.

3. Ponds, lakes, reservoirs, and wetlands greater than 1 acre: Includes the waterbody and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetlands pond or lake, whichever is greatest.

4. Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: At a minimum, these widths must include: The extent of landslides

and landslide-prone areas; the intermittent stream channel and the area to the top of the inner gorge; the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation; the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree; or 100 feet slope distance, whichever is greatest.

B. Standards and Guidelines

Specific and general S &Gs found in Forest LRMP's, PACFISH, and Biological Opinions are applied to various National Forest management activities such as Timber Management, Roads Management, Range Management, and Fire and Fuels Management and are listed below. Standards and Guidelines for other Forest management activities such as recreation, mining, fisheries restoration, and watershed management can be found in the respective Forest LRMPs (USFS 1990, 1990a) and in PACFISH (USFS 1995). Primary S&Gs listed by management activity include:

Roads Management:

1. For each existing or planned road, meet RMOs and avoid adverse effects on listed anadromous fish by: completing Watershed Analysis or site specific analysis prior to construction of new roads or landings in RHCAs, minimizing road and landing locations ins, initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

a. Road design criteria, elements, and standards that govern construction and reconstruction, road management objectives for each road, criteria that govern road operation, maintenance, and management, requirements for pre-, during-, and post-storm inspections and maintenance, regulation of traffic during wet periods to minimize erosion and sediment delivery and to accomplish other objectives, implementation and effectiveness monitoring plans for road stability, drainage, and erosion control, and mitigation plans for road failures;

b. Avoid sediment delivery to streams from road surfaces; outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe, route road drainage away from potentially unstable stream channels, fills and hillslopes. Avoiding disruption of natural flow paths; and

c. Avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in watersheds containing designated critical habitat for listed anadromous fish.

2. Determine the influence of each road on the RMOS. Meet RMOs and avoid adverse effects on listed anadromous fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of RMOS, or do not protect designated critical habitat for listed anadromous fish from increased sedimentation;

b. Prioritize reconstruction based on current and potential damage to listed anadromous fish and their designated critical habitat, the ecological value of the riparian area affected, and the feasibility of options such as helicopter logging and road relocation out of RHCAs;

c. Close and stabilize or obliterate- and stabilize roads not needed for future management. Prioritize these actions based on the current and potential damage to listed anadromous fish and their designated critical habitat, and the ecological value of the riparian resources affected; and

d. Construct new, and improve existing culverts bridges, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions.

e. Design, construct, operate, and maintain roads and trails of the forest transportation system based on resource objectives and intended uses, considering safety, total cost of transportation and impacts on the land.

f. Reestablish vegetative cover on obliterated roads by natural processes, where possible, or supplement by such means as scarifying, ditching, contouring, and seeding.

g. Design and maintain road drainage to prevent the influx of significant amounts of road sediment runoff into streams.

h. Avoid the use of heavy equipment within riparian ecosystems. when such use is unavoidable the activity will include mitigation measures designed to minimized adverse effects on the riparian zone and downstream values. Ground disturbing activities will normally be limited to 10% exposed soil or less within riparian ecosystems.

i. Protect water quality in all aspects of road and trail system management. Use practices, which will avoid or minimize sediment production from new road construction and will correct existing sediment sources.

j. Road drainage should be discharged where sediment can settle out before reaching a stream channel.

k. Road closure objectives include closures to prevent casual use in order to minimize sediment production and to effectively mitigate past impacts in order to put the area back into vegetative production.

l. The Biological Opinion (NMFS 1995) states that PACFISH guidelines for road management generally were adequate. Guidelines prioritize road restoration and management actions for Priority watersheds.

m. For proposed/new roads, where road density is greater than 2 miles/square mile in Priority Watersheds, the USFS should reduce road mileage and emphasize road closure, obliteration, and revegetation. (NMFS 1995).

n. For ongoing road development actions, the USFS should demonstrate that new roads are being offset by concomitant reductions in road mileage and road restoration in Priority Watersheds. (NMFS 1995).

o. Road Management Plans and Transportation Management Plans required by the interim PACFISH guidance should be completed and implemented in Priority Watersheds as soon as feasible. The status of these plans, schedules for completion, and effects of not completing these plans should be analyzed and described in the ElSs for ecosystem management. The ElSs should include a strategy for completing these plans. (NMFS 1995).

Timber Management:

1. Prohibit timber harvest or fuelwood cutting in RHCAs, except as described (see below). Do not include RHCAs in the land base used to determine the allowable sale quantity (ASQ), but any volume harvested can contribute to the timber sale program (USFS 1995). Exceptions to harvesting timber in RHCAs include:

- Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in RHCAs only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other riparian management objectives (RMOs), and where adverse effects on listed anadromous fish can be avoided. For watersheds with listed salmon or designated critical habitat, complete a Watershed Analysis prior to salvage cutting in RHCAs (USFS 1995).

- Apply silviculture practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOS, and in a manner that does not retard attainment of RMOs and that avoids adverse effects on listed anadromous fish.

2. Watershed analysis is required (PACFISH) prior to salvage cutting within RHCAs in watersheds with designated critical habitat. If management activities are planned within a Priority Watershed, the NMFS suggests that the potential significance of adverse effects to salmon and their habitat is heightened. Any proposed salvage or silvicultural activities

within RHCAs that pose more than a *de minimis* (the least) risk of adverse effects to listed salmon or critical habitat need to demonstrate clearly that the actions will avoid adverse effects to salmon and their habitat and will not retard or prevent attainment and maintenance of ecological goals and RMOS. Examples of actions that pose more than a *de minimis* risk in RHCAs include: a) machinery-related ground disturbance; b) cutting of live fire-resistant tree species (e.g. ponderosa pine, Douglas western larch and lodgepole pine); c) cutting of any native species of trees or shrubs that are contributing shade to the stream; and d) cutting or removal of any large trees (defined as any tree species older than 150 years or with a diameter at breast height of greater than 20 inches) from RHCAs that could contribute to maintaining or restoring a natural regime of large woody debris recruitment (NMFS 1995).

3. For new/proposed timber sales, it is recommended the USFS should evaluate equivalent clearcut area (ECA) in Priority Watersheds. If the existing ECA exceeds 15% of the potentially forested area, a watershed analysis should be conducted prior to initiating actions that would increase ECA. Actions that would increase ECA should proceed after watershed analysis only if there is low to de minimis risk of adversely affecting fish habitat and if attainment and maintenance of ecological goals and RMOs will not be retarded or prevented. For proposed/new actions, watershed analysis should be conducted prior to reducing RHCA widths in Priority Watersheds (NMFS 1995).

Fire Management

- Design fuel treatment and fire suppression strategies, practices, and actions as not to prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function, listed anadromous fish, or designated critical habitat.

- Design prescribed burn projects and prescriptions to contribute to the attainment of the RMOs.

- Re-establish vegetation following wild fire or management activities where necessary to prevent excessive erosion.

General:

The S&G and BMPs that generally apply to all categories of Forest management include:

- Maintain natural large woody debris, plus tree needed for future supply, to protect or enhance stream channel and bank structure, enhance water quality, and provide structural fish habitat within all Streamside Management Unit (SMU) classes.

- Enhance streambank vegetation and/or large woody debris where it can be effective in improving channel stability of fish habitat.

- Give areas in which water quality or channel stability are being adversely impacted high Priority for treatment to minimize the effects of the impact or to correct the impacting activity.

- Give maintenance of soil productivity and stability priority over uses described or implied in all other management direction, standards, or guidelines.

- Give management and enhancement of water quality**,** protection of watercourses and streamside management units, and fish habitat priority over other uses described or implied in other management standards, or guidelines.

- In all project environmental analyses address the presence of, and the potential impacts to, any wetlands within the project area. Particular attention will be paid to protection of springs during road location, timber sale plans, and range allotment management plans. Adverse impacts to wetlands will be avoided or mitigated.

- Give preferential consideration to resources such as fish, wildlife and vegetation and water that are dependent upon riparian areas over other resources in action within or affecting riparian areas.

- Meet Water Quality Standards for waters of the State of Oregon (Oregon Administrative Rules, Chapter 340-41) through planning, application, and monitoring of BMPs in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.

- Minimize detrimental soil conditions with total acreage impacted (compaction, puddling, displacement, and severe burning) not to exceed 20 percent of the total acreage within the activity area including landings and system roads.

- Down trees that influence or will eventually influence stream channel dynamics should not be removed.

- Acceptable erosion control means only minor deviation from established standards, provided no major or lasting damage is caused to soil or water.

- Equipment shall not be operated when conditions are such that soil and/or water damage will result. Contract provisions must be met. Erosion control work done by the purchaser shall be adjusted by the ground and weather conditions and the need for controlling runoff. Erosion control work shall be kept current.

- Revegetation measures, including grass seeding must be supplemental to other stabilization measures such as mulching, pitting, scarifying, subsoiling, waterbars, and dips. Hold soil in place on constructed roads and prevent silt movement into streams.

Range Management

- Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stock levels, timing of grazing, etc) that retard or prevent attainment of Riparian Management Objectives (RMOs) or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting RMOs and avoiding adverse effects on listed anadromous fish.

- Locate new livestock handling and/or management facilities outside of RHCAs. For existing livestock handling facilities outside RHCAs, assure that facilities do not prevent attainment of RMOs or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met.

- Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of RMOs or adversely affect listed anadromous fish.

- Develop and implement an effectiveness monitoring strategy for all range allotment activities that considers Federally listed fish species (IIT 1999).

Non-Federal Forest Lands

The purpose and goals of Oregon's Water Protection Rules (OAR 629-635-100) include protecting, maintaining, and improving the functions and values of streams, lakes, wetlands, and riparian management areas. Best management practices (BMPs) in the Oregon Forest Practices Act (FPA), including riparian zone protection measures and a host of other measures described below, are the mechanism for meeting State Water Quality Standards (WQS). There is a substantial body of scientific research and monitoring that supports an underlying assumption of the FPA, that maintaining riparian processes and functions is critical for water quality and fish and wildlife habitat. These riparian processes and functions include: Shade for stream temperature and for riparian species; large wood delivery to streams and riparian areas; leaf and other organic matter inputs; riparian microclimate regulation; sediment trapping; soil moisture and temperature maintenance; providing aquatic and riparian species dependent habitat; and nutrient and mineral cycling. Although the draft Upper Grande Ronde TMDL focuses primarily on shade as it affects stream temperature, riparian protection measures under the FPA provide a

broad array of water quality benefits and contribute to meeting water quality standards for other parameters such as sediment, DO, nutrients, and aquatic habitat.

Currently, many streams within the Upper Grande Ronde Sub-basin significantly exceed the WQS for temperature. It is unclear whether the elevated stream temperatures in the sub-basin result from current forestry activities. The proposed Upper Grande Ronde total maximum daily load (TMDL) demonstrates that urban and agriculture areas contribute significantly to stream warming within the subbasin. It is also important to note that historic forest practices such as splash dam activities and the widespread removal of wood from streams continue to influence current stream conditions and temperatures as a function of stream morphology. In addition, current forest practices occur on forestlands that simultaneously support non-forestry land uses that can affect water quality, such as grazing, recreation, and public access roads. With this noted, the TMDL demonstrates that increasing the level of riparian vegetation retained along forested reaches of these streams reduces solar loading, potentially preventing a substantial amount of stream heating. While providing high levels of shade to streams is an important aspect of meeting instream temperature standards it needs to be considered within the context of past management, stream morphology and flows, groundwater influences, site-productivity, insects, fire, and other disturbance mechanisms that vary in time and space across the landscape.

As described below, ODF and DEQ are involved in several statewide efforts to analyze the existing FPA measures and to better define the relationship between the TMDL load allocations and the FPA measures designed to protect water quality. Although the analysis and modeling in the draft TMDL demonstrate that increased levels of shade on many of the forested stream reaches in the sub-basin would decrease solar loading and potentially lower maximum daily stream temperatures, insufficient information exists to determine if specific FPA revisions will be necessary to meet the TMDL load allocations. The information in the TMDL, as well as other monitoring data, will be an important part of the body of information used in determining the adequacy of the FPA.

Forest practices on non-federal land in Oregon are regulated under the FPA and implemented through administrative rules that are administered by the Oregon Department of Forestry (ODF). The Oregon Board of Forestry (BOF), in consultation with the Environmental Quality Commission (EQC), establish BMPs and other rules to ensure that, to the extent practicable, NPS pollution resulting from forest operations does not impair the attainment of water quality standards. With respect to the temperature standard, surface water temperature management plans are required according to OAR 340-041-0026 when temperature criteria are exceeded and the waterbody is designated as water-quality limited under Section 303(d) of the Clean Water Act. In the case of state and private forest lands, OAR 340-041-0120 identifies the FPA rules as the surface water management plan for forestry activities

ODF and DEQ statutes and rules also include provisions for adaptive management that provide for revisions to FPA practices where necessary to meet water quality standards. These provisions are described in ORS 527.710, ORS 527.765, ORS 183.310, OAR 340-041-0026, OAR 629-635-110, and OAR 340-041-0120. Current adaptive management efforts under several

of the above statutes and rules are described in more detail following the discussion below on the roles of the BOF and EQC in developing BMPs that will achieve water quality standards.

ORS 527.765 Best management practices to maintain water quality.

(1) The State Board of Forestry shall establish best management practices and other rules applying to forest practices as necessary to insure that to the maximum extent practicable nonpoint source discharges of pollutants resulting from forest operations on forestlands do not impair the achievement and maintenance of water quality standards established by the Environmental Quality Commission for the waters of the state. Such best management practices shall consist of forest practices rules adopted to prevent or reduce pollution of waters of the state. Factors to be considered by the board in establishing best management practices shall include, where applicable, but not be limited to:

(a) Beneficial uses of waters potentially impacted;
(b) The effects of past forest practices on beneficial uses of water;
(c) Appropriate practices employed by other forest managers;
(d) Technical, economic and institutional feasibility; and
(e) Natural variations in geomorphology and hydrology.

ORS 527.770 Good faith compliance with best management practices not violation of water quality standards; subsequent enforcement of standards.

A forest operator conducting, or in good faith proposing to conduct, operations in accordance with best management practices currently in effect shall not be considered in violation of any water quality standards. When the State Board of Forestry adopts new best management practices and other rules applying to forest operations, such rules shall apply to all current or proposed forest operations upon their effective dates.

There are currently extensive statutes and administrative rules that regulate forest management activities in the Grande Ronde basin that address the key water quality issues of stream temperatures, riparian aquatic functions, and sediment dynamics. The following is a list of specific administrative rules describing the purpose and goals of the FPA towards the achievement and maintenance of water quality standards established by the EQC.

OAR 629-635-100 - Water Protection Rules; Purpose and Goals

(3) The purpose of the water protection rules is to protect, maintain and, where appropriate, improve the functions and values of streams, lakes, wetlands, and riparian management areas. These functions and values include water quality, hydrologic functions, the growing and harvesting of trees, and fish and wildlife resources.

(4) The water protection rules include general vegetation retention prescriptions for streams, lakes and wetlands that apply where current vegetation conditions within the riparian management area have or are likely to develop characteristics of mature forest stands in a "timely manner." Landowners are encouraged to manage stands within riparian management areas in order to grow trees in excess of what must be retained so that the excess may be harvested.

(5) The water protection rules also include alternative vegetation retention prescriptions for streams to allow incentives for operators to actively manage vegetation where existing vegetation

conditions are not likely to develop characteristics of mature conifer forest stands in a "timely manner."
(6) OARs 629-640-400 and 629-645-020 allow an operator to propose site-specific prescriptions for sites where specific evaluation of vegetation within a riparian management area and/or the condition of the water of the state is used to identify the appropriate practices for achieving the vegetation and protection goals.
(7) The overall goal of the water protection rules is to provide resource protection during operations adjacent to and within streams, lakes, wetlands and riparian management areas so that, while continuing to grow and harvest trees, the protection goals for fish, wildlife, and water quality are met.
(a) The protection goal for water quality (as prescribed in ORS 527.765) is to ensure through the described forest practices that, to the maximum extent practicable, non-point source discharges of pollutants resulting from forest operations do not impair the achievement and maintenance of the water quality standards.
(b) The protection goal for fish is to establish and retain vegetation consistent with the vegetation retention objectives described in OAR 629-640-000 (streams), OAR 629-645-000 (significant wetlands), and OAR 629-650-000 (lakes) that will maintain water quality and provide aquatic habitat components and functions such as shade, large woody debris, and nutrients.

OAR 629-640-000 - Vegetation Retention Goals for Streams; Desired Future Conditions
(1) The purpose of this rule is to describe how the vegetation retention measures for streams were determined, their purpose and how the measures are implemented. The vegetation retention requirements for streams described in OAR 629-640-100 through OAR 629-640-400 are designed to produced desired future conditions for the wide range of stand types, channel conditions, and disturbance regimes that exist throughout forestlands in Oregon.

(2) The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, over time, average conditions across the landscape become similar to those of mature streamside stands. Oregon has a tremendous diversity of forest tree species growing along waters of the state and the age of mature streamside stands varies by species. Mature streamside stands are often dominated by conifer trees. For many conifer stands, mature stands occur between 80 and 200 years of stand age. Hardwood stands and some conifer stands may become mature at an earlier age. Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall.

(3) The rule standards for desired future conditions for fish use streams were developed by estimating the conifer basal area for average unmanaged mature streamside stands (at age 120) for each geographic region. This was done by using normal conifer yield tables for the average upland stand in the geographic region, and then adjusting the basal area for the effects of riparian influences on stocking, growth and mortality or by using available streamside stand data for mature stands.

(4) The desired future condition for streamside areas that do not have fish use is to have sufficient streamside vegetation to support the functions and processes that are important to downstream fish use waters and domestic water use and to supplement wildlife habitat across the landscape. Such functions and processes include: maintenance of cool water temperature and other water quality parameters; influences on sediment production and bank stability; additions of nutrients and large conifer organic debris; and provision of snags, cover, and trees for wildlife.

(5) The rule standards for desired future conditions for streams that do not have fish use were developed in a manner similar to fish use streams. In calculating the rule standards, other factors used in developing the desired future condition for large streams without fish use and all medium and small streams included the effects of trees regenerated in the riparian management area during the next rotation and desired levels of instream large woody debris.

(6) For streamside areas where the native tree community would be conifer dominated stands, mature streamside conditions are achieved by retaining a sufficient amount of conifers next to large and medium sized fish use streams at the time of harvest, so that halfway through the next rotation or period between harvest entries, the conifer basal area and density is similar to mature unmanaged conifer stands. In calculating the rule standards, a rotation age of 50 years was assumed for even-aged management and a period between entries of 25 years was assumed for uneven-aged management. The long-term maintenance of streamside conifer stands is likely to require incentives to landowners to manage streamside areas so that conifer reforestation occurs to replace older conifers over time.

(7) Conifer basal area and density targets to produce mature stand conditions over time are outlined in the general vegetation retention prescriptions. In order to ensure compliance with state water quality standards, these rules include requirements to retain all trees within 20 feet and understory vegetation within 10 feet of the high water level of specified channels to provide shade.

(8) For streamside areas where the native tree community would be hardwood dominated stands, mature streamside conditions are achieved by retaining sufficient hardwood trees. As early successional species, the long-term maintenance of hardwood streamside stands will in some cases require managed harvest using site specific vegetation retention prescriptions so that reforestation occurs to replace older trees. In order to ensure compliance with state water quality standards, these rules include requirements in the general vegetation retention prescription to retain all trees within 20 feet and understory vegetation within 10 feet of the high water level of specified channels to provide shade.

(9) In many cases the desired future condition for streams can be achieved by applying the general vegetation retention prescriptions, as described in OAR 629-640-100 and OAR 629-640-200. In other cases, the existing streamside vegetation may be incapable of developing into the future desired conditions in a "timely manner." In this case, the operator can apply an alternative vegetation retention prescription described in OAR 629-640-300 or develop a site specific vegetation retention prescription described in OAR 629-640-400. For the purposes of the water

protection rules, "in a timely manner" means that the trees within the riparian management area will meet or exceed the applicable basal area target or vegetation retention goal during the period of the next harvest entry that would be normal for the site. This will be 50 years for many sites.

(10) Where the native tree community would be conifer dominant stands, but due to historical events the stand has become dominated by hardwoods, in particular, red alder, disturbance is allowed to produce conditions suitable for the re-establishment of conifer. In this and other situations where the existing streamside vegetation is incapable of developing characteristics of a mature streamside stand in a "timely manner," the desired action is to manipulate the streamside area and woody debris levels at the time of harvest (through an alternative vegetation retention prescription or site specific vegetation retention prescription) to attain such characteristics more quickly.

The Water Protection Rules are an important component of the rules that are designed to achieve and maintain water quality standards. The rules identify seven geographic regions and distinguishes between streams, lakes, and wetlands. The rules further distinguish each stream by size and type. Stream size is distinguished as small, medium, or large, based on average annual flow. Stream type is distinguished as fish use, domestic use, or neither.

Generally, no tree harvesting is allowed within 20 feet of all fish bearing, all domestic-use, and all other medium and large streams unless stand restoration is needed. In addition, all snags and downed wood must be retained in every riparian management area. Provisions governing vegetation retention are designed to encourage conifer restoration on riparian forestland that is not currently in the desired conifer condition. Future supplies of conifer on these sites are deemed desirable to support stream functions and to provide fish and wildlife habitat. The rules provide incentives for landowners to place large wood in streams to immediately enhance fish habitat. Other alternatives are provided to address site-specific conditions and large-scale catastrophic events.

The goal for managing riparian forests along fish-use streams is to grow and retain vegetation so that, over time, average conditions across the riparian landscape become similar to those of mature unmanaged riparian stands. This goal is based on the following considerations:

> (1) Mature riparian stands can supply large, persistent woody debris necessary to maintain adequate fish habitat. A shortage of large wood currently exists in streams on non-federal forestlands due to historic practices and a wide distribution of young, second growth forests. For most streams, mature riparian stands are able to provide more of the functions and inputs of large wood than are provided by young second-growth trees.
>
> (2) Historically, riparian forests were periodically disturbed by wildfire, windstorms, floods, and disease. These forests were also impacted by wildlife such as beaver, deer, and elk. These disturbances maintained a forest landscape comprised of riparian stands of all ages ranging from early successional to old growth. At any given time, however, it is likely that a significant proportion of the riparian areas supported forests of mature age

classes. This distribution of mature riparian forests supported a supply of large, persistent woody debris that was important in maintaining quality fish habitat.

The overall goals of the riparian vegetation retention rules along Type N and Type D streams are the following:

- Grow and retain vegetation sufficient to support the functions and processes that are important to downstream waters that have fish;
- Maintain the quality of domestic water; and
- Supplement wildlife habitat across the landscape.

These streams have reduced buffer widths and reduced basal area retention requirements as compared to similar sized Type F streams (Table 1). In the design of the rules this was judged appropriate based on a few assumptions. First, it was assumed that the amount of large wood entering Type N and D channels over time was not as important for maintaining fish populations within a given stream reach. And second, it was assumed that the future stand could provide some level of "functional" wood over time in terms of nutrient inputs and sediment storage. The validity of these assumptions needs to be evaluated over time through monitoring.

Table 1. Riparian Management Area widths for streams of various sizes and beneficial uses (OAR 629-635-310).

	Type F	**Type D**	**Type N**
LARGE	100 feet	70 feet	70 feet
MEDIUM	70 feet	50 feet	50 feet
SMALL	50 feet	20 feet	Apply specified water quality protection measures, and see OAR 629-640-200

For all streams that require an RMA, basal area targets are established that are used for any type of management within the RMA. These targets were determined based on the data that was available at the time, with the expectation that these targets could be achieved on the ground. There is also a minimum tree number requirement of 40 trees per 1000 feet along large streams (11-inch minimum diameter at breast height), and 30 trees per 1000 feet along medium streams (8-inch minimum diameter at breast height). The specific levels of large wood inputs that the rules are designed to achieve are based on the stream size and type. The biological and physical characteristics specific to a given stream are taken into account in determining the quantity and quality of large wood that is functional for that stream. Given the potential large wood that is functional for a given stream, a combination of basal area targets, minimum tree retention, buffer widths, and future regenerated stands and ingrowth are used to achieve the appropriate large wood inputs and effective shade for a given stream.

The expectation is that these vegetation retention standards will be sufficient towards maintaining stream temperatures that are within the range of natural variability. In the design of

the Water Protection Rules shade data was gathered for 40 small non-fish-bearing streams to determine the shade recovery rates after harvesting. One to two years after harvest, 55 percent of these streams were at or above pre-harvest shade levels due to understory vegetation regrowth. Most of these streams had a bankfull width averaging less than six feet, and most shade was provided by shrubs and grasses within 10 feet of the bank. Since 1991 there has also been a 120-acre limit on a single clearcut size, which is likely to result in a scattering of harvested area across a watershed over time. In the development of the rules it was assumed that this combined with the relative rapid shade recovery along smaller non-fish-bearing streams would be adequate in protecting stream temperatures and reduce possible cumulative effects. For fish bearing streams it is assumed that a 20-foot no-harvest buffer, combined with the tree retention requirements for the rest of the RMA, will be adequate to maintain shade levels necessary to achieve stream temperature standards. The monitoring program is currently collecting data to test these assumptions, evaluate the effectiveness of the rules, and evaluate whether or not water quality standards for temperature are being achieved.

In terms of sediment issues specific to forest roads, there are BMPs within the FPA specifically designed to regulate road design, construction and maintenance. The bulk of the BMPs are directed at minimizing sediment delivery to channels. The primary goals of the road rules are to: (1) protect the water quality of streams, lakes, and wetlands; (2) protect fish and wildlife habitat; and (3) protect forest productivity.

The Board of Forestry revised several BMPs related to road design when the new Water Protection Rules were adopted in the fall of 1994. Significant changes made to the road construction rules include the following:

- The requirement for operators not to locate roads in riparian management areas, flood plains, or wetlands unless all alternative locations would result in greater resource damage.
- The requirement for operators to design stream crossings to both minimize fill size and minimize excavation of slopes near the channel. A mandatory written plan is required for stream crossing fills over 15 feet deep.
- The requirement to design stream crossing structures for the 50-year flow with no ponding, rather than the 25-year storm with no specification of allowable ponding.
- The requirement that stream crossing structures be passable by juvenile fish as well as adult fish.
- The requirement that fish must be able to access side channels.
- The requirement that stream structures constructed under these rules must be maintained for fish passage.

In determining the location of a new road, operators are required to avoid steep slopes, slides and areas next to channels or in wetlands to the extent possible. Existing roads should be used when possible, and stream crossings should be used only when essential. The design of the road grade must vary to fit the local terrain and the road width must be minimized. The operator must also follow specific guidelines for stream-crossing structures (listed above). Cross-drainage

structures must be designed to divert water away from channels so that runoff intercepted by the road is dispersed onto the hillslope before reaching a channel. The specific method used is up to the operator, but the end result should be the dispersal of water running off of the road and the filtering of fine sediment before the water reaches waters of the state.

Construction and maintenance activities should be done during low water periods and when soils are relatively dry. Excavated materials must be placed where there is minimal risk of those materials entering waters of the state, and erodible surfaces must be stabilized. Landings must be built away from streams, wetlands and steep slopes.

Road maintenance is required on all active and inactive roads. Regardless of when a road was constructed, if the road has been used as part of an active operation after 1972, it is subject to all maintenance requirements within the current rules. Culverts must be kept open, and surface road drainage and adequate filtering of fine sediment must be maintained. If the road surface becomes unstable or if there is a significant risk of sediment running off of the road surface and entering the stream, road activity must be halted and the erodible area must be stabilized. Abandoned roads constructed prior to 1972 and not used for forest management since that time are not subject to Forest Practices regulatory authority.

All roads in use since 1972 must either be maintained or vacated by the operator. Vacated roads must be effectively barricaded and self-maintaining, in terms of diverting water away from streams and off of the former road surface, where erosion will remain unlikely. Methods for vacating roads include pulling stream-crossing fills, pulling steep side cast fills, and cross ditching. It is up to the landowner to choose between vacating a road and maintaining a road. If a road is not vacated, the operator is required to maintain the road under the current rules whether it is active or inactive, however they are not required to bring the design up to current standards outside of the normal maintenance and repair schedule.

The ODF has a monitoring program that is currently coordinating separate projects to monitor the effectiveness of the forest practice rules with regard to landslides, riparian function, stream temperature, chemical applications, sediment from roads, BMP compliance, and shade. The results from some of these projects have been released in the form of final reports and other projects will have final reports available in the spring of 2000, 2001 and beyond.

Voluntary measures are currently being implemented across the state under the Oregon Plan for Salmon and Watersheds (OPSW) to address water quality protection. These measures are designed to supplement the conifer stocking within riparian areas, increase large wood inputs to streams, and provide for additional shade. This is accomplished during harvest operations by (1) placing appropriate sized large wood within streams that meet parameters of gradient, width and existing wood in the channel; and (2) relocating in-unit leave trees in priority areas[2] to maximize

[2] The Executive Order replaced the concept of "core areas" with "priority areas". See (1)(f) of the Executive Order (p.5).

their benefit to salmonids while recognizing operational constraints, other wildlife needs, and specific landowner concerns.

The measures include the following:

ODF 8S: Riparian Conifer Restoration

Forest practice rules have been developed to allow and provide incentives for the restoration of conifer forests along hardwood-dominated RMAs where conifers historically were present. This process enables sites capable of growing conifers to contribute conifer LWD in a timelier manner. This process will be modified to require an additional review process before the implementation of conifer restoration within core areas.

ODF 19S: Additional Conifer Retention along Fish-Bearing Streams in Core Areas

This measure retains more conifers in RMAs by limiting harvest activities to 25 percent of the conifer basal area above the standard target. This measure is only applied to RMAs containing a conifer basal area that is greater than the standard target.

ODF 20S: Limited RMA for Small Type N Streams in Core Areas

This measure provides limited 20 foot RMAs along all perennial or intermittent small Type N streams for the purpose of retaining snags and downed wood.

ODF 21S: Active Placement of large wood during Forest Operations

This measure provides a more aggressive and comprehensive program for placing large wood in streams currently deficient of large wood. Placement of large wood is accomplished following existing ODF/ODFW placement guidelines and determining the need for large wood placement is based upon a site-specific stream survey.

ODF 22S: 25 Percent In-unit Leave Tree Placement and Additional Voluntary Retention

This measure has one non-voluntary component and two voluntary components:

1) The State Forester, under statutory authority, will direct operators to place 25 percent of in-unit leave trees in or adjacent to riparian management areas on Type F and D streams.
2) The operator voluntarily locates the additional 75 percent in-unit leave trees along Type N, D or F streams, and
3) The State Forester requests the conifer component be increased to 75 percent from 50 percent.

ODF 61S: Analysis of "Rack" Concept for Debris Flows

OFIC members will conduct surveys to determine the feasibility and value of retaining trees along small type N streams with a high probability of debris flow in a "rack" just above the confluence with a Type F stream. The rack would extend from the RMA along the Type F stream up the Type N stream some distance for the purpose of retaining trees that have a high likelihood of delivery to the Type F stream.

ODF 62S: Voluntary No-Harvest Riparian Management Areas

Establishes a system to report and track, on a site-specific basis, when landowners voluntarily take the opportunity to retain no-harvest RMAs.

The voluntary management measures are implemented within priority areas. Several of the measures utilize in-unit leave trees and are applied in a "menu" approach to the extent in-unit leave trees are available to maximize their value to the restoration of salmonid habitat. The choice of menu measures is at the discretion of the landowner, but one or more of the measures is selected.

The measures can be described as either active restoration measures, or passive restoration measures that provide long-term large wood recruitment. Voluntary measures ODF 8S and 21S are active restoration activities. ODF 8 restores hardwood-dominated riparian areas back to a conifer-dominated condition, where appropriate, using a site-specific plan. Site-specific plans require additional consultation with the ODFW to minimize potential damage to the resource. They often result in conditions that are more protective of the resources than would occur without the site-specific plan. ODF 21S addresses large wood placement if stream surveys determine there is a need. Measures ODF 19S, 20S, 22S, and 62S provide future large wood recruitment through additional riparian protection. This additional protection is accomplished by retaining in-unit leave trees, snags, and downed wood within and along RMAs, and by changing the ratio of in-unit leave trees to 75 percent conifer.

The following application priority has been developed for OPSW voluntary measures for harvest units containing more than one stream type. The list establishes the general priority for placement of in-unit leave trees.

1) Small and medium Type F streams.
2) Non-fish bearing streams (Type D or Type N), especially small low-order headwater stream channels, that may affect downstream water temperatures and the supply of large wood in priority area streams.
3) Streams identified as having a water temperature problem in the DEQ 303(d) list of water quality limited waterbodies, or as evidenced by other available water temperature data; especially reaches where the additional trees would increase the level of aquatic shade.
4) Potentially unstable slopes where slope failure could deliver large wood.
5) Large Type F streams, especially where low gradient, wide floodplains exist with multiple, braided meandering channels.
6) Significant wetlands and stream-associated wetlands, especially estuaries and beaver pond complexes, associated with a salmon core area stream.

The Oregon Plan also has voluntary measures addressing sediment issues related to forest roads. Many forest roads built prior to the development of the FPA or prior to the current BMPs continue to pose increased risk to fish habitat. Industrial forest landowners and state forest lands are currently implementing the Road Hazard Identification and Risk Reduction Project, measures

ODF 1S and ODF 2S, to identify risks to salmon from roads and address those risks. The purposes of this project are:

1. Implement a systematic process to identify road-related risks to salmon and steelhead recovery.
2. Establish priorities for problem solution.
3. Implement actions to reduce road related risks.

The Road Hazard Identification and Risk Reduction Project is a major element of the Oregon Plan. The two major field elements of this project are (1) the surveying of roads using the Forest Road Hazard Inventory Protocol, and (2) the repairing of problem sites identified through the protocol. Road repairs conducted as a result of this project include improving fish passage, reducing washout potential, reducing landslide potential, and reducing the delivery of surface erosion to streams.

Roads assessed by this project include all roads on Oregon Forest Industry Council member forestland, plus some other industrial and non-industrial forestland, regardless of when they were constructed. Industrial forest landowners have estimated spending approximately $13 million a year, or $130 million over the next 10 years, on this project for the coastal ESUs alone. However, the effort is not limited to nor bound by this funding estimate. Funding for the implementation for this measure within the other ESUs will be reflective of road problems found.

Under ODF 2S, the State Forest Lands program has spent over $2.5 million during the last biennium (1997-1999) for the restoration of roads, replacement of culverts and other stream crossing structures damaged by the 1996 storm. State Forest Lands are also proposing to spend an additional $2.5 million dollars in each of the next two biennia to improve roads, including stream crossing structures. This effort will upgrade approximately 130 miles of road in each biennium.

In addition to ODF 1S & 2S, there are additional measures under the Oregon Plan that address road management concerns:

ODF 16S - Evaluation of the Adequacy of Fish Passage Criteria: Establish that the criteria and guidelines used for the design of stream crossing structures pass fish as intended under the goal.

ODF 34S - Improve Fish Passage BMPs on Stream Crossing Structures: Ensure that all new stream crossing structures on forestland installed or replaced after the fall of 1994 will pass both adult and juvenile fish upstream and down stream.

Adaptive Management Process

By statute, forest operators conducting operations in accordance with the BMPs are considered to be in compliance with Oregon's water quality standards. The 1994 Water Protection Rules were adopted with the approval of the Environmental Quality Commission as not violating water

quality standards. However, there are several provisions within the FPA and rules that require adaptive management.

The ODF is currently in the process of reviewing the effectiveness of the forest practice rules. In January of this year the Governor of Oregon signed Executive Order no. EO 99-01 that directed the Oregon Board of Forestry, with the assistance of an advisory committee, to determine to what extent changes to forest practices are needed to meet state water quality standards and protect and restore salmonids. The committee is directed to consider both regulatory and non-regulatory approaches to water quality protection. To carry out this charge, an ad hoc advisory committee is in the process of developing four separate issue papers on the following topics:

Fish passage restoration and water classification
Forest roads
Riparian functions
Landslides

The committee represents diverse interests, including environmental, industrial, non-industrial, county, and public advocates. In addition to ODF technical staff, the Oregon Department of Environmental Quality (DEQ) and Oregon Department of Fish and Wildlife (ODFW) have technical staff participating in the process. The committee expects to make recommendations to the Board of Forestry in early 2000. The Board will then consider the recommendations in determining whether revisions to the FPA and additional voluntary approaches are necessary consistent with ORS 527.710.

As the designated management agency (DMA) for water quality management on nonfederal forestlands, the ODF is also working with the DEQ through a memorandum of understanding (MOU) signed in June of 1998. This MOU was designed to improve the coordination between the ODF and the DEQ in evaluating and proposing possible changes to the forest practice rules as part of the Total Maximum Daily Load process. The purpose of the MOU is also to guide coordination between the ODF and DEQ regarding water quality limited streams on the 303d list. An evaluation of rule adequacy will be conducted (also referred to as a "sufficiency analysis") through a water quality parameter by parameter analysis. This statewide demonstration of forest practices rule effectiveness in the protection of water quality will address the following specific parameters and will be conducted in the following order[3]:

1) Temperature (estimated draft report target completion date Fall, 1999)
2) Sediment and turbidity (estimated date Winter, 2000)
3) Aquatic habitat modification (estimated date Fall, 2000)
4) Bio-criteria (estimated date Winter, 2001)
5) Other parameters (estimated date Summer, 2001)

[3] The estimated completion dates listed here differ from those dates listed in the MOU. Due to unforeseen circumstances the DEQ and ODF have agreed to revise the dates.

These sufficiency analyses will be reviewed by peers and other interested parties prior to final release. The analyses will be designed to provide background information and techniques for watershed-based assessments of BMP effectiveness and water quality assessments for watershed with forest and mixed land uses. Once the sufficiency analyses are completed, they will be used as a coarse screen for common elements applicable to each individual TMDL to determine if forest practices are contributing to water quality impairment within a given watershed and to support the adaptive management process.

There may be circumstances unique to a watershed or information generated outside of the statewide sufficiency process that need to be considered to adequately evaluate the effectiveness of the BMPs in meeting water quality standards. Information from the TMDL, ad hoc committee process, ODF Water Protection Rule effectiveness monitoring program, and other relevant sources may address circumstances or issues not addressed by the statewide sufficiency process. This information will also be considered in making the FPA sufficiency determination. ODF and DEQ will share their understanding of whether water quality impairment is due to current forest practices or the long-term legacy of historic forest management practices and/or other practices. The two agencies will then work together and use their determinations to figure out which condition exists (a, b, c, or d in the MOU). The MOU describes the appropriate response depending on which condition exists.

Currently the ODF and DEQ do not have adequate data to make a collective determination on the sufficiency of the current FPA BMPs in meeting water quality standards within the Upper Grande Ronde Sub-basin. This situation most closely resembles the scenario described under condition c of the ODF/DEQ MOU. Therefore, the current BMPs will remain as the forestry component of the TMDL. The draft version of statewide sufficiency analysis for temperature will be completed in Fall 1999. The proposed Upper Grande Ronde TMDL will be completed in Winter 1999. Data from an ODF/DEQ shade study will be collected over the summer of 1999 and a final report will be completed by the Spring of 2000. The final report for ODF's Water Protection Rules effectiveness monitoring program will be completed by March 2000. Information from the ad hoc committee advisory process may be available by late 1999/early 2000. Information from these efforts, along with other relevant information provided by the DEQ and ODF, will be considered in reaching a determination on whether the existing FPA BMPs meet water quality standards within the Upper Grande Ronde Sub-basin. By the Spring of 2000 ODF and DEQ will either make a collective determination on FPA adequacy for the Upper Grande Ronde Sub-basin, or if data is still inconclusive, ODF will design and implement a specific monitoring program as part of the basin plan under a schedule and scope jointly agreed to by ODF and DEQ. A collective determination on FPA adequacy would then be made upon completion of the specific monitoring program.

The above adaptive management process may result in findings that indicate changes are needed to the current forest practice rules to protect water quality. Any rule making that occurs must comply with the standards articulated under ORS 527.714(5). This statute requires, among other things, that regulatory and non-regulatory alternatives have been considered and that the benefits

provided by a new rule are in proportion to the degree that existing forest practices contribute to the overall resource concern.

3.2.4 Agriculture Sources

Grazing on federal lands is included under Range Management in the Federal Forest Lands section under 3.2.3, Forestry Sources.

Primary responsibility for control of water pollution from agricultural sources is granted to the Oregon Department of Agriculture (ODA) by Senate Bill 1010, the Agricultural Water Quality Act, adopted by the Oregon State Legislature in 1993. The Act provides for the development of a program whereby ODA works with local farmers and ranchers to develop water quality management plans for specific watersheds that have been identified as polluted by agricultural practices. Agricultural Water Quality Management Area (AWQMA) plans are expected to identify problems in the watershed that need to be addressed and outline ways to correct those problems. The AWQMA plans are developed at the local level, reviewed by the State Board of Agriculture, and then implemented by associated Oregon Administrative Rules. The intent is that these plans focus on educational and technical assistance, focused approaches, and flexibility to landowners in addressing agricultural water quality issues. There may be, however, situations that require corrective action. In those cases, when an operator refuses to take action, the law allows ODA to take enforcement action to achieve compliance.

The intent is that the AWQMA plan will meet the needs of the Water Quality Management Plan (WQMP) for TMDL implementation purposes to avoid duplication of effort since the law requires the development of a separate stand-alone plan for agriculture. To meet both requirements, the AWQMA plan must meet the rigor and address the elements and load allocations identified in the TMDL. To facilitate coordination, four members of the Agricultural Water Quality Advisory Committee that developed the AWQMA plan also served on the Grande Ronde Water Quality Committee whose charge was to develop the WQMP for the TMDL.

The AWQMA plan will be incorporated by reference into the Upper Grande Ronde River Subbasin WQMP. The Upper Grande Ronde Water Quality Committee understands that when implementing the AWQMA plan, ODA, the Local Management Agency, and the Union Soil and Water Conservation District acknowledge the goals, priorities, and pollution load allocations identified in the WQMP and will consider those when implementing the AWQMA plan. The DEQ will include the AWQMA as an attachment to the Upper Grande Ronde River Subbasin Plan when the TMDL and WQMP is submitted to EPA for final approval.

The administrative rules implementing AWQMA plans are included in Oregon Administrative Rules (OAR) Chapter 603, Division 90, Agricultural Water Quality Management Program. Rules specific to the Upper Grande Ronde River Subbasin are in OAR 603-095-0400 through

603-095-0480. These rules were adopted in the fall of 1999 prior to the formal establishment of the TMDL and WQMP for the Upper Grande Ronde River Subbasin.

Recognizing the adopted rules need to be quantitatively evaluated in terms of load allocations in the TMDL and pursuant to the June 1998 Memorandum of Agreement between the ODA and DEQ, the agencies will conduct a technical evaluation commencing in early 2000. The agencies will establish the relationship between the plan and its implementing rules and the load allocations in the TMDL to determine if the rules provide reasonable assurance that the TMDLs will be achieved. The AWQMA Local Advisory Committee (LAC) will be apprised and consulted during this evaluation. This adaptive management process provides for review of the AWQMA plan to determine if any changes are needed to the current AWQMA rules specific to the Upper Grande Ronde River Subbasin. The agencies will strive to complete this evaluation by the end of year 2000. The review will be complete in time for the reconvening of the LAC plan and rule evaluation scheduled to begin no later than 2001.

References for Element 3: Management Measures

Anderson Perry & Associates, 1998, City of La Grande, Oregon Wastewater Facilities Plan, Final Draft – Review Copy.

Anderson Perry & Associates, 1998, City of Union, Oregon Wastewater Facilities Plan Update 1997, Revised September 30, 1998.

Draft Municipal Work Group Water Quality Nonpoint Source Report, November 12, 1998.

Draft Transportation Work Group Water Quality Nonpoint Source Report, September 17, 1998.

EPA, 1993, Guidance for Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters, EPA Office of Water, Washington D.C.

Interagency Implementation Team. 1999.
Range ResourcesMonitoring Plan for Effectiveness Monitoring of Aquatic and Riparian Resources within the Range of Bulltrout, Salmon, and Steelhead. Draft revised July 9, 1999.

Memorandum of Understanding Between the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry, April 1998.

National Marine Fisheries Service. 1995.
Biological Opinion for the implementation of interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California (PACFISH).

National Marine Fisheries Service. 1998.
Biological Opinion for the Land and Resource Management Plans for National Forest and Bureau of Land Management Resource Areas in the Upper Columbia River Basin and Snake River Basin Evolutionarily Significant Units.

Memorandum of Agreement between the Oregon Department of Agriculture and the Oregon Department of Environmental Quality, June 1998.

Upper Grande Ronde River Subbasin Agricultural Water Quality Management Plan, Oregon Department of Agriculture, September, 1999.

Oregon Department Of Transportation Maintenance Management System Water Quality And Habitat Guide Best Management Practices, January 1997.

ODF Forest Practice Administrative Rules

Report to the Full Committee, Recommendations & Conclusions Regarding Forestry Issues Affecting Temperature, Sediment, and Habitat in the Grande Ronde Basin, October 27, 1998.

United States Environmental Protection Agency, Rural Roads: Pollution Prevention and Control Measures, September 1992.

Upper Grande Ronde River Subbasin Agricultural Water Quality Management Plan, December 1998, Draft Plan.

USDA Forest Service and USDI BLM. 1995c.
Environmental assessment for implementation of interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California (PACFISH).

U.S. Department of Agriculture, Forest Service. 1990.
Final Environmental Impact Statement. Wallowa-Whitman National Forest Land and Resource Management Plan.

U.S. Department of Agriculture, Forest Service. 1990a.
Final Environmental Impact Statement. Umatilla National Forest Land and Resource Management Plan.

U.S. Fish and Wildlife Service. 1998.
Biological Opinion for the Effects to Bulltrout From Continued Implementation of Land and Resource Management Plans and Resource Management Plans as Amended by the Interim Strategy for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada (Infish) and the Interim Strategy for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). U.S. Fish and Wildlife Service, Regions 1 and 4, Portland, OR and Denver, CO.

Element 4: Timeline for Implementation

The purpose of this element is to provide a chronological list of actions that will take place during the implementation of this plan. Each of these activities are discussed in more detail elsewhere in the document. The table below lists the completion date, activity to be completed, responsible organization and a reference to additional information elsewhere in the plan. In many cases the organization listed under "Responsibility" in the table is not the only organization with responsibility for implementing the activity, but is the lead or primary agency. Many activities are on going. They do not have specific completion dates but will continue to be implemented throughout the life of the plan. These are listed in a separate table following the timeline table.

It is the intent in implementing this Water Quality Management Plan that each of the activities identified in this timeline will be carried out in a way that acknowledges and considers the plan priorities identified at the end of Element 1: Condition Assessment and Problem Description, Priorities (beginning on page 24). As stated in Element 1, setting management and geographic priorities helps direct limited resources to the most important project types and locations. This will lead to changes in management practices that are having the most impact on watershed health and will do so in the most critical subwatersheds first. Numerous studies and assessments carried out over the past decade have repeatedly identified similar priorities. Keeping a strong focus on those priorities will help to insure that the implementation of the plan will result in the desired improving trend in water quality in the most timely and efficient manner possible. This means that, to the extent that resources allow, the activities identified below will focus on the management categories and geographic priorities identified in Element 1. . For example, when the cities and county "Identify model ordinances to address identified gaps in coverage," (by 2/01) they will do so with reference to the high priority management categories: restore (or protect) riparian vegetation, improve in-stream flow, and improve stream channels. When, for example, assigning priorities for transportation related issues/problems (by 12/00), or implementing solutions to those problems (on-going activity), problems in high priority sub-watersheds will, in general, be addressed ahead of problems in low priority sub-watersheds. As a final example, when implementing the public information/education strategies identified under on-going activities, the responsible agencies should focus their efforts on high priority management categories in high priority watersheds.

Activities with Estimated Completion Dates

Date	Activity	Responsibility	Reference
4/00	Establish committee to address transportation related issues	Union County	Element 3.2.1
4/00	Begin review of relevant City and County Ordinances/Policies	City of La Grande and Union County	Element 3.2.2
Spring /00	Review effectiveness of forest practice rules, statewide, make recommendations to Board of Forestry	Oregon Department of Forestry	Element 3.2.3
Spring /00	Prepare final report from the ODF/DEQ shade study	Oregon Department of Forestry	Element 3.2.3
Spring /00	ODF/DEQ make collective determination of FPA adequacy for Upper Grande Ronde Subbasin, or if inconclusive, design and implement specific monitoring program to resolve questions.	ODF/DEQ	Element 3.2.3
Spring /00	Begin technical evaluation to determine if AWQMA implementing rules provide reasonable assurance that TMDLs will be achieved	ODA/DEQ	Element 3.2.4
6/00	Identify relevant existing City and County ordinances that may affect NPS pollution	City of La Grande and Union County	Element 3.2.2
12/00	Identify gaps in coverage, relevant to water quality, of City and County ordinances	City of La Grande and Union County	Element 3.2.2
01/01	Identify and inventory transportation related “hot spots”	Union County	Element 3.2.1
12/01	Assign priorities for transportation related issues/problems.	Union County	Element 3.2.1
12/00	Complete Design plans and specifications for upgrades of La Grande WWTP	City of La Grande	Element 3.1
12/00	Complete evaluation to determine if AWQMA implementing rules provide reasonable assurance that TMDLs will be achieved	ODA/DEQ	Element 3.2.4
2/01	Identify model ordinances to address identified gaps in coverage	City of La Grande and Union County	Element 3.2.2
12/02	Complete upgrade construction La Grande WWTP, eliminate summer discharge	City of La Grande	Element 3.1
12/02	Complete construction of upgrades to Union WWTP, eliminate summer discharge	City of Union	Element 3.1

On-going Activities

Activity	Responsibility	Reference
Oversee implementation of transportation related solutions	Union County	Element 3.2.1
Encourage & promote use of BMPs for transportation relates sources	Union County	Element 3.2.1
Oversee implementation of ordinances to improve/protect surface water quality. Encourage and assist adoption of similar measures by smaller cities.	City of La Grande and Union County	Element 3.2.2.
Encourage & promote use of BMPs for Urban Sources	City of La Grande and Union County	Element 3.2.1
Insure all forest activities on federal lands comply with standards and guides listed in Wallowa-Whitman N.F. Forest Plan, PACFISH, and BMPs defined in the implementation plan for CWA Section 208	La Grande Ranger Dist. Wallowa-Whitman N.F., Umatilla National Forest	Element 3.2.1, Element 3.2.3, Element 3.2.4
Insure all forest activities on private lands comply with the Oregon Forest Practices Act	Oregon Department of Forestry	Element 3.2.3
Implement monitoring and evaluation program.	USFS, ODFW, Union SWCD, DEQ, WRD, GRMWP	Element 7
Implement Urban Public Information/ Education Strategy	City of La Grande, Union County	Element 8
Implement Forestry Public Information/ Education Strategy	Oregon Department of Forestry	Element 8
Implement Agriculture Public Information/ Education Strategy	Union SWCD, Oregon Department of Ag.	Element 8
Impanel ongoing plan oversight and review committee	Union County	Element 9

Element 5: Identification of Responsible Participants

The purpose of this element of the Upper Grande Ronde Subbasin Water Quality Management Plan is to identify the organizations responsible for the implementation of the plan and to list the major responsibilities of each organization. What follows is a simple list of those organizations and responsibilities. This is not intended to be an exhaustive list of every participant that has some responsibility for improving water quality in the Subbasin. Because this is a community wide effort, a complete listing would have to include every business, every industry, every farm, and ultimately every citizen living or working within the Upper Grande Ronde Subbasin. We are all contributors to the existing quality of the Grande Ronde River and we all must be participants in the efforts to improve the river.

City of La Grande: Implement Wastewater Treatment Plant Upgrades
Control Storm Water Runoff
Review/Revise/Adopt (as necessary) Relevant Ordinances

City of Union: Implement Wastewater Treatment Plant Upgrades
Control Storm Water Runoff
Review/Revise/Adopt (as necessary) Relevant Ordinances

Other Cities in the Subbasin: Encouraged to Control Storm Water Runoff
Review/Revise/Adopt (as necessary) Relevant Ordinances

Union County: Review/Revise/Adopt (as necessary) Relevant Ordinances
Lead Committee to Identify and Prioritize Transportation Solutions.

Union Soil and Water Conservation District: Local Management Agency for SB 1010
Coordinate Water Quality Monitoring
Technical Assistance

Grande Ronde Model Watershed Program: Overall Coordination
Data Base Development and Maintenance
Project Development & Funding Assistance

Confederated Tribes of the Umatilla Indian Reservation: Project Development
Project Implementation

Oregon Department of Environmental Quality: NPDES Permitting and Enforcement
WPCF Permitting and Enforcement
Technical Assistance
Financial Assistance
Work with ODF/ODA on Evaluations

Oregon Department of Agriculture:	Agricultural WQMP Implementation & Enforcement CAFO Permitting and Enforcement Technical Assistance Revise Agricultural WQMAP and implementing rules to clearly address TMDL and Load Allocations as necessary.
Oregon Department of Forestry:	Forest Practices Act Implementation Conservation Reserved Enhancement Program Revise statewide FPA rules and/or Adopt Basin Specific Rules as necessary.
Oregon Department of Transportation:	BMP Implementation – State Highways
Oregon Water Resources Department:	Oregon Water Law Enforcement Technical Assistance
Oregon Department of Fish & Wildlife:	Fish Habitat Enhancement Programs Technical Assistance Financial Assistance
US Environmental Protection Agency:	Technical Assistance Financial Assistance
USDA Forest Service:	Enforce Standards and Guides for Harvest Enforce Standards and Guides for Grazing Enforce Standards and Guides for Roads
USDA Natural Resource Conservation Service:	Technical Assistance
USDA Farm Service Agency:	Financial Assistance

Element 6: Reasonable Assurance of Implementation

6.1 THE OREGON PLAN

The Oregon Plan for Salmon and Watersheds represents a major effort, unique to Oregon, to improve watersheds and restore endangered fish species. The Oregon Plan is a major component of the demonstration of "reasonable assurance" that this Water Quality Management Plan will be implemented.

The Plan consists of four essential elements:

1. Coordinated Agency Programs:
Many state and federal agencies administer laws, policies, and management programs that have an impact on salmon. These agencies are responsible for fishery harvest management, production of hatchery fish, water quality, water quantity, and a wide variety of habitat protection, alteration, and restoration activities. Previously, agencies conducted business independently. Salmon, whose life cycle crosses the jurisdictional boundaries of all of these agencies, suffered. Salmon suffered because they were affected by the actions of all the agencies, but no single agency was responsible for comprehensive, life- cycle management. Under this plan, all government agencies that impact salmon are accountable for coordinated programs in a manner that is consistent with conservation and restoration efforts.

2. Community-Based Action:
Government, alone, cannot conserve and restore salmon across the landscape. The Oregon Plan recognizes that actions to conserve and restore salmon must be worked out by communities and landowners, with local knowledge of problems and ownership in solutions. Watershed councils, soil and water conservation districts, and other grassroots efforts are vehicles for getting the work done. Government programs will provide regulatory and technical support to these efforts, but local people will do the bulk of the work to conserve and restore watersheds. Education is a fundamental part of community based action. People must understand the needs of salmon in order to make informed decisions about how to make changes to their way of life that will accommodate the needs of the fish.

3. Monitoring:
The monitoring program combines an annual appraisal of work accomplished and results achieved. Work plans will be used to determine whether agencies meet their goals as promised. Biological and physical sampling will be conducted to determine whether salmon habitats and populations respond as expected to conservation and restoration efforts.

4. Appropriate Corrective Measures:
The Oregon Plan includes an explicit process for learning from experience, discussing alternative approaches, and making changes to current programs. The Plan emphasizes improving

compliance with existing environmental laws rather than arbitrarily establishing new protective laws. Compliance will be achieved through a combination of education and prioritized enforcement of laws that are expected to yield the greatest benefits for salmon.

In summary, the Oregon Plan involves the following: (1) coordination of effort by all parties, (2) development of action plans with relevance and ownership at the local level, (3) monitoring progress, and (4) making appropriate corrective changes in the future. The following table identifies specific elements of the Oregon Plan, and the responsible agencies, that are directly relevant to the implementation of the Upper Grande Ronde Subbasin WQMP. An X indicates that the water quality parameter associated with that column is addressed by the Oregon Plan Objective associated with that row. (Note: The initials that proceed the objective identify the responsible agency. For example: ODA2 – Implementation of CAFO Program, means that the Oregon Department of Agriculture (ODA) is responsible for implementing a confined animal feeding operation (CAFO) program. Acronyms are defined at the front of the this document beginning on page 4.)

Oregon Plan Objective ↓	Water Quality Parameters Addressed						
	Temperature	Sediment	Habitat Modification[1]	pH[2]	Flow	Dissolved Oxygen	Bacteria
ODA1 - Implementation of SB1010 Program	X	X	X	X		X	X
ODA2 - Implementation of CAFO Program		X	X	X		X	X
OEDD7 - Assist Dairy Industry to Reduce Nonpoint Source Pollution		X	X	X		X	X
DEQ1S - Implementation of Recently Revised Water Quality Standards for Temperature, Dissolved Oxygen, and Sedimentation	X	X				X	
DEQ2S - Development of 303(d) List and Identification of Priorities for TMDL Development	X	X	X	X	X	X	X
DEQ3S - Watershed Council Support	X	X	X	X	X	X	X
DEQ4S - Enhanced 401 Certification for Fill and Removal Operations	X	X	X	X	X	X	X
DEQ5S - Revise Water Quality Standard for Sediment		X					
DEQ7S - Apply for Instream Water Rights on Streams with TMDLs	X	X	X	X	X	X	X
DEQ9S - Implement Water Quality Standards for Biological Criteria, Nutrients, Toxics and pH			X	X			
DEQ10S - Develop Water Quality Standards for Wetlands			X	X			
DEQ11S - Revise Water Quality Standards for Nutrients			X	X		X	
DEQ13S - Implementation of SDWA Source Water Protection Program		X		X		X	
DEQ14S - Management of Point Source Discharges through NPDES Permits	X	X	X	X	X	X	X
DEQ15S - Management of Storm Water Discharges through NPDES Permits	X	X	X	X	X	X	X
DEQ16S - Revise SRF Loan Criteria to Help Protect Salmon	X	X	X	X	X	X	X
DEQ17S - Implement On-Site Program to Control Nutrient Loads to Surface Waters				X		X	X
DEQ18S - Implement Groundwater Protection Act to Prevent Adverse Impacts to Salmonid-Bearing Watersheds				X		X	

DEQ31S - 401 Certification of Grazing leases on Federal Lands	X	X	X	X	X	X	X
DEQ32S - Evaluate and Require Mitigation for the Impacts of Dams and Hydroelectric Projects on Water Quality During Re-licensing or Reauthorization	X	X	X	X	X	X	X
DEQ33S - Evaluate and Require Mitigation for the Impacts of Dams and Hydroelectric Projects on Water Quality During Development of TMDLs	X	X	X	X	X	X	X
ODFW IVA3 - Protect Instream Flows	X				X	X	
ODFW IVA8 - Identify Instream Flow Priorities	X				X	X	
ODFW IVB3 - Promote Use of Beavers to Restore Salmonid Habitat			X				
ODF 1S - Road Erosion And Risk Project	X	X	X				
ODF 2S - State Forest Lands Road Erosion And Risk Project	X	X	X				
ODF 3S - Technical And Policy Review Of Rules And Administrative Processes Related To Slope Stability	X	X	X				
ODF 4S - Stream Habitat Assessments			X				
ODF 7S - Fund 7 New Fish Biologists To Provide Technical Assistance For Salmonid Habitat Restoration			X				
ODF 8S - Riparian Hardwood Conversions			X				
ODF 15S - Evaluation Of Road And Timber Harvest Bmps To Minimize Sediment Impacts	X	X					
ODF 18S - Wildlife Tree Placement On State Forest Lands	X		X				
ODF 19S - Additional Conifer Retention Along Fish-Bearing Streams In Core Areas	X		X				
ODF 20S - Limited Rma For Small Type N Streams	X		X				
ODF 21S - Active Placement Of Lwd During Forest Operations			X				
ODF 22S - 25 Percent In-Unit Leave Tree Placement And Additional Voluntary Retention	X		X				
ODF 23S - Bmp Compliance Audit Program	X	X	X				
ODF 24S - State Forest Lands Stream Habitat Assessment And Instream Projects			X				
ODF 25S - Fish Presence/Absence Surveys And Fish Population Surveys	X	X	X				

ODF 27S - Increased Riparian Protection	X	X	X				
ODF 28S - Protection Of Significant Wetlands, Including Estuaries	X	X	X				
ODF 29S - Forest Practice Chemical Protection Rules Increased Buffers	X						
ODF 30S - Large Woody Debris Recruitment Incentives			X				
ODF 31S - Large Woody Debris Placement Guidelines			X				
ODF 32S - Fish Presence Survey (OAR 629-635-200(11))	X	X	X				
ODF 33S - Increase Number Of Streams And Stream Miles Protected	X	X	X				
ODF 34S - Improve Fish Passage Bmps On Stream Crossing Structures			X				
ODF 35S - Increase Design For Larger Flows		X					
ODF 36S - Upgraded Road Construction & Fill Requirements		X					
ODF 37S - Upgraded Skid Trail Construction And Fill		X					
ODF 53S - Oregon Professional Logger Program	X		X				
ODF 61S - Analysis Of "Rack" Concept For Debris Flows		X					
ODF 62S - Voluntary No Harvest In Riparian Management Areas	X	X	X				
DOGAMI1 - Sediment Management at Mine Sites		X					
DOGAMI2 - Mine Operator Assistance to Watershed Councils		X					
DOGAMI3 - Good Mine Operators Award		X					
DOGAMI4 - Best Management Practices Manual		X					
DOGAMI5 - Storm Water Management at Mine Sites		X					
DLCD2 - Riparian Area Technical Assistance	X	X	X				
DLCD4 - Implement New Goal 5 Rules for Riparian and Wetland Protection	X	X	X				
DSL 1 - Update Standard Permit Conditions		X					
DSL 5-8 - Revised General Authorizations	X						
DSL 20 - Revised Standard Waterway Lease			X	X			
OSMB1 - Increase Number of Streams Adopted through Adopt-A-River Program	X						
OSMB2 - Increase Number of Boat Waste Pump-Outs and Dump				X			X

Stations							
ODOT1 - Protection and Replacement of Riparian Vegetation	X						
ODOT2 - Erosion and Sediment Management		X					
ODOT3 - Protection of Aquatic Habitat			X				
ODOT5 - Stream Fertility			X	X			
BLM/USFS1 - Watershed/Habitat Restoration	X	X	X	X		X	
BLM/USFS13 - Hydropower Licensing and Relicensing Coordination	X		X				
BLM/USFS 14- Clean Water Act Section 303 Compliance	X	X	X	X			
USFWS1 - Jobs-in-the-Woods Program	X	X	X	X		X	
USFWS11 - Comments and Prescriptions on Federal Energy Regulatory Commission Hydropower Projects	X		X				
USFWS13 - Review of Dredge and Fill Projects	X	X	X				
USFWS14 - Response to Oil and Hazardous Substances Spills			X				
USFWS15 - Natural Resource Damage Assessment			X				
USFWS23 - Environmental Contaminant Investigations			X				
NOAA-NMFS1 - Habitat Restoration	X	X		X		X	
NOAA-NMFS13 - Hydropower Facilities	X		X				
NOAA-NMFS14 - Non-Hydropower Facilities	X		X				
NOAA-NMFS35 - Hazardous Materials Response & Assessment			X				
EPA6 - Water Quality Standards for Temperature and Total Dissolved Gas	X						

NOTES:

#1 -- The most closely related Oregon Plan parameter is "Biological Condition." Factors for decline in this parameter include habitat degradation and channel modification.

#2 -- The Oregon Plan recognizes that pH problems may be due to factors such as excessive algal growth attributable to excess nutrient loading from point and nonpoint sources. Therefore, Oregon Plan objectives addressing pH generally also address nutrients and/or algal growth, parameters for which six segments are listed in the Upper Grande Ronde Sub-basin. Another Oregon Plan parameter of concern is "Stream Fertility," which refers to problems stemming from either excess or inadequate nutrients. Consequently, for purposes of this table, Oregon Plan objectives addressing Stream Fertility are assumed to relate to nutrients and thus to pH.

6.2 VOLUNTARY MEASURES

There are many voluntary, non-regulatory, watershed improvement programs (activities) that are in place and are helping to address the water quality concerns in the Upper Grande Ronde River Subbasin. Both technical expertise and partial funding are provided through these programs. Examples of activities promoted and accomplished through these programs include: planting of conifers, hardwoods, shrubs, grasses and forbs along streams; relocating legacy roads that may be detrimental to water quality; replacing problem culverts with adequately sized structures, and improvement/ maintenance of legacy roads known to cause water quality problems**.** These activities have been and are being implemented to improve watersheds and enhance water quality. Many of these efforts are helping resolve water quality related legacy issues. The programs addressing these problems include, but are not limited to, the following:

1. Grande Ronde Model Watershed

The mission of the Model Watershed Program is to serve as an example for the establishment of watershed management partnerships among local residents, state and federal agency staffs, and public interest groups concerned with the management of a particular watershed. The central strategy of the approach is based upon the belief that a locally based effort to improve coordination, integration and implementation of existing local, state, and federal programs can effectively protect, enhance, and restore a regional watershed area.

2. Landowner Assistance Programs

A variety of incentive programs are available to landowners in the Upper Grande Ronde River Subbasin. These incentive programs are aimed at improving the health of our watersheds, particularly on private lands. They include technical and financial assistance, provided through a mix of state and federal funding. Local natural resource agencies administer this assistance, including the Oregon Department of Forestry (ODF), the Oregon Department of Fish and Wildlife (ODFW), and the Natural Resource Conservation Service (NRCS). These agencies work with local organizations including the Union Soil and Water Conservation District (USWCD) and the Grande Ronde Model Watershed to provide this assistance.

Field workers from the ODF, ODFW, NRCS, and USWCD, provide technical assistance and advice to individual landowners/operators. These services include on-site evaluation, technical project design, stewardship/conservation plans, and referrals for funding as appropriate.

Financial assistance is provided through a mix of cost-share, tax credit, and grant funded incentive programs designed to improve on-the-ground watershed conditions. Some of these programs, due to source of funds, have specific qualifying factors and priorities.

Cost share programs include the Forestry Incentive Program (FIP), Stewardship Incentive Program (SIP), Environmental Quality Incentives Program (EQIP), and the Wildlife Habitat Incentive Program (WHIP).

The **Forestry Incentive Program (FIP)** provides up to 50% of actual costs for qualifying projects to reforest, treat pre-commercial forest stands, and treat forest fuels. Contact ODF.

The **Stewardship Incentive Program (SIP)** provides up to 75% of actual cost to develop a Stewardship Plan on forestland, or land capable of growing forest species. Once a plan is developed, SIP can provide up to 50% of actual costs for a variety of projects including reforestation, precommercial forest stand and fuel treatment, fish and/or wildlife habitat improvements, soil conservation measures, and riparian and wetland improvements. Contact ODF.

The **Environmental Quality Incentives Program (EQIP)** provides funding for a wide variety of practices to improve watershed conditions on forest, agricultural, and grazing lands. These include stream and riparian area improvements, grazing and water management measures, vegetation improvements, and agricultural practices. Contact NRCS.

The **Wildlife Habitat Improvement Program (WHIP)** provides funding for a variety of practices to improve wildlife habitat, including planting, vegetation management, and other measures. Contact NRCS.

The **Conservation Reserve Program (CRP)** is designed to take highly erodible farm lands out of production to reduce erosion. This is done through a rental payment applied through a 10 year contract with the landowner/operator. Land enrolled in CRP must have permanent cover established, grass or tree/shrub. The establishment of this cover is cost-shared if the landowner/operator chooses. Grazing and agricultural production is prohibited during the 10 year contract. Contact NRCS.

The **Conservation Reserve Enhanced Program (CREP**) is similar to CRP, except it focuses on riparian areas along designated fish-bearing streams. Eligible lands include agricultural and marginal pasture lands. Contracts may run up to 15 years. Cover including trees/shrubs must be established, and is cost-shared at 75%. Rental rates are higher than CRP rates. Contact NRCS or ODF.
The **Forest Resource Trust (FRT**) is a long-term trust program designed to help convert under producing forestland into productive forests. Funding and technical assistance is provided as an investment in the landowner's forest. When the timber is harvested, a percentage of the net revenue is then paid back to the Trust by the landowner. A

landowner may receive up to $100,000 every two years, and up to 100% of reforestation costs. Contact ODF.

State and federal tax credit programs also provide incentives for resource improvement. The **Oregon Reforestation Tax Credit** provides a 30% state income tax credit for reforestation costs on under productive forestlands. Contact ODF.
There is a **10% Federal Income Tax Credit for Reforestation**. Contact individual tax accountant.

Grant funds are available for improvement projects on a competitive basis. Field agency personnel assist landowners in identifying, designing, and submitting eligible projects for these grant funds. Projects are generally submitted through the Grande Ronde Model Watershed, and are reviewed by their technical committee and Board. For private landowners, the recipient and administrator of these grants is generally the Union Soil and Water Conservation District. Grant fund sources include:
Oregon Watershed Enhancement Board (OWEB) which funds watershed improvement projects with state money. This is an important piece in the implementation of Oregon's Salmon Plan. Current and past projects have included road relocation/closure/improvement projects, in-stream structure work, riparian fencing and revegetation, off stream water developments, and other management practices.
Bonneville Power Administration (BPA) funds are federal funds for fish habitat and water quality improvement projects. These have also included projects addressing road conditions, grazing management, in-stream structure, and other tools.
Individual grant sources for special projects have included Forest Health money available through the State and Private arm of the USDA Forest Service.

The Upper Grande Ronde Subbasin has a number of past, current, and proposed projects funded through the assistance programs listed above.

3. Private Lands Forest Network (PLFN).

The Private Lands Forest Network is a non-profit landowner cooperative formed to improve reforestation efforts on private forest and riparian areas. The purpose of the PLFN is: (1) Educate and demonstrate to landowners/managers the benefits of quality reforestation and aforestation. (2) Provide high quality site specific tree seedlings in significant quantities to meet private land owners'/managers' needs. (3) Further enhance current supplies of tree seeds/seedlings by establishing a tree seed bank which would contain a ten year supply of select, high quality seed of both conifer and riparian species needed for future plantings. (4) Provide high quality site specific forest tree seedlings in significant quantities to meet the needs and requirements of the Blue Mountains. (5) Increase the survivability of planted seedlings by providing cold storage facilities, tree planting tools, and instructions on the care and correct planting techniques of those seedlings.

4. Oregon State University Extension Service

OSU Extension Service provides educational opportunities to private landowners on a variety of forest and agriculture related topics; as an example, a session on forest road location, construction and maintenance was recently provided. OSU provides continuing education to operators and landowners on forest management practices and new issues in forestry.

5. Oregon Department of Fish and Wildlife Programs

ODFW has several watershed improvement programs that help maintain or improve water quality. The programs include: streamside fencing that assist in management of livestock to encourage riparian vegetation , provide shrubs and trees for riparian area planting and grass seed for stabilization of disturbed sites, and technical assistance for riparian area and instream projects.

6.3 REGULATORY/STRUCTURED PROGRAMS

There are a variety of structured programs that are either in place or will be put in place to help assure that this Water Quality Management Plan will be implemented. Some of these are traditional regulatory programs such as discharge permit programs for industry. In these cases the pollutants of concern in the Upper Grande Ronde will be considered and the regulation will be carried out as required by federal, state, and local law. Other programs, while structured, are not strictly regulatory (transportation and agricultural programs described below). In these cases local implementing agencies agree to make a good faith effort to implement the program.

1. NPDES and WPCF Permit Programs

The DEQ administers two different types of wastewater permits in implementing Oregon Revised Statute (ORS) 468B.050. Briefly, the statute requires that no person shall discharge waste into waters of the state or operate a waste disposal system without obtaining a permit from the DEQ. Discharge and disposal are terms of art that characterize the means of discarding of waste. Discharge pertains to getting rid of the waste by putting it into some kind of surface water. Disposal pertains to getting rid of the waste by other means, such as evaporation, seepage, or land application, among others.

Consequently, the DEQ administers National Pollutant Discharge Elimination System (NPDES) permits for waste discharge, and Water Pollution Control Facilities (WPCF) permits for waste disposal. The NPDES permit is also a Federal permit, which is

required under the Clean Water Act for discharge of waste into waters of the United States. DEQ has been delegated authority to issue NPDES permits from EPA. The WPCF permit is unique to the State of Oregon. As the permits are renewed they will be revised to insure that all 303(d) related issues are addressed in the permit. The permits for the major discharges and disposers are already being revised to address issues as described in the Management Measures section of this Water Quality Management Plan (Element 3).

2. Transportation

It is anticipated that the management practices for transportation sources identified by the transportation work group will be voluntarily implemented by the responsible agencies. All of those agencies were represented on the work group that identified the practices and actions to be implemented. There is incentive to voluntarily implement the practices not only to improve water quality and protect listed species but also to avoid any additional regulation. In addition to voluntary incentives, there are existing authorities and agreements that are adequate to assure implementation:

The US Forest Service (USFS) is required by federal law to comply with the Clean Water Act and meet Oregon Water Quality Standards on national forests. The Wallowa-Whitman Forest Plan includes implementation of the BMPs identified by the transportation work group.

The Oregon Department of Transportation (ODOT) reviewed its Maintenance Management System in 1997. The review acknowledged the potential of routine maintenance activities to pollute receiving waters and made recommendations for improvements to the current maintenance practices. These recommendations are included in this plan and were adopted by ODOT district managers in the spring of 1997 (the Upper Grande Ronde is included in ODOT District 13). Implementation of these practices is also an integral part of ODOT's efforts in support of the Governor's Oregon Plan for addressing listed fish species and improving watersheds.

The Oregon Forest Practices Act and its implementing rules (OAR 629-625, Road Construction and Maintenance) establish minimum requirements for transportation system maintenance and construction on private forestlands. The Oregon Department of Forestry administers these rules.

The Union County Commissioners will direct the County Public Works Department to implement these BMPs as a matter of policy.

The City of La Grande will endorse the practices identified by the transportation work group.

Private roads on agricultural land will be addressed through the Agricultural Water Quality Management Area Plan that has been adopted into administrative rule by the Oregon Department of Agriculture.

3. Municipal & Rural Residential

Union County and the City of La Grande have both ordinances and policies that are relevant to the implementation of the management practices discussed under Municipal Sources in the Management Measures element of this Water Quality Management Plan. These Ordinances and Policies will be reviewed and revised as described in Element 3.2.2 Municipal Sources.

4. Forestry

The Oregon Department of Forestry (ODF) is the designated management agency for regulation of water quality on nonfederal forestlands. The Board of Forestry has adopted water protection rules, including but not limited to OAR Chapter 629, Divisions 635-660, which describe BMPs for forest operations. These rules are implemented and enforced by ODF and monitored to assure their effectiveness. The Environmental Quality Commission , Board of Forestry, DEQ and ODF have agreed that these pollution control measures will be relied upon to result in achievement of state water quality standards. ODF provides on the ground field administration of the Forest Practices Act. For each administrative rule, guidance is provided to field administrators t insure proper, uniform and consistent application of the Statutes and Rules. The FPA requires penalties, both civil and criminal, for violation of Statutes and Rules. Additionally, whenever a violation occurs the responsible party is obligated to repair damage. For more information see Element 3.2.3, management measures for forestry, non-federal forestlands.

5. Agriculture

The Oregon Department of Agriculture (ODA) has primary responsibility for control of pollution from agricultural sources. This is done through the Agricultural Water Quality Management (AWQM) program authorities granted ODA under Senate Bill 1010 adopted by the Oregon State Legislature in 1993. A plan and rules specific to the Upper Grande Ronde River have been developed and adopted and are now in effect in the sub-bain.

The AWQM Act directs ODA to work with local farmers and ranchers to develop water quality management area plans for specific watersheds that have been identified as violating water quality standards and having agricultural water pollution contributions. The agricultural water quality management area plans are expected to identify problems in the watershed that need to be addressed and outline ways to correct those problems. These water quality management area plans are developed at the local level, reviewed by the State Board of Agriculture, and then adopted into Oregon Administrative Rules. It is the intent that these plans focus on education, technical assistance, and flexibility in

addressing agricultural water quality issues. There may be, however, situations that require corrective action. In those cases when an operator refuses to take action, the law allows ODA to take enforcement action. For more information see Element 3.2.4, management measures for agriculture and Appendix D, Agriculture Water Quality Management Area Plan..

6. Federal Forest Lands

The USDA-Forest Service is required by federal law to comply with the Clean Water Act and to meet Oregon Water Quality Standards. The Wallowa-Whitman and Umatilla Forest Plans as ammended by PACFISH and INFISH include implementation of BMPs and other specific standards and guidelines as part of the structured program in place to insure WQMPs will be implemented.

Element 7: Monitoring and Evaluation

7.1 Purpose

Monitoring will provide information on progress being made toward achieving water quality standards. The information generated by each of the agencies/entities gathering data in the subbasin will be pooled and used to determine whether management actions are having the desired effects or if changes in management actions are needed. If progress is not occurring then the appropriate management agency (ODA, ODF, SWCD, GRMWP Cities, County, USFS) will be contacted with a request for action.
The objectives of this monitoring effort are to demonstrate long-term recovery, better understand natural variability, track implementation of projects and BMPs, and track effectiveness of WQMP implementation. This monitoring and feedback mechanism is a major component of the "reasonable assurance of implementation" for this WQMP.

7.2 Tracking Implementation of the WQMP

Implementation of the plan will be tracked by accounting for the numbers, types, and locations of projects, BMPs, educational activities, or other actions taken to improve or protect water quality. This will be done on an annual basis.

The Grande Ronde Model Watershed Program currently maintains an inventory of restoration projects implemented in the basin. In addition to projects funded through the Model Watershed Program, the inventory also includes projects funded through other sources (OWEB, CWA Section 319, ODFW, NRCS, etc.). As a result, this inventory includes most projects implemented on public land or on private land using public funds. The information is plotted on a GIS map. This inventory will be expanded to include a listing of other activities relevant to the implementation of the WQMP. This will include educational activities and upgrades to point sources. The inventory is updated on an annual basis. For restoration projects funded through the Model Watershed Program, monitoring reports are required annually for five years. So in addition to the project inventory, many projects will have documentation of effectiveness and changes over time. The Model Watershed will continue this activity and make the information available to all agencies/entities involved in the implementation of the WQMP. Likewise, other agencies will make information available to the Model Watershed for inclusion in the inventory.

The agricultural component of this WQMP is the Upper Grande Ronde River Subbasin Agricultural Water Quality Management Area Plan developed by a local agricultural advisory committee under the authority of the ODA and SB1010). To assist with tracking implementation, the ODA or its local management agency will identify the number of farms and, to the extent possible, the number and types of BMPs to address water quality that were implemented during the reporting period. The ODA will also

identify any relevant educational activities that took place during the reporting period. This information will be provided to the Model Watershed Program in a time frame that will allow the information to be added to the project inventory.

The La Grande, Walla Walla, and North Fork John Day Ranger Districts, the ODF, Union County, and the City of La Grande will provide input to the Model Watershed Program to insure relevant projects and activities that occur in their jurisdictions are included in the inventory. This should include education/public outreach activities and status of up-grades to wastewater treatment plants for the Cities of La Grande and Union. The ODFW, DEQ, and OWEB will also provide input to insure projects funded through their sources are included as appropriate.

There may be additional projects, done by private landowners at their own expense, which are beneficial to water quality and therefore relevant to the implementation of this plan and progress toward attainment of standards. Accounting for these activities may be difficult because there is no way to know that they have been implemented unless the landowner voluntarily publicizes the project. An effort will be made however, to let the public know of the effort to inventory beneficial projects so that they can report their projects to the Model Watershed for inclusion in the subbasin project inventory if they so desire.

7.3 Water Quality and Related Parameter Improvements

A number of cooperators currently collect water quality or related data in the Upper Grande Ronde Subbasin. These include: the USFS La Grande Ranger District, ODFW, Union SWCD, DEQ, Oregon Water Resources Department, OSU, BLM, USFS Walla Walla Ranger District. The cooperators monitor to meet a variety of objectives, so site locations and methods will vary over time. A subset of sites will, however, be maintained annually to establish long term records. A few of the DEQ's ambient monitoring sites have been in place for more than 20 years and will be continued. Because of the many cooperators that are active in the subbasin there are hundreds of sites where some level of water quality monitoring is, or has, taken place. What is described in this section is a subset of monitoring efforts that will be maintained over time and will be adequate for demonstrating effectiveness of implementation efforts on a subbasin scale. These are the key sites identified by the agencies for documenting and understanding the long term water quality trends in the Upper Grande Ronde Subbasin.

7.3.1 Temperature

Temperature data is relatively abundant in the Upper Grande Ronde Subbasin. Numerous OSU researchers, agency personnel, and contractors have collected water and air temperature data from numerous sites over the past decade. Most of these data have been collected upstream of the City of La Grande but there is considerable temperature data from the Grande Ronde Valley and in other parts of the subbasin as well. This

information, along with Forward Looking Infrared Radiometry (FLIR) data, is being used to determine baseline information on temperature in the subbasin. Additional temperature data collection will, however, be important in documenting WQMP implementation and project effectiveness as well as better understanding natural temperature variations and establishing long term records.

DEQ began a long term monitoring project in 1994 with funding from the National Nonpoint Source Monitoring program administered by EPA. This program includes air and water temperature monitoring at several sites on tributaries in the Upper Grande Ronde. The project involves the deployment of at least 20 temperature recorders during the summer months of each year. This monitoring will continue for at least five more years under current funding commitments. The tributaries involved are:

McCoy Creek
McIntyre Creek
Dark Canyon Creek
Limber Jim Creek
Lookout Creek

The Union SWCD, in cooperation with the Grande Ronde Model Watershed Program, monitors temperature at a number of sites each summer. Three sites on the mainstem Grande Ronde have been monitored annually since 1995 and it is the intent that these three sites will be continued to establish long term trends. These sites are:

Grande Ronde River at Island City
Grande Ronde River at Hull Lane
Grande Ronde River at Market Lane (beginning 1998)
Grande Ronde River at Rhinehart

The Union SWCD also monitors temperature at five trending sites on Catherine Creek. These are:

Catherine Creek up-stream of Union
Catherine Creek down-stream of Union
Catherine Creek at Davis Dam
Catherine Creek at Hwy 273
Catherine Creek at Market Lane (beginning 1998)

The USFS La Grande Ranger District monitors stream temperature at many sites on national forest lands in the subbasin. Approximately 40 of these sites are located to monitor long term trends by major subwatershed and in particular spawning and rearing streams. Five key sites include continuous stream flow, air temperature, relative humidity and incoming solar radiation as well as stream temperature. These sites are:

Grande Ronde River below Clear Creak near Starkey (Woodley C.G.)
Meadow Creek above Bear Creek near Starkey (in Starkey Exp. Forest)
Meadow Creek below Dark Canyon Creek near Starkey (near mouth)
Five Points Creek at Hilgard (near mouth)
North Fork Catherine Creek near Medical Springs (up-stream of SF)

The ODFW monitors temperature at six sites that are associated with BPA funded fencing projects. These projects have a 15 year monitoring component included in the contract language. The sites are:

Meadow Creek at approximately river mile 10
Meadow Creek at approximately river mile 8
Sheep Creek near F.S. 51 Road (river mile 2.4)
Sheep Creek at river mile 6.7
McCoy Creek near mouth
McCoy Creek below mouth of canyon

Temperature – Shade Component

Stream-side shade is an important indicator of solar radiation load which is a major factor in stream heating. The DEQ has directly monitored shade, using a solar pathfinder, at approximately 50 sites in the Upper Grande Ronde Subbasin during the past six years. Shade at sites included in the National Nonpoint Source Monitoring Project mentioned above are measured annually. The Union SWCD will establish additional shade monitoring sites as resources allow. Shade will be measured at additional indicator sites every five years to track progress toward achieving shade load allocations.

Temperature – Channel Form Component (and habitat modification)

Channel form and stream surface width are important physical factors affecting stream temperature. Channel width (wetted) is commonly measured through the use of channel cross-sections performed during habitat surveys. Baseline information is available from the USFS and ODFW habitat surveys conducted in many of the subwatersheds in the Subbasin. The DEQ routinely collects this kind of information at the sites included in the National Nonpoint Source Monitoring Project. In 1995, as part of the Grande Ronde Cooperative River Basin Study, the Union SWCD and NRCS hired the ODFW to survey private lands in the Grande Ronde Valley. These surveys will be repeated, at least at a subset of indicator reaches, a minimum of once every 10 years (as funding permits) to track changes in channel form. In addition, the USFS has seven long-term channel reference sites designed to study channel morphology and vegetative recovery on the La Grande Ranger District. These same sites will be used to track habitat modification. Standard stream surveys will be conducted on a recurring basis to document changes in channel morphology, large wood, and other factors.

7.3.2 Dissolved Oxygen, pH, and Nutrients

The DEQ maintains three long-term ambient water quality sites in the Upper Grande Ronde Subbasin. Among the parameters routinely measured at these sites are DO, pH, and the nutrients ortho-phosphorus and total inorganic nitrogen (nitrate + nitrite + ammonia). The sites are: Grande Ronde River at Hilgard
Grande Ronde River at Peach Lane
Grande Ronde River at Elgin (Hwy 82 Bridge)

In addition, the DEQ samples for these parameters at the National Nonpoint Source Monitoring Project sites in the upper reaches of the Subbasin.

The Union SWCD monitors DO, pH and nutrients (including ortho-phosphorus and total inorganic nitrogen) at three additional Grande Ronde River sites and four Catherine Creek sites:

Grande Ronde River at Island City
Grande Ronde River at Hull Lane
Grande Ronde River at Rhinehart
Catherine Creek up-stream of Union
Catherine Creek down-stream of Union
Catherine Creek at Davis Dam
Catherine Creek at Hwy 237

7.3.3 Flow

The Oregon Water Resources Department maintains nine stream gauging stations in the Upper Grande Ronde Subbasin:

Grande Ronde River below Clear Creek (Woodley Campground)
Grande Ronde River near Perry
Grande Ronde River near Imbler (Rhinehart)
Meadow Creek above Bear Creek near Starkey (Upper Meadow Creek)
Meadow Creek below Dark Canyon Creek near Starkey (Lower Meadow Creek)
Five Points Creek at Hilgard
North Fork Catherine Creek near Medical Springs (above South Fork confluence)
Catherine Creek up-stream of Union (below State Park)
Catherine Creek at Union (10^{th} Street)

7.4 Quality Assurance/Quality Control/Data Management

The Grande Ronde Model Watershed Program, Union and Wallowa SWCDs, local state and federal agencies, and academic institutions all use data collected in the Upper Grande Ronde Subbasin. Data quality must be known to insure that it is of sufficient quality for its intended use.

In general, data will be gathered and handled in accordance with the *Oregon Plan for Salmon and Watersheds* "Water Quality Monitoring Guide Book". Special projects or other monitoring efforts will be done in accordance with specific quality assurance plans that identify the precision and accuracy of the data collected. Where this information is not available the data will be identified as of unknown quality. For educational demonstration or screening efforts data of lesser quality is sometimes collected and still

has value. Such data can be included in data bases and data summaries but will be flagged and its quality identified.

The Union SWCD, in cooperation with the Grande Ronde Model Watershed, will maintain a database of all water quality data collected in the Upper Grande Ronde Subbasin. Data in the database will be available to all the cooperators and to the public. The cooperators agree to make water quality data collected by their organization available to the Union SWCD for inclusion in the database.

7.5 Reporting/Revision

The Union SWCD, in cooperation with the Grande Ronde Model Watershed, will be responsible for collating and summarizing data and providing copies of data summaries to the other cooperators on an annual basis (by the first of March of the year following the year being reported). Within two weeks of release of the data summary, the monitoring coordinator will convene a water quality advisory committee to discuss any needed revisions in monitoring strategies and coordinate the coming monitoring season activities. The committee will include, at a minimum, representation from the Oregon Department's of Fish & Wildlife, Agriculture, Forestry, and Environmental Quality, USFS La Grande Ranger District, Union SWCD, Grande Ronde Model Watershed Program. Other representation may be included as needed.

On a biannual basis (odd numbered years) the Union SWCD monitoring coordinator will produce a report on the status of water quality in the Upper Grande Ronde Subbasin (as funding allows). This report will be developed in cooperation with the water quality advisory committee described above. The agencies involved in implementing the WQMP will use this report, in conjunction with the project inventories discussed in section 7.2, to adjust the Water Quality Management Plan over time as indicated by monitoring results. The water quality advisory committee will review drafts of the report and consensus on interpretations will be sought prior to producing a final draft of the report. Copies of the final report will be made available to the participating agencies, local media, and the general public.

Element 8: Public Involvement

To be successful at improving water quality a Water Quality Management Plan must include a process to involve interested and affected stakeholders in both the development and the implementation of the plan. This public involvement element of the WQMP first describes how interested stakeholders were provided the opportunity to be involved in the development of the plan. The second section of this element describes a strategy by which the affected agencies/organizations will continue to involve and educate the public during the implementation of the Upper Grande Ronde Subbasin Water Quality Management Plan (WQMP).

8.1 Plan Development

The process that led to the development of this WQMP began in October of 1997 when the Oregon Environmental Quality Commission adopted a rule related to TMDLs in the Upper Grande Ronde Subbasin. The rule, among other things, directed the DEQ to establish a local advisory committee to help develop a process for addressing the known nonpoint source contributions to identified water quality problems (Agenda Item E, October 3, 1997 EQC Meeting). The Grande Ronde Water Quality Committee (GRWQC) was established jointly by the DEQ and the Grande Ronde Model Watershed Program in November of 1997. Membership of the GRWQC is identified in the introduction to this document (page 5) and included representation from affected stakeholder groups and the public. The first meeting was held on December 11, 1997. Since that time more than 25 committee meetings were held. All meetings were open to the public. Meetings were announced in advanced in the La Grande Observer newspaper as well as through direct mailing of meeting notices and agendas to a mailing list of interested persons. Early meetings focused on informing committee members of technical and legal issues. Later meetings were used to keep the committee apprised of the development of the TMDL and load allocations as the analysis progressed and to develop, review, and revise the developing Water Quality Management Plan.

In addition to the regular Advisory Committee meetings, several subcommittees (workgroups) met to develop proposals and recommendations to bring to the full committee. Formal workgroups included transportation, municipal/industrial, forestry, and agriculture. An organizational chart is provided in the introduction to this document (Figure 1, page 9). In addition to the formal workgroups, there were ad hoc technical discussions on specific topics including monitoring, site potential vegetation, prioritization, public involvement, and others. No final decisions were made by either the formal or ad hoc workgroups (with the exception of the agriculture group which legally makes its own decisions and recommendations on agricultural pollution control plans under the Agricultural Water Quality Management Act (SB 1010)). These groups functioned as a forum for people with interest or expertise in particular areas to develop recommendations that were brought back to the GRWQC for consideration.

A formal public comment period and hearing was conducted prior to the adoption, by the Environmental Quality Commission, of the rule that started the process. Details can be found in the staff report: Establish Total Maximum Daily Loads (TMDLs) for the Grande Ronde River and Catherine Creek to Meet Water Quality Standards Including Establishment of In-stream Criteria, Environmental Quality Commission, Agenda Item E, October 3, 1997.

Another formal public comment period and hearing was conducted prior to the finalization of this Water Quality Management Plan and TMDL documents. The public notice and hearings officer report are Appendix E of this document.

8.2 Plan Implementation

As mentioned previously, public awareness and involvement will be crucial to the successful implementation of this plan and resulting improvements in water quality. The tables that follow identify public involvement activities that will take place during the implementation of this Water Quality Management Plan.

The City of La Grande and Union County will likely need to be the lead, or at least very actively involved, on urban, rural residential, and transportation related issues. Out reach to city and county planning and public works staff is important in addition to general public outreach. Because the City of La Grande has far more resources than any of the other towns in the subbasin, La Grande may develop programs and materials (and even management practices) that could be shared with the other cities for their use.

The Department of Forestry, using its connections with the forest industry and small wood lot owners seems the logical lead for forest public involvement on private land (perhaps with the help of forestry extension). The USFS is the obvious lead on federal land.

During the implementation of the adopted Water Quality Management Plan, the Oregon Department of Forestry will lead the public awareness and involvement process involving components of the plan affecting commercial activities on nonfederal forestlands. The two-way communication sought by the department during this phase will have four objectives:

- To clearly explain and exchange information regarding the nonfederal forestland component of the plan in order to build understanding, acceptance, and support for this component;

- To clearly explain and exchange information on the other components of the plan and how other land users are affected;

- To exchange information and encourage cooperative monitoring efforts that can lead to further improvements in the nonfederal forestland component and/or the overall plan in the future;
- To encourage forestry community involvement in future revisions of the nonfederal forestland component.

The primary message conveyed to the forestry community will be that compliance with water quality standards and load allocations during commercial activities on nonfederal forestlands will continue to be achieved through compliance with the best management practices (BMPs) established under the Oregon Forest Practices Act and forest practice rules. Consistent with the DEQ/ODF Memorandum of Understanding, the Act and BMPs may be modified in the future, on either a statewide or watershed-specific basis to better ensure water quality standard compliance. If and when such changes occur, forest landowners and operators will be expected to comply with those revised requirements, as well.

The forestry community will also be encouraged to continue their voluntary efforts, consistent with the Oregon Plan for Salmon and Watersheds, to provide levels of water quality protection above those accomplishments so they can be documented.

The Department of Forestry will continue current programs to educate forest landowners and operators on all elements of the Forest Practices Act. The department will continue to monitor and report on forest practice rule compliance and effectiveness. If forest practice rule modifications are planned, a full public involvement process will be designed. Such processes typically include Eastern Oregon Regional Forest Practice Committee review, other advisory group review, board of Forestry public meetings, interagency coordination, scientific review, informal and formal opportunities for public comment, and feedback from the department on how the public comments were used in the revision process. Such revisions processes will be governed by the rulemaking requirements of the Forest Practices Act and, in particular, ORS 527.714.

The Department of Agriculture, working with its local management agency (Union SWCD), is the logical lead for agriculture (perhaps with the help of ag. Extension.

Urban Water Quality Public Information/Education Strategy

Audience: Citizens of cities and rural residential areas, real estate and development community, city and county public works and ODOT employees in the Subbasin.

Message: The primary message conveyed to citizens will be that everyone is a contributor to the water quality in the subbasin and everyone needs to participate in the efforts to improve water quality. All citizens can participate by using less fertilizer and garden chemicals, washing vehicles on the lawn, keeping wastes of all kinds out of storm drains, drainage ditches, and creeks, and similar measures. Special emphasis will be

given to protection of riparian vegetation, especially retention of trees along the river and urban streams.

The primary message to the real estate and development community will be that the BMPs described under Element 3: Management Measures for municipal sources need to be adhered to during and after construction and development activities. Development should be designed to protect and retain vegetation (esp. trees), minimize impervious surfaces, and retain stormwater on site to the extent possible.

The primary message to public works and Transportation employees will be to emphasize the importance of water quality and the potential effect of their activities on water quality. Adherence to the BMPs for construction and maintenance described in the transportation section of Element 3: Management Measures will be emphasized.

Strategy: City and County mailings, stormdrain stenciling, displays in public places, public service announcements, outreach to city and county planing departments, outreach to city and county public works departments.

Time Frame: Ongoing.

Responsible Party: City of La Grande, Union County

Forestry Public Information/Education Strategy

Audience: Nonfederal forest landowners, operators, and other interested stakeholders

Message: The primary message conveyed to the forestry community will be that compliance with water quality standards and load allocations during commercial activities on nonfederal forestlands will continue to be achieved through compliance with the best management practices (BMPs) established under the Oregon Forest Practices Act and forest practice rules. Consistent with the DEQ/ODF Memorandum of Understanding, the Act and BMPs may be modified in the future, on either a statewide or watershed-specific basis to better ensure water quality standard compliance. If and when such changes occur, forest landowners and operators will be expected to comply with those revised requirements, as well. The forestry community will also be encouraged to continue their voluntary efforts, consistent with the Oregon Plan for Salmon and Watersheds, to provide levels of water quality protection above those accomplishments so they can be documented.

Strategy: Meetings, field consultations, and other direct communications with individual landowners and operators, industrial landowner associations, non-industrial landowner

associations, logger associations, the Eastern Oregon Regional Forest Practice Committee, OSU Forestry Extension, and other interested parties.

Time Frame: Ongoing, with significant increase in both targeted and broad public involvement during periods of rule revision.

Responsible Party: Forest Practices Program Director, ODF

Agriculture Water Quality Public Information/Education Strategy

Audience: Landowners, farmers, ranchers, advisory committee members, general public and schools.

Message: The primary message will be to educate people about what SB 1010 is and how it works, raise awareness of what the prohibited conditions are, what the available solutions are, and where financial and technical assistance is available.

Strategy: Public meetings, hearings, direct mail, newspaper articles, workshops, project tours, public service announcements, presentations at commodity group meetings.

Time Frame: Ongoing.

Responsible Party: ODA, Union SWCD

Element 9: Maintenance of Effort over Time

The purpose of this element of the management plan is to demonstrate a strategy for maintaining the implementation of the water quality management plan and the resulting water quality improvements over the long term.

To insure long term implementation of the Upper Grande Ronde River Subbasin Water Quality Management Plan the Union County Commissioners will impanel an ongoing committee which will meet regularly (at least 1 time per year) to oversee plan implementation, review plan priorities and practices, and encourage public education and involvement. This committee will be made up of private citizens and representatives of the management agencies involved in implementation of the water quality management plan. At a minimum the membership will include:

Watershed Council (Grande Ronde Model Watershed Program)
City of La Grande
Union Soil and Water Conservation District
Union County
Oregon Department of Agriculture
Oregon Department of Forestry
Oregon Department of Environmental Quality
U.S. Forest Service
Public/Citizen

Involvement of other agencies and publics will be involved as needed. These may include ODFW, DSL, Tribes, environmental interests, EPA, industry groups, or others.

The committee's major charge will be to periodically review the entire plan and revise as necessary. This will involve:

1. Review of the activities of the responsible agencies to determine if implementation is occurring as planned. If it is not, determine the reason and revise the plan timeline for implementation as necessary.
2. Promotion of ongoing communication and education among the public on the goals of the plan and on the availability of financial and technical assistance for implementing priority projects.
3. Continuing efforts to encourage adequate technical and financial assistance programs that are active in the subbasin to help implement resource enhancement projects.
4. Continue efforts to explore revised or additional management measures such as flow augmentation.
5. As additional information becomes available, continue to improve and revise cost/benefit estimates.

Element 10: Costs and Funding

The purpose of this section is to describe estimated costs and demonstrate there is sufficient funding available to begin implementation of the WQMP. Another purpose is to identify potential future funding sources for project implementation. There are many natural resource enhancement efforts and programs occurring in the subbasin which are relevant to the goals of the plan that were being implemented prior to the completion of the TMDL and WQMP. These would be ongoing regardless of whether or not this TMDL and WQMP is implemented. For example, the USFS, NRCS, Union SWCD and Grande Ronde Model Watershed were all involved in implementing resource enhancement projects prior to the development of this plan. The ODF was implementing the FPA in the Upper Grande Ronde long before this plan was developed and will continue to do so. So, while the cost of implementing forest practices in the Upper Grande Ronde is important to water quality, these costs are not a direct result of implementation of this plan unless the plan ultimately results in changes to the practices. In the case of agricultural practices, the approach taken in the development of the Agricultural Management Area Plan was to identify conditions that would be prohibited rather than identify practices that would be implemented. This makes it difficult to estimate the costs prior to implementation because we will not know what was implemented until the practices or measures are on the ground.

The discussion that follows focuses on identifiable costs that are related to the implementation of this water quality management plan and documenting that sufficient funding is available and in place to begin implementing the plan.

10.1 Implementation

Costs of constructing wastewater treatment plant upgrades and improving stormwater facilities are estimated at more than 20 million dollars as shown below. These costs will be born by the ratepayers of the Cities of La Grande and Union in the case of the treatment plant upgrades, and by Boise Cascade Corporation for their improvements. Sewer rates in both La Grande and Union will increase by 10 to 25 percent as a result of the treatment plant upgrades (DEQ Fiscal and Economic Impact Statement in Agenda Item E, October 3, 1997 EQC Meeting). The City of La Grande may also have significant costs associated with stormwater management but costs cannot be estimated until the water quality portion of the City's Surface Water Management Plan is completed.

City of La Grande Wastewater Treatment Plant Upgrades	$13,563,000
City of Union Waste Water Treatment Plant Upgrades	$5,480,000
Boise Cascade Particleboard Facility Stormwater Improvements	$480,000
Boise Cascade La Grande Sawmill Stormwater Improvements	$230,000
Boise Cascade Elgin Plywood Plant Stormwater Improvements	$380,000
Total Point Source Costs of Upgrades	$20,133,000

Nonpoint Sources:
Estimating the cost of implementation of the nonpoint source components of the WQMP is more difficult. It is important to recognize that the process of implementing this plan and installing BMPs and restoration projects will continue for decades. Unlike point sources that must fully construct improvements within a few years, it is neither necessary nor possible to identify and secure all of the funding that will be needed to implement all NPS controls identified in the WQMP. It is also important to understand that while there will be costs to individuals who need to install improvements or practices on their own property, the costs of resource enhancement projects are seldom covered by the landowners alone. These kinds of improvements have public as well as private benefits and a share of the costs is often provided through a variety of public funding sources (discussed below). In some instances where an individual declines to correct an identified problem on a voluntary basis an enforcement action could be initiated. Such a situation could result in loss of eligibility for some public funding sources.

Most practices that will need to be implemented in the Upper Grande Ronde Subbasin will be related to riparian vegetation improvement (e.g. planting, fencing, off stream livestock water), bank stability improvements (e.g. planting, rock or log weirs, engineered structures), sediment control from roads, ditches, and fields (e.g. planting, road improvements or closures, ditch maintenance), and flow augmentation (e.g. wetland/wet meadow restoration, off channel storage, water right purchase/lease). Costs of specific projects will vary greatly with location and type of treatment. Rather than estimating a total cost this section attempts to demonstrate that sufficient funds are available to begin the implementation of the NPS components of this plan. Long term continuation of plan implementation will be dependent on future appropriations of funding to a variety of programs.

Transportation related practices will be applied as discussed in Element 3. Specific, localized, road related "hot spots" have not yet been identified, so an accurate estimate of these costs is not possible. It is known that the County, State and USFS all have budgets for road maintenance. These budgets have not grown in recent years and, in fact, have shrunk in some cases. The County estimates that it annually spends about $30,000 dollars in staff time working on Grande Ronde Model Watershed projects and issues that are directly related to the implementation of the transportation component of this plan. Over the past few years, the County has successfully implemented at least seven road related improvement projects using funding provided through the Model Watershed and over $500,000 of in-kind Union County Public Works Department resources. Likewise, the City of La Grande will use existing public works budgets and the USFS will use existing road maintenance budgets to direct resources toward the prioritized road related problems as resources allow. Where existing resources cannot cover the expense of a priority project, the County, City, or USFS will pursue restoration funds in cooperation with the Grande Ronde Model Watershed Program.

As with transportation issues, Union County, the City of La Grande, and the smaller cities in the subbasin plan to conduct the ordinance evaluation and revisions discussed

under municipal sources in Element 3.2.2. This will largely amount to insuring that public works employees use the appropriate management practices in conducting their activities and insuring that appropriate practices are used for new development both during and after construction. This may result in increased development costs. Some other cities in Oregon, facing similar TMDL challenges and needing to implement nonpoint source controls to improve the quality of urban runoff, have established surface water management fees of $3.00 to $4.00 per month in addition to sewer fees.

Direct costs of the federal forestland component of this plan will be born by the USFS and funded through the their appropriations. Union County and industry incur indirect costs as a result of reduced timber harvest and subsequent losses of forest receipts. The USFS has also actively pursued resource enhancement project funding through the Grande Ronde Model Watershed Program and other sources in recent years. These efforts are expected to continue.

As currently written, the private forest land component of this WQMP consists of continued implementation of the existing forest practice rules. This means that at the current time there is no incremental cost to the forest industry on private land. This could change as a result of the "sufficiency analysis" and basin specific evaluation discussed under Non-Federal Forest Lands in Element 3.2.3. Even so, it is important to recognize that the ODF does have on-going costs associated with implementing the FPA in the Upper Grande Ronde Subbasin and the forest industry does have ongoing costs to comply with the regulations. ODF has a block grant through the Grande Ronde Model Watershed Program for enhancing woody debris and other structure in streams in conjunction with forest operations. The program makes use of donated equipment time when the equipment is already in the area for logging purposes. The result is many miles of stream habitat improvement in situations that would have been prohibitively expensive if equipment had to be mobilized specially for the project. It is also important to recognize that the forest industry has voluntarily helped support the Oregon Plan financially. Millions of dollars have been raised some of which comes into the Upper Grande Ronde Subbasin, for enhancement projects, through the Oregon Watershed Enhancement Board. As mentioned previously, while the Agricultural Water Quality Management Area Plan (AWQMAP) and rules represent a new effort to control nonpoint source pollution from agriculture, the approach has been to identify "prohibited conditions" rather than identifying actions that will be taken. Therefore, it is difficult to estimate what the cost of implementation will be. It is recognized that there is undoubtedly an associated cost of implementing the AWQMAP. The section of the AWQMAP titled "Implementation Costs and Funding Sources" simply state, "A variety of funding sources are available to private landowners to assist in implementing water quality enhancing practices." This is followed with a few examples of funding sources. The Union SWCD provides technical assistance to landowners who want to develop voluntary individual farm plans or enhancement projects. The cost of providing this service is approximately $60,000 per year. The Farm Services Agency and the NRCS are very active in providing financial and technical assistance to the agricultural community. Last year the two agencies provided approximately $300,000 in assistance through the Environmental Quality

Incentive Program, Stewardship Incentive Program, and Conservation Reserve Program. It is hoped that this level of funding can be continued. In addition, the Wetland Reserve Program acquired $1.5 million in easements last year.

10.2 Monitoring

The water quality and quantity monitoring effort described in Element 7 is comprised of the key sites identified by the agencies for documenting and understanding the long-term water quality trends in the Upper Grande Ronde Subbasin. This monitoring is already underway and is expected to continue at this level. Annual resources by agency are identified below. These are current budgets. Availability of funding in future years is subject to state and federal appropriations.

Union Soil & Water Conservation District	$70,000
U.S. Forest Service	$95,000
Oregon Water Resources Department	$55,000
Oregon Department of Environmental Quality	$90,000
Total Annual Cost for Monitoring Key Sites	$310,000

10.3 Potential Sources of Project Funding

Funding is essential to implementing projects associated with this water quality management plan or with any natural resource improvement or enhancement effort. There are many sources of public financial assistance that can be tapped into for improving natural resources. Unfortunately finding the source most appropriate to a particular project and then working through the necessary paper work is sometimes a cumbersome process. The Oregon Coordinated Resource Management (CRM) Task Group has complied an annotated list and description of available programs in Oregon: Public Funding Sources For Landowner Assistance, January, 1997, Oregon CRM Task Group. (The list is currently being revised and updated.) A copy of the complete brochure can be obtained from Oregon CRM member agencies which include:

Oregon Department of Forestry (ODF)
Oregon Division of State Lands (DSL)
Oregon Department of Fish & Wildlife (ODFW)
Oregon Department of Water Resources (WRD)
Oregon Department of Agriculture (ODA)
Oregon State University Extension Service
Oregon Association of Conservation Districts (OACD)
USDA Forest Service (USFS)
USDA Natural Resources Conservation Service (NRCS)
USDA Farm Service Agency (FSA)
USDI Bureau of Land Management (BLM)
USDI Fish & Wildlife Service

What follows is a partial listing of assistance programs available in the Upper Grande Ronde Subbasin. For more options, or for more complete information on purpose and eligibility, either call the sponsoring agency or obtain a copy of the annotated listing described above.

Program	Agency	Phone
Grande Ronde Model Watershed Program	GRMWP	541 962-6590
Oregon Watershed Enhancement Board	OWEB	503 378-3589 x 831
Environmental Quality Incentives Program	USDA-NRCS	541 963-4231 x 3
Wetland Reserve Program	USDA-NRCS	541 963-4231 x 3
Conservation Reserve Enhancement Program	USDA-NRCS	541 963-4231 x 3
Stewardship Incentive Program	ODF	541 963-3168
Access & Habitat	ODFW	541 963-2138
Partners for Wildlife Program	USDI-Fish&Wildlife	503 231-6179
Conservation Reserve Program	USDA-FSA	541 963-4231 x 2
Conservation Implementation Grants	ODA	503 986-4700
Water Projects w/ Public Benefits	WRD	503 378-3739
Nonpoint Source Water Quality Control	DEQ	503 229-5279

The following is a list of "organizations" that have cooperated in watershed restoration projects in the Grande Ronde Basin (*from Grande Ronde Model Watershed Program Project Database).*

ID	Organization Name
BCC	Boise Cascade Corp.
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
COE	U.S. Army Corps of Engineers
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTYEL	City of Elgin
CTYLG	City of La Grande
CTYUN	City of Union
DEQ	Dept. of Environmental Quality
DOGAMI	Oregon Dept. of Geology and Mineral Industries
DU	Ducks Unlimited, Inc.
EOARC	Eastern Oregon Agricultural Center

EOU	Eastern Oregon University
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FSA	consolidated Farm Services Administration
GRMWP	Grande Ronde Model Watershed Program
GWEB	Governor's Watershed Enhancement Board
NFF	National Forest Foundation
NFWF	National Fish & Wildlife Foundation
NMFS	National Marine Fisheries Service
NPT	Nez Perce Tribe
NRCS	Natural Resources Conservation Service
NWPPC	Northwest Power Planning Council
OCAFS	Oregon Chapter of the American Fisheries Society
ODA	Oregon Dept. of Agriculture
ODF	Oregon Dept. of Forestry
ODFW	Oregon Dept. of Fish and Wildlife
ODOT	Oregon Dept. of Transportation
OSPRD	Oregon State Parks & Recreation Dept.
OSU	Oregon State University
OSUE	Oregon State Univ. Extension
OWEB	Oregon Watershed Enhancement Board
OWHP	Oregon Watershed Health Program
OWRD	Oregon Water Resources Dept.
PLFN	Private Lands Forest Network
SWCD	Soil and Water Conservation District
TNC	The Nature Conservancy
TU	Trout Unlimited
UNCO	Union County
USFS	U.S. Forest Service
USFWS	U.S. Fish & Wildlife Service

Appendices

Appendix A – Transportation Workgroup Report

Appendix B – Municipal/Industrial Workgroup Report

Appendix C – Forestry Workgroup Report

Appendix D – Agriculture Water Quality Management Area Plan

Appendix E – Hearings Officer Report