Technical Memorandum

WRIA 35 – Grande Ronde Level 1 Assessment Addendum

Draft

July 12, 2005

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Table of Contents

Exhibits

1.1 Overview of Grande Ronde Implementation Area

This assessment for the Grande Ronde Implementation Area (IA) is an addendum to the WRIA 35 Middle Snake River Watershed Level 1 Assessment Report (HDR/EES 2005). The Grande Ronde IA is located only in Washington State, however, a large majority of the Grande Ronde subbasin is situated in Oregon. As a result, Oregon land uses and physical conditions affect water quantity and water quality as it applies to WRIA 35 watershed management. There is an overall lack of available data pertaining directly to Washington; accordingly data associated with portions of Oregon are summarized in this document where Washington data is not available.

Subbasin Location

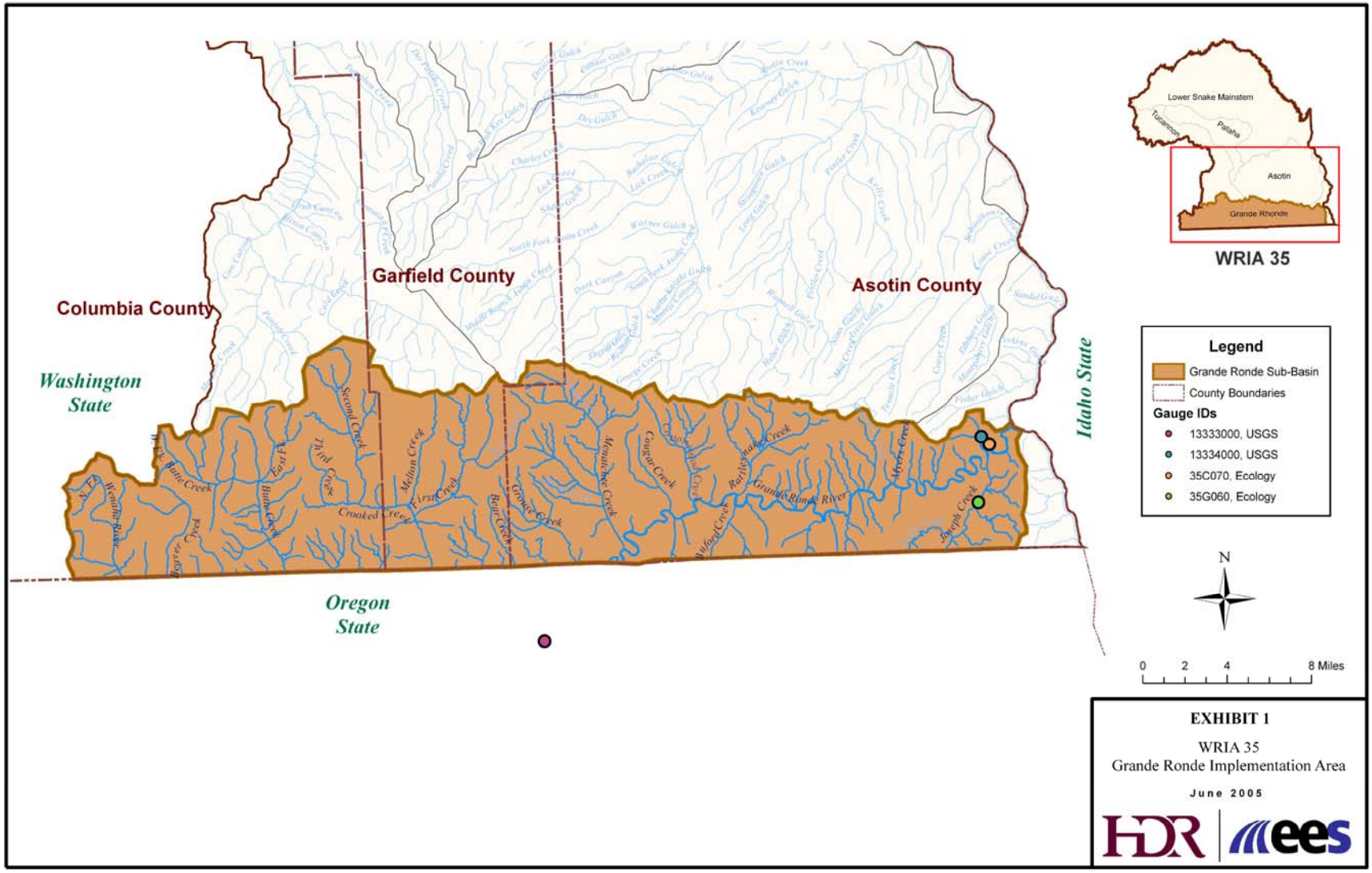
The entire Grande Ronde subbasin encompasses an area of about 4,000 square miles in northeast Oregon and southeast Washington and drains 341 square miles of southeast Washington. The IA includes portions of Asotin, Columbia, and Garfield counties.

The Grande Ronde subbasin is located in the southwest portion of the Blue Mountain Ecological Province and may be roughly characterized as mostly rugged mountainous terrain with two major river systems, the Grande Ronde and Wallowa rivers. It is defined by the Blue Mountains to the west and northwest, and the Wallowa Mountains to the southeast. It is in these mountain ranges, with peaks as high as 7,700 feet in the Blues and nearly 10,000 feet in the Wallowas, where the headwater streams of the Grande Ronde begin.

Physical Description

The Grande Ronde River flows generally northeast for 212 miles from its origin to join the Snake River at river mile (RM) 169. This confluence is about 20 miles upstream of Asotin, Washington. The Grande Ronde River begins in the Blue Mountains near the Anthony Lakes recreation area and it crosses into Washington at RM 38.7 before joining the Snake River. Major streams flowing into the Grande Ronde River are Catherine and Joseph creeks and the Wallowa and Wenaha rivers. The primary Grande Ronde River tributary located within Washington is Joseph Creek. Joseph Creek flows in a general northerly direction and enters the Grande Ronde River at RM 4.3. The other major tributaries are located in Oregon. An overview of the Grande Ronde IA is shown in Exhibit 1. Rugged mountains in the headwater areas have an important influence on the character of the Grande Ronde subbasin. Peaks in the Wallowa Mountains approach 10,000 ft. and serve as the source of many of the Grande Ronde's tributary streams. The Blue Mountains reach elevations of 7,700 ft. and are the source of the Grande Ronde River and other tributary streams. The relatively low elevation of the Blue Mountains can result in earlier snow melt than in the Wallowa Mountains, resulting in low flows in the Grande Ronde River in late summer (July, August, and September).

INSERT EXHIBIT 1
Showing general geographic location of the Grande Ronde IA, as well as Stream flow and WQ gauges



1.2 Surface Water Resources

This section describes streamflow characteristics and stream gauging data within the Grande Ronde IA. Also discussed are instream flow requirements and some general limitations of available data.

1.2.1 Gauging Data and Stream Flows

Limited and periodic stream flow data is available within the Grande Ronde IA in Washington State for the period between 1908 and 2003; some relevant flow data is also available from one flow gauge located in Oregon. This section gives a description of these flow gauges, their periods of record, and briefly describes stream flow characteristics. See Exhibit 1 for gauge locations.

USGS gauge 13334000 was located on the Grande Ronde River mainstem near Zindel, Washington (Lat. 46º04'13", Long. 177º00'16") and recorded daily stream flow data during the years of 1908, 1909, and 1911. Peak stream flow data was also collected at this gauging station between 1905 and 1912, and instantaneous flows were monitored between 1976 and 1977. Although this gauge is no longer active, the most recent stream flow data taken from this location may be used to estimate flow contributions from tributaries between Zindel, Washington and Troy, Oregon.

USGS gauge 13333000 is located on the Grande Ronde mainstem near Troy, Oregon (Lat.45º56'47", Long. 117º26'54") and recorded continuous stream flow data between 1944 and 2001. Provisional data is available through 2004 and it is likely that this gauge is still operating. Although this gauge is located in Oregon, the gauge is near enough to the Washington border that the data likely provides an adequate estimate for stream flow in the Grande Ronde River within Washington.

The Washington State Department of Ecology (Ecology) installed a real-time telemetry stream gauging station on Joseph Creek in 2003 (Lat. 46º01'46", Long. 117º00'57"). The gauging station (35G060) is located at the mouth of Joseph Creek approximately 3 miles upstream of the Grande Ronde River and Snake River confluence. Data from this gauge may be useful in estimating the total flow contribution to the Grande Ronde River from the upper portions Joseph Creek Watershed.

Summary of Existing Data

Stream gauging data from the stations mentioned above are summarized in Table 1. Exhibits 2 through 4 show the mean monthly stream flows for USGS and Ecology gauges as well as the 10% and 90% exceedance flows at these stations. Exceedance flows were calculated from the mean monthly flows for the full period of record at each gauge location. The 10% exceedance flow represents stream flow values that would be exceeded only 10% of the time (i.e., high water events), 90% exceedance represents stream flow values that would be exceeded 90% of the time (i.e., low flow periods).

Table 1 Grande Ronde Implementation Area Gauging Locations				
Gauge ID	**Gauge Location**	**Period of Record**	**Data Type**	**Volume**
USGS 13334000	Grande Ronde River at Zindel, WA	1908, 1909, and 1911 1905 – 1912, 1976 –1977	Daily Stream flow Peakflow (8 records) Peakflow (11 records)	2629 cfs -- --
USGS 13333000	Grande Ronde River at Troy, OR	1944 – 2001	Daily Stream flow	3068 cfs
Ecology 35G060	Joseph Creek at mouth	2003 – Present	Telemetry	70 cfs

Sources:
*Washington State Dept. of Ecology River and Stream Monitoring Network (https://fortress.wa.gov/ecy/wrx/wrx/flows/regions/state.asp)
**USGS Water Resources of the United States (http://water.usgs.gov/)

Exhibit 2

USGS Gauge 13334000 Grande Ronde River at Zindel, WA

Lat. 46°04'13" | Long. 117°00'16" (1908, 1909, and 1911)

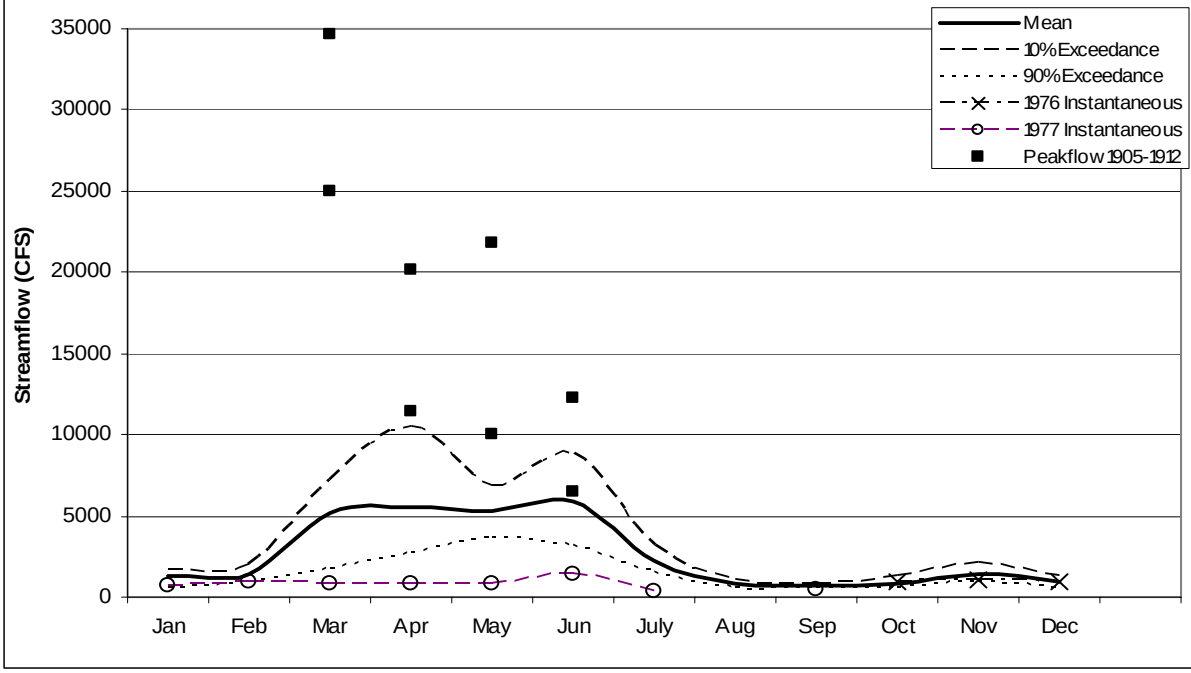


Exhibit 3

USGS Gauge 13333000 Grande Ronde River at Troy, OR

Lat. 45°56'47" | Long. 117°26'54" (1944 - 2001)

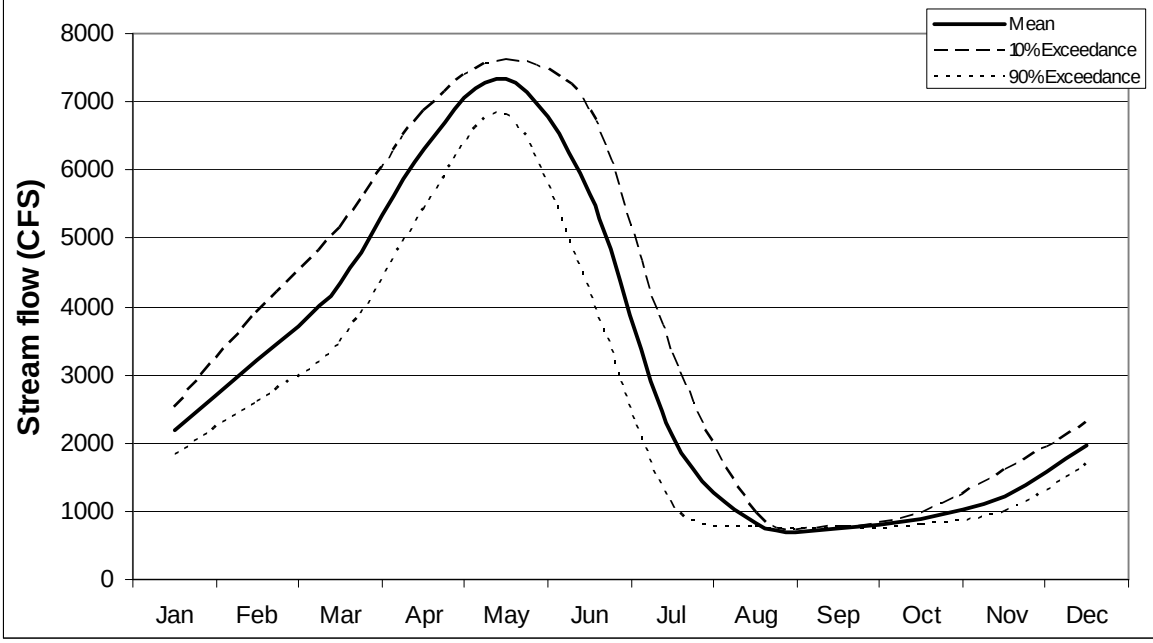
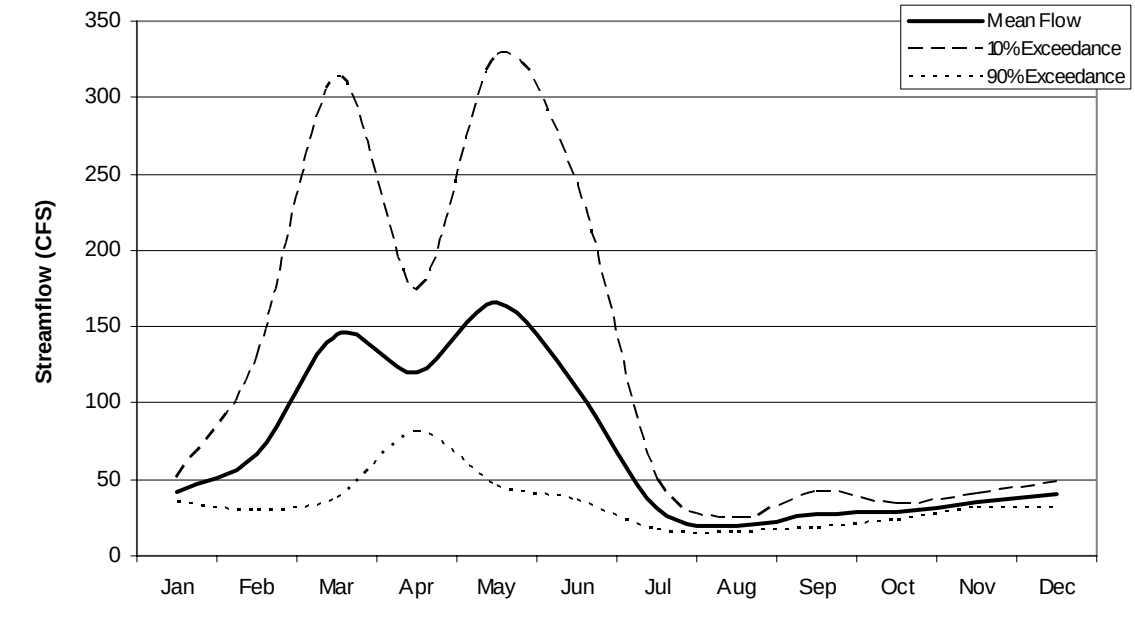


Exhibit 4

WDOE Gauge 35G060 Joseph Creek near Mouth

Lat. 46°01'46" | Long. 117°00'57" (June 2003 - May 2005)



Grande Ronde River Mainstem

Stream flow gauges on the Grande Ronde River at Troy, Oregon and Zindel, Washington suggest that the long-term flow pattern of the River are approximated by spring runoff events that begin in March, peak between May and early June, and then decline by late June or early July. The normal low flow period for this reach of the Grande Ronde River is between August and October. Data collected from USGS gauges 1333000 and 13334000 suggest that mean peak flows in the Grande Ronde River mainstem range between 6,000 and 7,200 cfs, while low flows usually drop to about 800 cfs. Grande Ronde River irrigation withdrawals in the Oregon portion of the Grande Ronde watershed have reduced flows downstream in Washington during the summer and early fall (Parametrix, 2005)

Joseph Creek

Stream flow data recorded at the mouth of Joseph Creek suggest that the general pattern of flow follows spring runoff events that typically begin in late February or early March, peak between late March and late May, and decline by July. Low flow characteristically occurs in Joseph Creek from the end of July to November. Data from Ecology gauge 35G060 indicate that mean peak flows in Joseph Creek range from 125 to 160 cfs. Mean low flows typically range from 20 to 40 cfs.

Specific stream flow data is currently not available for other streams within the Grande Ronde IA.

Stream Flow Data Adequacy

Grande Ronde River:

Stream flow data in the Grande Ronde River mainstem within Washington is limited. The available data is old (most from early 1900's) and much of the data is incomplete, showing only peak values or instantaneous flows. The instantaneous flows taken from 1976 and 1977 and the peak flows from 1905 to 1912 do not match the more complete 1908-1911 dataset collected at this location. The dual peaks in the hydrograph for USGS gauge13334000 is the result of a limited amount of data. Current and continuous flow data at this gauge location would provide a better understanding of water availability in the lower Grande Ronde River system.

Joseph Creek:

Stream flow data from Joseph Creek is currently being monitored. However, the period of record for this gauge is limited to partial datasets spanning three different water years. Broad differences in runoff timing during this short period of record have resulted in the dual peaked hydrograph of Ecology gauge 35G060. Stream flow data will continue to be collected from this gauge to augment existing flow data.

Flow data is currently not available from other streams in the region. As a result, there is no way to measure stream flow in the lower portion of the Grande Ronde River mainstem or its major tributaries other than Joseph Creek. Instream flow management would benefit from the installation and operation of additional flow gauges on the lower Grande Ronde River, as well as at the mouths of the more significant tributaries. This could provide opportunities for improved instream flow management.

1.2.2 Instream Flow Requirements

Section 2 of the WRIA 35 Level I Assessment describes the various instream flow requirements for the entire WRIA. No Surface Water Source Limitations (SWSL) or other instream flow requirements were identified within the Grande Ronde IA at that time. However, one SWSL has since been identified on the Grande Ronde River; this SWSL is summarized in Table 2.

Table 2
Surface Water Source Limitations in the Grande Ronde IA

Stream Name	Type	Location	Documentation Basis
Grande Ronde River	Low Flow	T7N, R46E, Sec. 13	Letter from Washington Fish and Game, Nov. 12, 1975. No diversions after September 15 or when base flow is established.

1.3 Water Demand Projections

This section includes the demand projections for the Grande Ronde IA. A general discussion of water use is included in Section 2 of the WRIA 35 Level I Assessment. There are no urbanized or incorporated areas within this portion of WRIA 35. As a result, irrigated agriculture and individual domestic well use are the major types of water use.

1.3.1 Municipal and Rural Residential Demand

Planning for future water supply needs requires projection of long-term demand to quantify probable water resource requirements. There are no urban centers within the area, therefore, urban water uses are not included in the demand projections. For the purposes of estimating water use, all of the Grande Ronde IA was assumed to be rural or agricultural water uses

The method described here is similar to the method used for all other implementation areas in WRIA 35 with the modifications specified below.

County population data from the Washington State Office of Financial Management (OFM) (http://www.ofm.wa.gov), and data from the WRIA 35 Level I Assessment were used as the basis for calculating population forecasts for each county within the Grande Ronde IA. There are no urbanized centers within the Grande Ronde IA, and so the populations within urban centers and incorporated areas were removed from the County totals, yielding rural population values for each county. The rural population of each county within the Grande Ronde implementation area was assumed to be proportional to the land area of each county within the area. Population projections through 2025 are given in Table 3.

Table 3 Population Projection for Grande Ronde IA by County				
Year	**Asotin Co.**	**Columbia Co.**	**Garfield Co.**	**Total Pop.**
2000	159	293	125	577
2005	140	293	125	558
2010	158	293	125	576
2015	149	293	125	567
2020	137	293	125	555
2025	97	293	125	515

Note: Data modified from Level I Assessment and updated with current OFM population values to reflect the populations of only those portions of each county that lie within the Grande Ronde IA.

In order to convert population forecasts to water demand projections, an average per capita demand was used for each county. The per capita demand was calculated using a modified Department of Health formula published in the "Water System Design Manual" (2001), Publication 331-123, as follows: Average per capita demand = [(8,000/R)+200]/2.5, where R is the average rainfall. The formula was modified so that the resulting units were in gallons per capita, instead of gallons per residential connection. The modification required an assumption that an average of 2.5 persons reside in a household (residential connection). The results of the calculated average per capita demand are found in Table 4, as well as the average estimated rainfall for each county.

Table 4 Average Rainfall and Per Capita Residential Demand			
	Asotin County	**Columbia County**	**Garfield County**
Average Rainfall (inches/year)	14.4	25.3	16.3
Average Daily per Capita Demand (gallons)	300.9	206.7	276.3

Source: Level I Assessment.

County rainfall data was obtained from the website worldclimate.com[1]. The estimated per capita demands are relatively high, compared to other estimates of typical average per capita demands in other regions of the State. This disparity is due to the types of uses such as irrigation of larger rural residential lots and the drier climate in WRIA 35, the per capita demand numbers are considered reasonable for the purposes of watershed management.

Rural population divided by county area gave the rural population density. The proportional area of each county that fell within the Grande Ronde IA was multiplied by its respective population density. This yielded an estimate of population for each county within the IA. Using population forecasts shown in Table 3 and per capita demand shown in Table 4, the projected average day demand and annual demand for residential connections was developed through the year 2025. The results are shown in Table 5 and 6 respectively.

[1] Worldclimate.com gathers climate data from dozens of reputable sources, including the National Climactic Data Center of the National Oceanic and Atmospheric Administration.

Table 5 Average Day Demand Projections for Grande Ronde				
Year	**Asotin Co.**	**Columbia Co.**	**Garfield Co.**	**Grande Ronde IA Total**
2000	48015	60563	34537	143115
2005	42263	60563	34537	137364
2010	47681	60563	34537	142782
2015	45097	60563	34537	140198
2020	41429	60563	34537	136530
[illegible]	29342	60563	34537	124443

Note: Data given in gallons per day.

Table 6 Annual Demand Projections for Grande Ronde IA				
Year	**Asotin Co.**	**Columbia Co.**	**Garfield Co.**	**Grande Ronde IA Total**
2000	54	68	39	160
2005	47	68	39	154
2010	54	68	39	160
2015	51	68	39	157
2020	46	68	39	153
2025	33	68	39	139

Note: Data given in acre-feet per year.

1.3.2 Agricultural Demand

Prior to 1993, and effectively until [illegible]2, agricultural irrigators have not been required to measure, record, and report their annual water use. As a result, there is little data documenting the actual volume of surface or groundwaters diverted for agricultural irrigation on a watershed scale.

In 1993, the Washington State Legislature revised the State Water Code (Chapter 90.03 RCW) to require measuring for all surface water diversions.

Ecology has since created a new rule clarifying the *Requirements for Measuring and Reporting Water Use*, Chapter 173-173 WAC. The Compliance Plan developed by Ecology for administering the new rule calls for the water users in WRIA to conform measuring and reporting practices to the new rule. In the Spring of 2002, informal letters were sent to water right-holders identified as using 80 percent of the water in WRIA 35, notifying the users that they would receive a regulatory compliance order.

Water meters are currently being installed by many irrigators to monitor water diversions in WRIA 35. In time, this new rule will likely result in improved data regarding agricultural and other water uses. A more detailed report of changes in water use measurement is given in the WRIA 35 Level I Assessment report.

Agricultural Water Usage in the Grande Ronde IA

No data concerning actual irrigated acres or amount of water applied for irrigation was available for the Grande Ronde IA from either the WSU Extension Office or the Asotin County Conservation District. As a result, Geographic Information System (GIS) data taken from Ecology was used to estimate the number of acres in the IA that were under irrigation as either cropland or pasture. In order to give a conservative estimate, the total irrigated acreage was assumed to be mostly alfalfa. One of the primary crops in the region, alfalfa also has one of the highest water demands[2], requiring approximately 2.5 afy. However, some of the irrigated crops and pasture likely require less water annually. The number of acres irrigated and types of crops change from year to year with varying crop rotation patterns and changes in market values, which further complicate the accurate projection of agricultural water use. According to data, there are approximately 4,895 acres in the IA. Assuming most of these acres are alfalfa, estimated total water usage for irrigation in the Grande Ronde IA is roughly 12,238 afy. This GIS estimate is not consistent with Asotin Conservation District estimates of irrigated agriculture. Asotin Conservation District estimates that only 350 to 500 acres are currently under irrigation[3], making irrigation water use approximately 875 to 1250 afy.

There is potential for additional stock watering from exempt wells in the IA, but the extent and impact of this water use is unknown. A further review may be conducted if necessary under the WRIA 35 Level 2 Assessment. It is anticipated that this water use, if calculated, would not be substantial.

The majority of the water used is derived from surface diversions from the Grande Ronde mainstem and Joseph Creek (WRATS 2005). Diversions generally take place from May through October. Diversions are not metered or reported, so it is difficult to determine the amount of water being used for agricultural use. The irrigated acreages associated with the water rights in the subbasin are summarized in Table 7. Data summarized in Table 7 represent the full use of irrigation water rights in the area, however it is common that the amount of water actually available is less than the full right allows.

Table 7
Irrigation Water Rights in the Grande Ronde IA

Purpose of Use	Acreage	Instantaneous Flow (cfs)	Annual Volume (afy)
Surface (primary)	487	9	1986
Ground (primary)	29	--	161
Total (primary)	516	9	2147

Source: WRATS database (2004)
1. Not all rights have a specified cfs associated with them; only those that do are shown here.

Irrigation systems consist primarily of hand and wheel lines.[4]. These are relatively simple irrigation systems, with an estimated 65% field application efficiency[5]. Future upgrades of

[2] Personal Communication with Cheryl Sonnen, Asotin County Conservation District (May, 2005).
[3] Personal Communication with Cheryl Sonnen, Asotin County Conservation District (June, 2005).
[4] Personal communication with Cheryl Sonnen, Asotin County Conservation District, February 2004 and Mark Heitstuman, WSU Extension Agent, February 2004

irrigation practices to increase efficiency, changes in irrigation timing, or use of storage to collect water for use during the dry summer months could potentially benefit instream flows throughout the IA.

1.4 Water Rights and Claims

Section 2.9 in the WRIA 35 Level I Assessment includes a general discussion of the water rights and claims status for WRIA 35 as a whole. This section includes an IA-specific summary of the types of uses and the estimated quantities of water rights for the Grande Ronde IA.

In order to derive the IA-specific water rights, individual water rights were mapped based on their location per the township-range-section description in the WRATS database. Tables 8 and 9 include summaries of the types of uses and associated quantities for surface and groundwater permitted and certificated water rights, respectively. Water rights associated with irrigation account for over 87 percent of the total annual water rights allocated.

In order to determine the portion of the projected demand associated with surface water versus groundwater, a comprehensive survey of water users is needed. This was not done for the Level 1 assessment. However, a rough estimate using Table 8 and Table 9 shows that surface water use is higher annually than groundwater use in the IA. This is because there are no urban or incorporated areas and the bulk of water use revolves around surface water diversions for irrigation. Based strictly on the water rights ratios, it is estimated that surface water use is 12.4 times the amount of groundwater use (or 93 percent of total water use). Complicating this estimation is the fact that several water rights have multiple purposes of use, and it was outside the scope of this effort to determine the actual use of these water rights.

[5] Washington State University, 1985, Washington State Irrigation Guide

Table 8 Summary of Surface Water Rights[1] for Grande Ronde IA			
Purpose of Use	**Number of Records**	**Annual Quantity, Qa (afy)**	**Instantaneous Quantity, Qi (cfs)**
IR	10	1871	9
ST WL	11	13	0
IR ST	2	77	0
DS IR	1	38	0
DS ST	1	1	0
FS	1	0	6
DS HE	1	2	0

NOTES:

1. The detailed summary by Purpose of Use only includes data pertaining only to water right permits and certificates, as listed in the Department of Ecology Water Rights Application Tracking System (WRATS) database (February 4, 2004). Quantities of water associated with claims and water right applications are not included in this table. There are no annual or instantaneous quantities associated with water right applications, because they are not appropriated rights.
2. Not all rights have a specified cfs associated with them; only those that do are shown here.

- **DG**--Domestic General (use of water for all domestic uses not specifically defined in the water right record or not defined by the other specific domestic use categories.
- **DM**--Domestic Multiple (more than one dwelling none of which are under municipal control)
- **DS**--Domestic Single (one dwelling with lawn and garden, up to one-half acre)
- **FS**--Fish Propagation
- **HW**--Highway (maintenance and construction)
- **IR**--Irrigation
- **RE**—Recreational
- **RW**--Railway (use of water to serve railway equipment and facilities)
- **ST**--Stock Watering
- **WL**--Wildlife Propagation

Table 9 Summary of Groundwater Rights[1] for the Grande Ronde IA			
Purpose of Use	**Number of Records**	**Annual Quantity, Qa (afy)**	**Instantaneous Quantity, Qi (gpm)**
DS	1	1	20
DS ST	1	2	10
DM	5	134	400
DM IR	1	24	30

NOTES:

1. The detailed summary by Purpose of Use only includes data pertaining only to water right permits and certificates, as listed in the Department of Ecology Water Rights Application Tracking System (WRATS) database (February 4, 2004). Quantities of water associated with claims and water right applications are not included in this table. There is no feasible means of evaluating the validity, or documenting the amount of, water associated with claims. There are no annual or instantaneous quantities associated with water right applications, because they are not appropriated rights.

   - **DG**--Domestic General (use of water for all domestic uses not specifically defined in the water right record or not defined by the other specific domestic use categories.
   - **DM**--Domestic Multiple (more than one dwelling none of which are under municipal control)
   - **DS**--Domestic Single (one dwelling with lawn and garden, up to one-half acre)
   - **FS**--Fish Propagation
   - **HW**--Highway (maintenance and construction)
   - **IR**--Irrigation
   - **ST**--Stock Watering

1.5 Surface Water Quality

In much of Eastern Washington, the volume of water available for instream and out-of-stream uses is a primary factor of consideration when evaluating watershed health. Insufficient flow volumes can have significant direct impacts upon water quality, including parameters such as water temperature and dissolved oxygen. However, even when sufficient flow volumes are available, the beneficial use of both ground and surface water can be limited by water quality. Various degrees of water quality impairment can restrict the beneficial uses of surface and groundwater for the purposes of recreational, drinking, industrial, and agricultural uses, as well as for fish habitat.

This section includes a discussion of water quality parameters, surface water quality regulation, and surface water quality in the Grande Ronde IA. Groundwater quality and associated regulations are discussed in Section 7 of the WRIA 35 Level I Assessment.

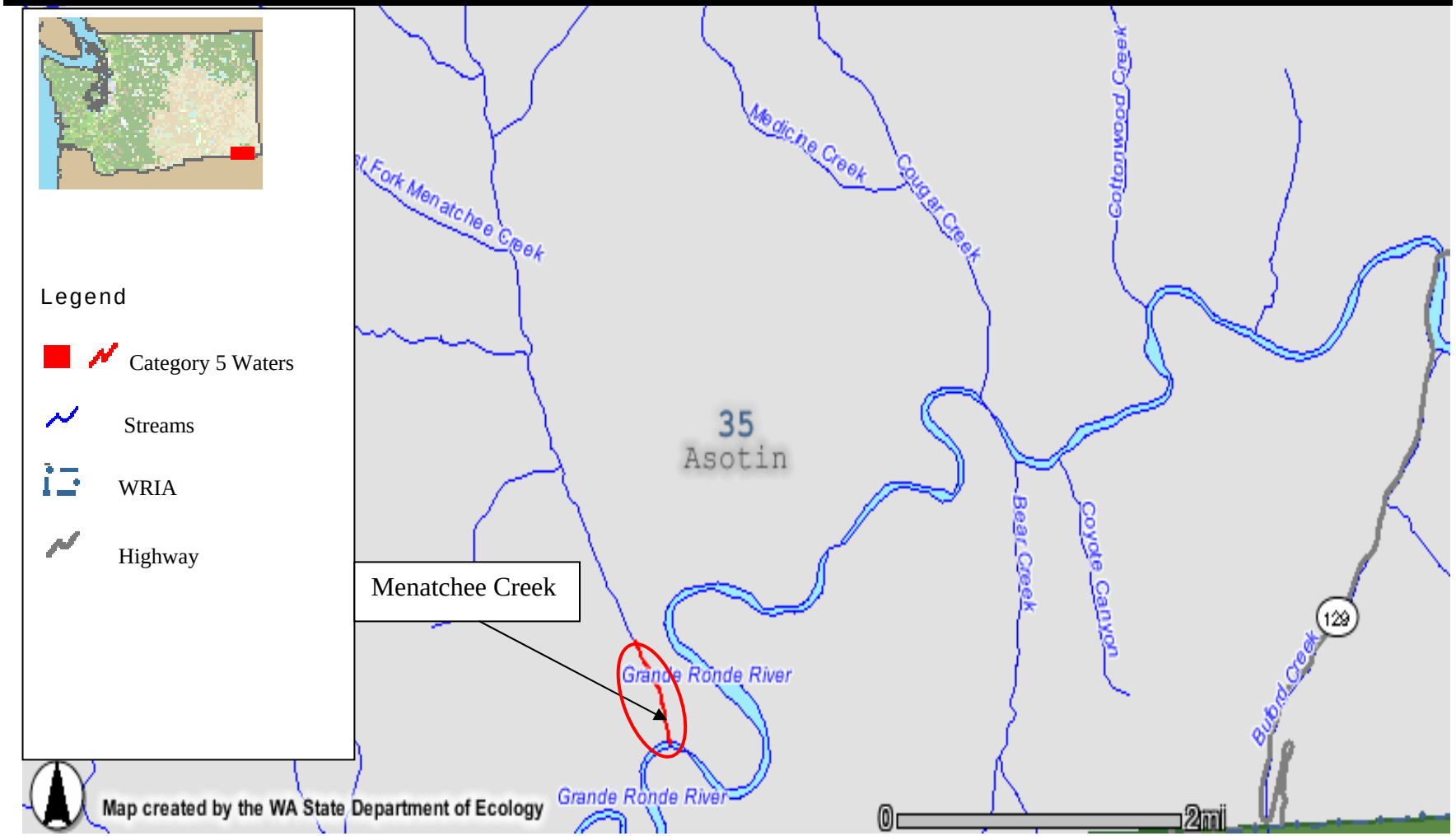
There are 10 streams listed as water quality limited in the lower Grande Ronde River watershed within Oregon and none in Washington as shown in Table 10 below.

Table 10 303 (d) Listed Waters in the Oregon Portion of the Lower Grande Ronde Watershed	
Water Body	**Parameter of Concern**
Grande Ronde River mainstem	Temperature Sediment Habitat
Chesnimnus Creek	Temperature Sediment Habitat
Crow Creek	Temperature
Joseph Creek	Temperature
Salmon Creek	Temperature
Elk Creek	Temperature Sediment Habitat
Davis Creek	Temperature
Peavine Creek	Temperature Habitat
Wenaha River	Temperature

Source: Nowak, 2004.

There are no 303 (d) listed water bodies in the Washington State portion of the Grande Ronde River drainage system. However, stream temperatures taken by the Umatilla National Forest staff at the mouth the Menatchee Creek showed mean 7-day maximum temperatures (64ºF – 66ºF) were at or above State standards for salmonids (54ºF – 64ºF depending upon lifestage) in 2001 and 2002. As a result, all of Menatchee Creek that lies within T06N, R43E, Section 12 has been added to Ecology's 2002-2004 Candidate 303 (d) list as seen in Exhibit 5.

Exhibit 5
2002 – 2004 Proposed 303(d) listings within the Grande Ronde IA



Source: Washington State's Water Quality Assessment [303(d) & 305(b) Report] 2004 Submittal.

1.5.1 Existing Surface Water Quality Monitoring

Periodic water quality monitoring has occurred in the Grande Ronde area since the 1970's. However, the period of record for these data is relatively short and irregular. Water quality monitoring has been conducted by Ecology (Gauge 35C070) on the Grande Ronde River near Anatone (Lat. 46º 04' 14", Long. 117º 00' 24"), approximately one mile upstream of USGS gauge 133340000. Water quality data available for this station include conventional parameters from 1977, 1980 through 1982, and 1993. Because this location is relatively low in the watershed, the data may be used to capture (estimate) impacts to water quality from most upstream locations. Locations where various water quality parameters have been recorded are described in Table 11.

Table 11
Grande Ronde Implementation Area Water Quality Monitoring Locations

Gauge ID	Gauge Location	Period of Record	Data Type
USGS 13334000	Grande Ronde River at Zindel, WA	1976 – 1977	Conventional parameters
Ecology 35C070	Grande Ronde River near Anatone	1977, 1980 - 82, 1993	Conventional parameters
None	Grande Ronde River at Cottonwood Acclimation Pond	1992 – 2000	Temperature

1.5.2 Areas of Impacted Water Quality

Recorded water quality impairments are not well documented in the Washington portion of the Grande Ronde IA because much of the watershed is located in Oregon. Oregon water quality data was not evaluated during the course of this assessment. Accordingly, data that might be useful for describing areas of impacted water quality are also limited. Available water quality data in the Grande Ronde IA is focused on the Grande Ronde River mainstem. Water quality data is not generally available for tributary streams other than temperature data from the mouth of Menatchee Creek.

Grande Ronde River Mainstem

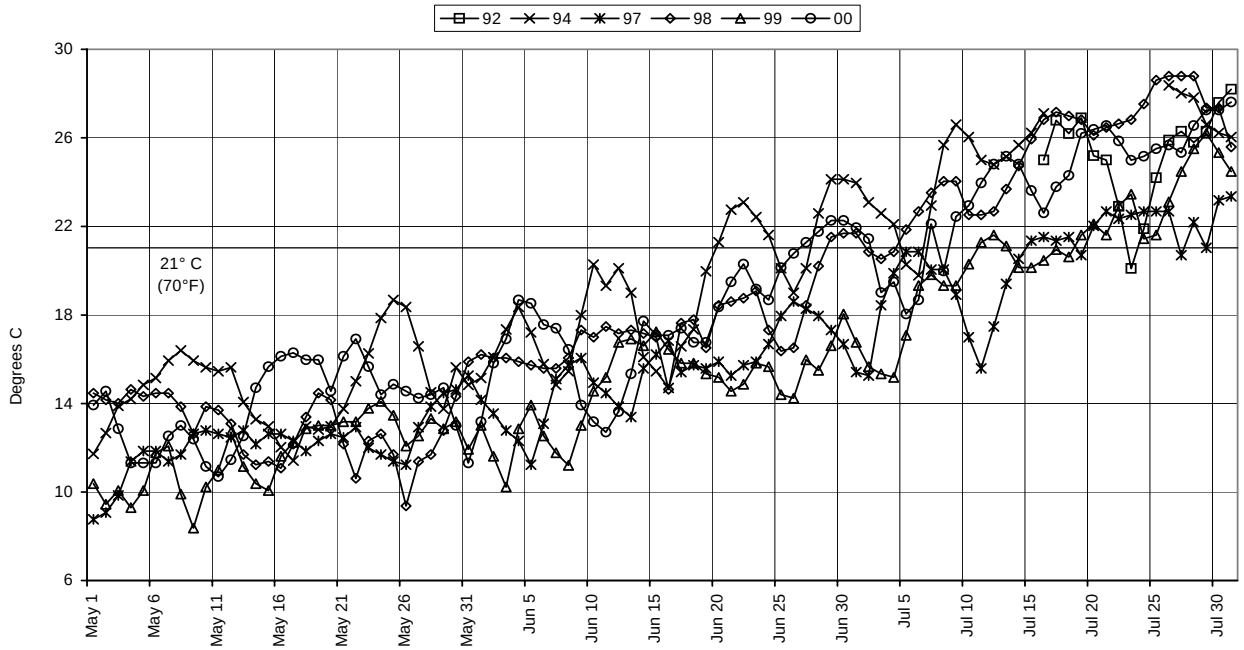
According to available data, the primary concerns for this reach are elevated summer temperatures and suspended sediment.

Temperature: A study was conducted by Fishpro (now HDR Fishpro) for the Nez Perce Tribe (1992 – 2000) in conjunction with a steelhead acclimation pond near Cottonwood Campground on the Grande Ronde River. A portion of the study included mainstem temperature analysis during the months of May, June, and July. Data from the study indicate that summer temperatures in the mainstem of the Grande Ronde River at RM 28.7 ranged from 53.6°F in May, 59.8°F in June, and 71.4°F in July as shown in Exhibit 6. See Exhibits 7 through 11 for other conventional information. The cause of high summer stream temperatures was not identified in the study.

Exhibit 6

Daily Maximum River Temperature: Cottonwood Acclimatin Facility

May - June 1992 through 2000



Source: Fish-Pro, 2002 (Cottonwood Acclimation Facility Modifications for Fall Chinook Preliminary Design Report)

Exhibit 7
Mean Temperature: Grande Ronde River near Anatone
Ecology Gauge 35C070: 1976-1977; 1980-1981; and 1992-1993

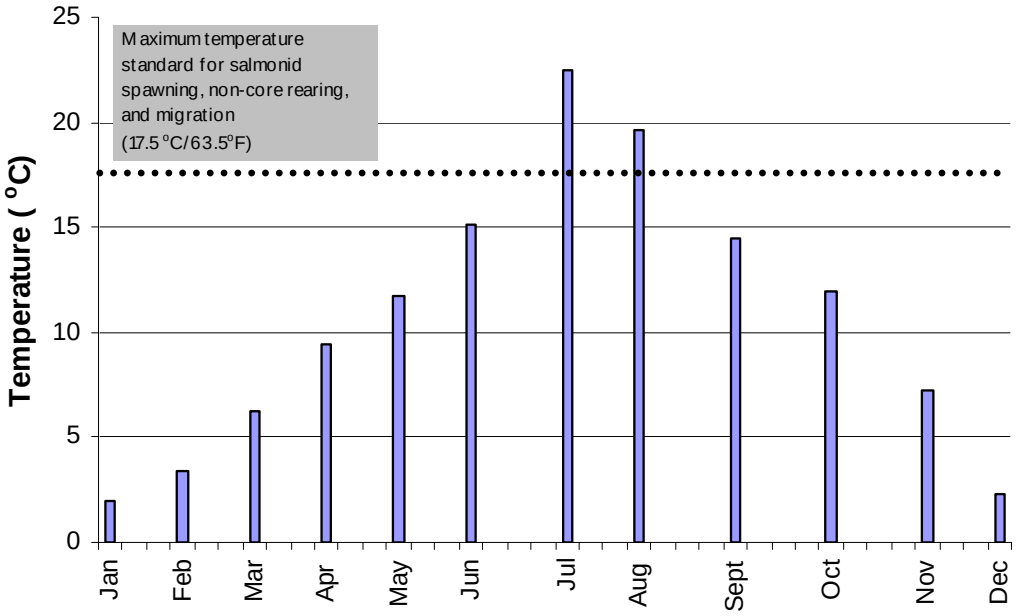


Exhibit 8
Mean Turbidity: Grande Ronde River near Anatone
Ecology Gauge 35C070: 1976-1977; 1980-1981; and 1992-1993

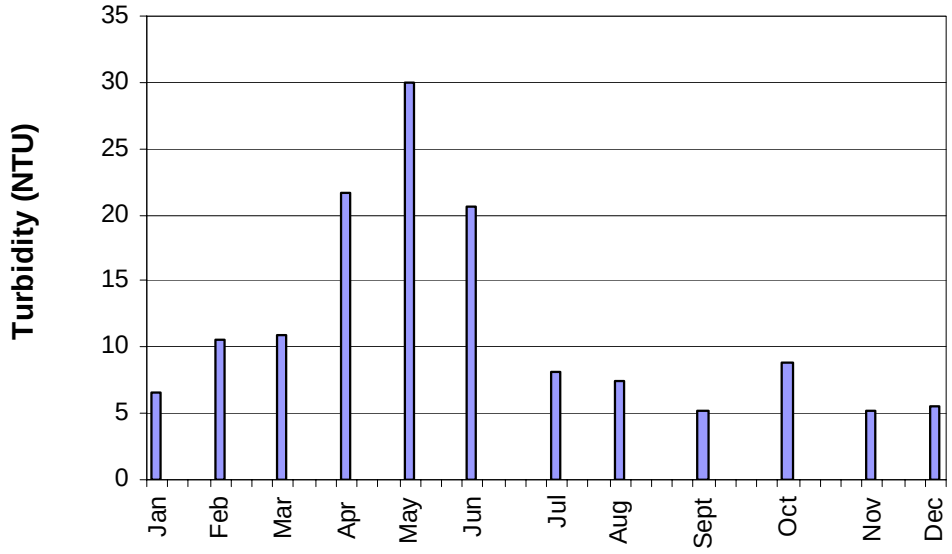


Exhibit 9
Mean TSS: Grande Ronde River near Anatone
Ecology Gauge 35C070: 1976-1777; 1980-1981; 1992-1993

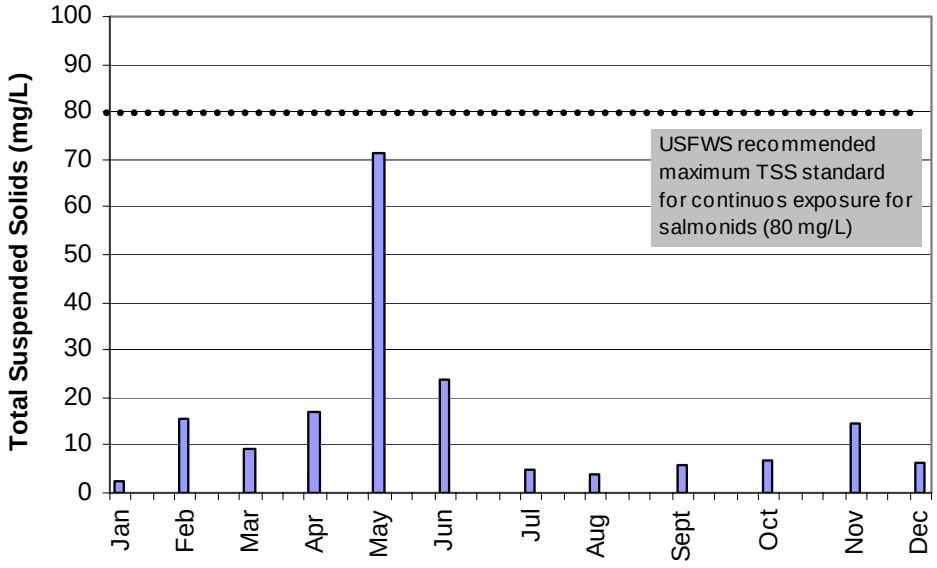


Exhibit 10
Mean Turbidity: Grande Ronde River at Zindel, WA
USGS 13334000: 1976 - 1977

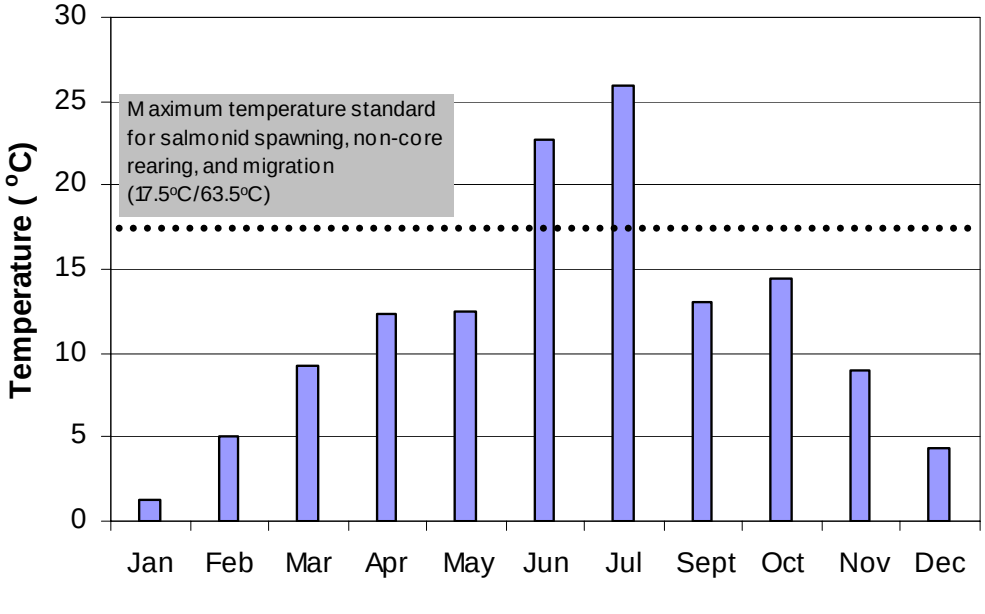
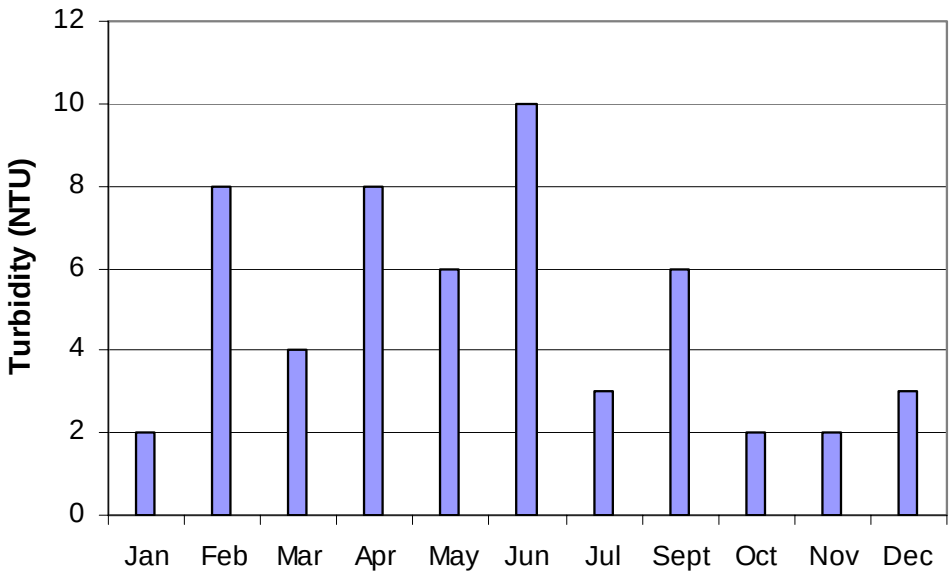


Exhibit 11
Mean Turbidity: Grande Ronde River at Zindel, WA
USGS 13334000: 1976 - 1977



1.6 Aquatic Habitat Assessment

Aquatic habitat descriptions in this document are derived from the Grande Ronde Subbasin Plan (2004).

Aquatic habitat data is limited in the Grande Ronde IA, however, Ecosystem Diagnosis and Treatment (EDT) was conducted by *M.C. Nowak* in conjunction with planning efforts that concluded in December, 2004. This analysis did not give many details regarding existing habitat, instead, the plan focused on identifying priority areas for restoration based on the EDT analysis of a few specific stream reaches. Most of the analyzed reaches are located in Oregon. As a result this section deals with focal species identification and distribution, as well as identification of priority restoration reaches. Habitat limiting factors are inferred through the prioritization of each reach, and some detail is given for specific reaches where data are available.

Threatened and Endangered Species

In addition to the Federal Endangered Species Act (ESA), Washington employs Endangered and Threatened Species listings at the State level. The Grande Ronde subbasin is, or may be, host to four fish species and fifteen wildlife species listed as Threatened or Endangered at the state or federal level, or both, listed fish species are shown in Table 12.

Table 12

State and Federally Endangered Fish Species

Common Name	Scientific Name	Federal Status	Washington Status
Chinook Salmon	*(Oncorhynchus tshawytscha)*	Threatened	Candidate
Steelhead	*(Oncorhynchus mykiss)*	Threatened	Candidate
Bull Trout	*(Salvelinus confluentus)*	Threatened	Candidate

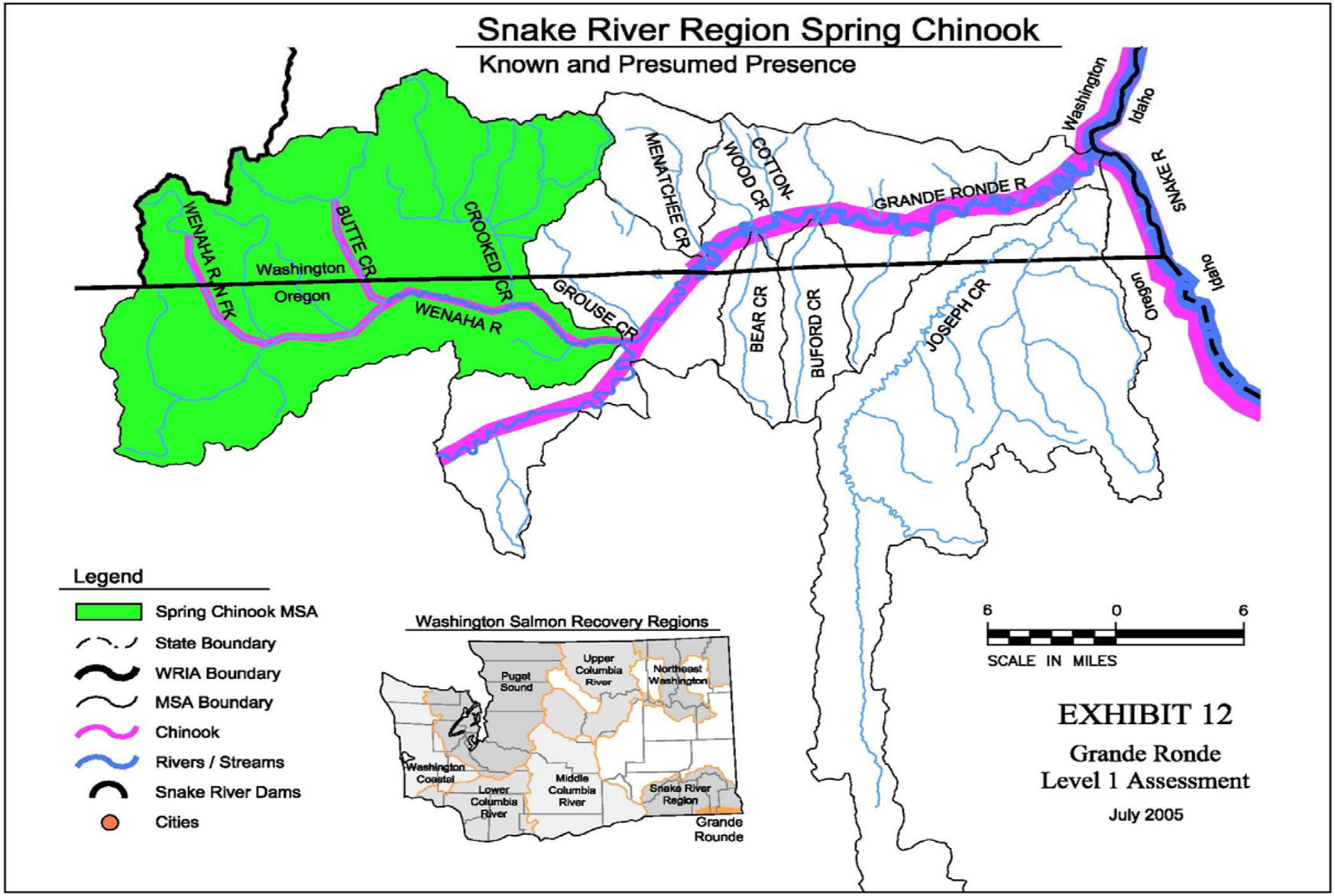
The Subbasin Plan (SBP) identified spring Chinook, summer steelhead, and bull trout as focal aquatic species within the Grande Ronde subbasin.

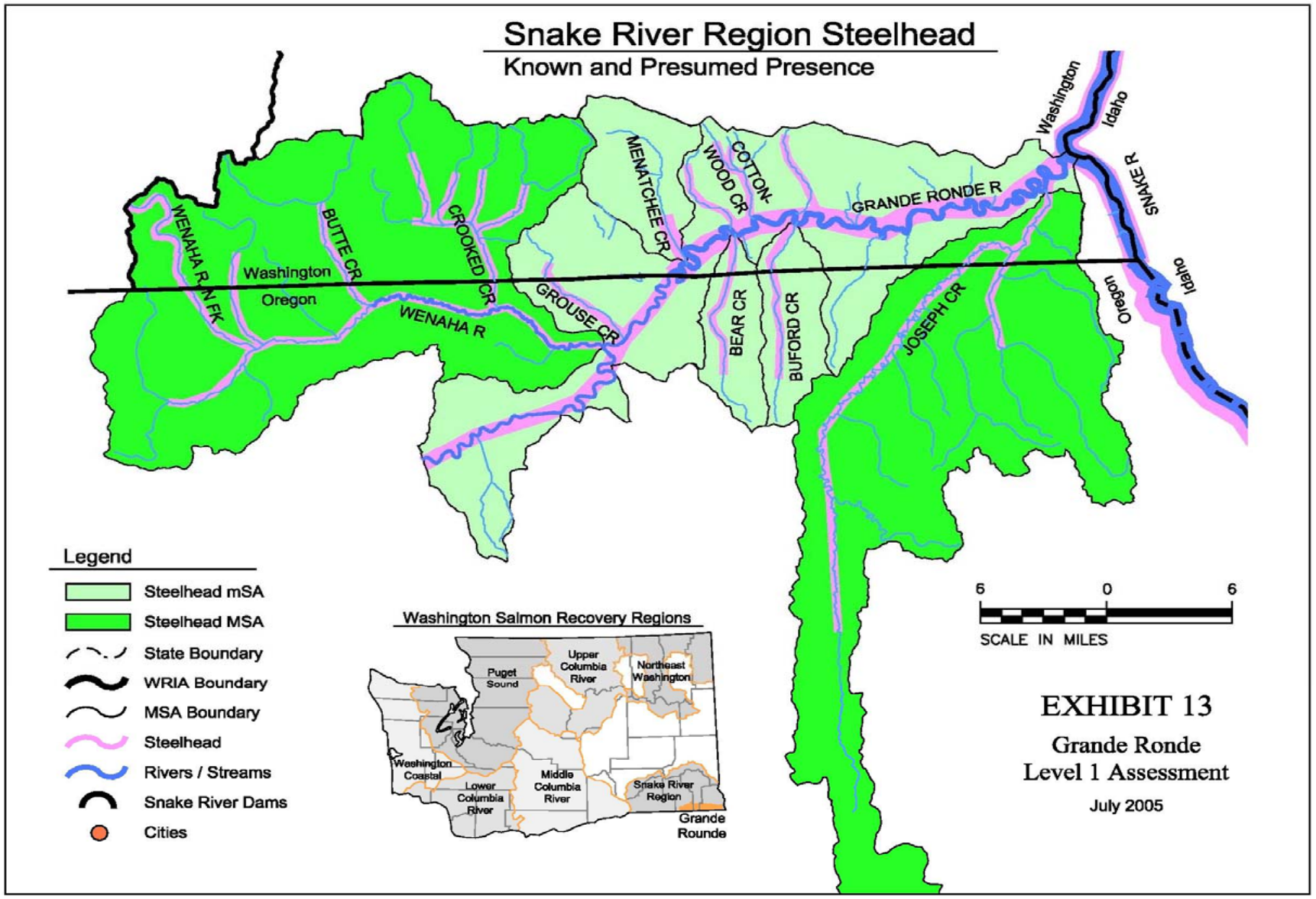
Focal Species Distribution

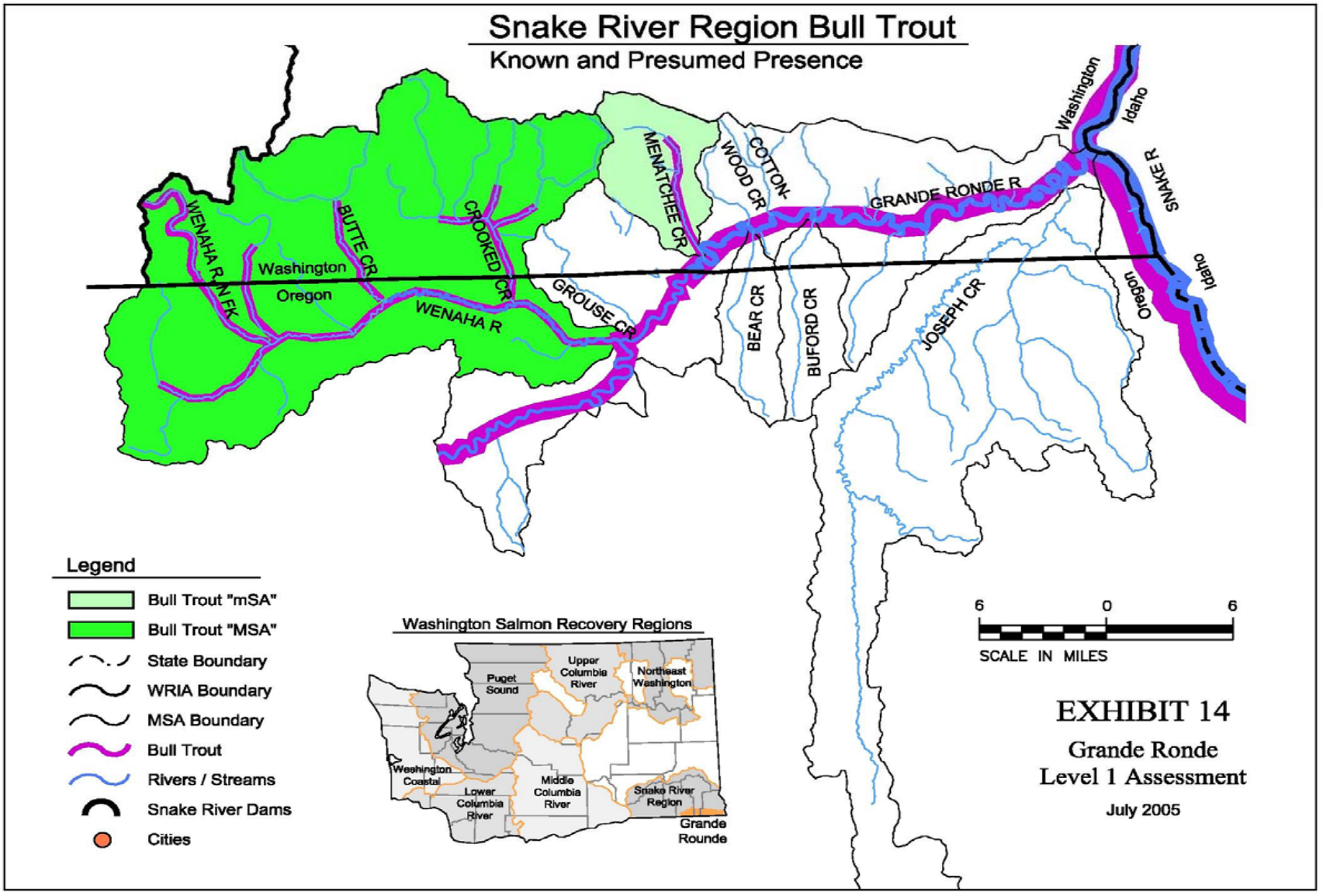
The distribution of spring Chinook within the Grande Ronde watershed is shown in Exhibit 12. In Washington, rearing and migration are limited to the Grande Ronde River mainstem. Spawning and rearing generally take place the North Fork Wenaha River and Butte Creek.

The distribution of summer steelhead within the Grande Ronde watershed is shown in Exhibit 13. In Washington, summer steelhead habitat includes all of the Grande Ronde River mainstem, as well as the North Fork Wenaha River, Butte Creek, and a majority of Crooked Creek.

The distribution of bull trout within the Grande Ronde watershed is shown in Exhibit 14. In Washington, summer steelhead habitat includes all of the Grande Ronde River mainstem, as well as the North Fork Wenaha River, Butte Creek, and portions of Crooked Creek. Historically, bull trout were distributed throughout the Grande Ronde subbasin. Limited information is available on historical distribution, but it is suspected that bull trout occurred in all major tributaries (West and Zakel 1993). Exhibit 14 is at such a large scale it does not include many of the smaller tributaries (including Menatchee Creek) that may provide bull trout habitat. This exhibit should be considered a general overview.


Snake River Region Spring Chinook
Known and Presumed Presence
Washington
Oregon
Idaho
WENAHA R N FK
BUTTE CR
CROOKED CR
WENAHA R
GROUSE CR
MENATCHEE CR
WOOD CR
COTTON-
GRANDE RONDE R
SNAKE R
BEAR CR
BUFORD CR
JOSEPH CR
Legend
Spring Chinook MSA
State Boundary
WRIA Boundary
MSA Boundary
Chinook
Rivers / Streams
Snake River Dams
Cities
Washington Salmon Recovery Regions
Puget Sound
Upper Columbia River
Northeast Washington
Washington Coastal
Lower Columbia River
Middle Columbia River
Snake River Region
Grande Rounde
6 0 6
SCALE IN MILES
EXHIBIT 12
Grande Ronde
Level 1 Assessment
July 2005


Snake River Region Steelhead
Known and Presumed Presence
Washington
Idaho
SNAKE R
Oregon
Idaho
GRANDE RONDE R
COTTON-WOOD CR
MENATCHEE CR
CROOKED CR
BUTTE CR
WENAHA R N FK
Washington
Oregon
WENAHA R
GROUSE CR
BEAR CR
BUFORD CR
JOSEPH CR
Legend
Steelhead mSA
Steelhead MSA
State Boundary
WRIA Boundary
MSA Boundary
Steelhead
Rivers / Streams
Snake River Dams
Cities
Washington Salmon Recovery Regions
Puget Sound
Upper Columbia River
Northeast Washington
Washington Coastal
Lower Columbia River
Middle Columbia River
Snake River Region
Grande Rounde
6
0
6
SCALE IN MILES
EXHIBIT 13
Grande Ronde
Level 1 Assessment
July 2005


Snake River Region Bull Trout
Known and Presumed Presence
Washington
Oregon
Idaho
WENAHA R N FK
BUTTE CR
CROOKED CR
MENATCHEE CR
COTTON-WOOD CR
GRANDE RONDE R
SNAKE R
WENAHA R
GROUSE CR
BEAR CR
BUFORD CR
JOSEPH CR
Legend
Bull Trout "mSA"
Bull Trout "MSA"
State Boundary
WRIA Boundary
MSA Boundary
Bull Trout
Rivers / Streams
Snake River Dams
Cities
Washington Salmon Recovery Regions
Puget Sound
Upper Columbia River
Northeast Washington
Washington Coastal
Lower Columbia River
Middle Columbia River
Snake River Region
Grande Rounde
6 0 6
SCALE IN MILES
EXHIBIT 14
Grande Ronde
Level 1 Assessment
July 2005

1.6.1 Existing Habitat Conditions

This section presents some general habitat limitations for the lower portion of the Grande Ronde mainstem and Joseph Creek. Also summarized, are the priority restoration areas identified through the EDT process areas. No priority Protection Areas were defined in the SBP. EDT analysis was conducted for Chinook and steelhead only. All three species have slightly varying habitat requirements, however, it may be reasonable to assume that enough similarities exist between them that limiting factors for Chinook and steelhead would also limit bull trout to some degree.

Lower Grande Ronde River

The lower Grande Ronde River was identified in the plan as "from the mouth to river mile 12". This area was classified by EDT as a priority for restoration due to habitat limiting factors for steelhead and Chinook such as reduced habitat diversity, high sediment loads, high temperatures, and reduced habitat quantity. Other habitat limitations were listed as low summer flows, pathogens, competition with hatchery fish, and predation.

A relative absence of woody debris in this reach has caused the lack of habitat quantity and habitat diversity. There are also hydromodifications in multiple areas where roadways are impinging upon the floodplain.

In the tributaries of the lower Grande Ronde River, the primary limiting factor affecting fish survival was sediment, which impacts the egg incubation life history stage of salmonids. Temperature, pathogens, and habitat quantity may also limit fish survival in these tributaries. Reduced habitat quantity is indicative of reduced channel wetted widths resulting from hydromodification/road construction.

Tributary reaches are the likely source of most identified sediment impacts in the Grande Ronde mainstem, thus restoration of the main stem sections would depend on stopping sediment delivery from tributary areas.

Lower Joseph Creek

The lower portion of Joseph Creek was identified in the plan as "from the mouth to river mile 3". This area was classified by EDT as a priority for restoration due to habitat limiting factors for steelhead and Chinook such as habitat quantity and sediment. Other habitat limitations were listed as temperature, habitat diversity, and pathogens.

The limited habitat quantity for juvenile rearing is indicative of reduced channel wetted widths, due to hydromodification associated with road construction. Incubation life history stages were impacted by the reduction in availability of suitable gravels. Pathogens present a potential of whirling disease in the subbasin, however there is no indication that whirling disease is currently impacting fish populations. Flow is not a typical limiting factor in this area.

Through the EDT process, the five highest priority restoration areas in the Grande Ronde subbasin were identified. Of these five areas, the lower Grande Ronde, lower Grande Ronde tributaries, and lower Joseph Creek were included as high priorities for restoration as shown in Table 13.

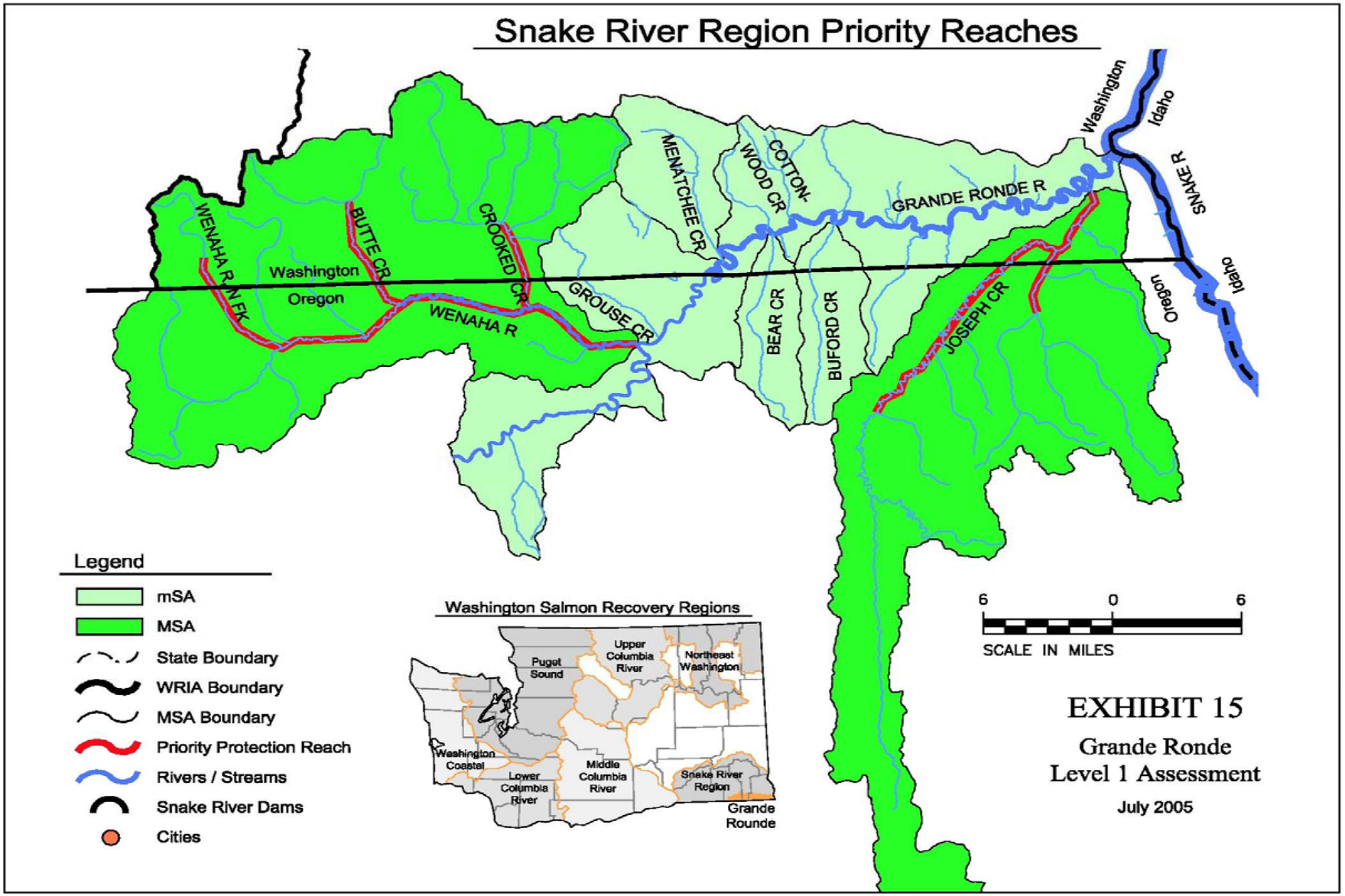
Table 13

High Priority Restoration Reaches Identified by EDT

Geographic Area	Location	Primary Limiting Factors
Lower Grande Ronde Mainstem	Mouth to River Mile 12	Habitat Quantity Habitat Diversity
Lower Grande Ronde Tributaries	Mouth to River Mile 12	Habitat Quantity Sediment
Lower Joseph Creek	Mouth to River Mile 3	Habitat Quantity Sediment

Source: Grande Ronde Subbasin Plan, 2004.

Exhibit 15 identifies priority protection and restoration areas that were developed in conjunction with the Snake River Salmon Recovery Plan (2005). This exhibit delineates major spawning areas (MSA) and minor spawning areas (mSA)


Snake River Region Priority Reaches
Washington
Idaho
SNAKE R
Idaho
Oregon
GRANDE RONDE R
MENATCHEE CR
WOOD CR
COTTON-
BEAR CR
BUFORD CR
JOSEPH CR
GROUSE CR
CROOKED CR
BUTTE CR
WENAHA R
WENAHA R N FK
Washington
Oregon
Legend
mSA
MSA
State Boundary
WRIA Boundary
MSA Boundary
Priority Protection Reach
Rivers / Streams
Snake River Dams
Cities
Washington Salmon Recovery Regions
Puget Sound
Upper Columbia River
Northeast Washington
Washington Coastal
Lower Columbia River
Middle Columbia River
Snake River Region
Grande Rounde
6
0
6
SCALE IN MILES
EXHIBIT 15
Grande Ronde
Level 1 Assessment
July 2005

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