

Grande Ronde Subbasin Gauging Station Operations

BPA Project # 1992-026-01  
Contract # 34944

OWEB Project # 207-246

Reporting Period: October 1, 2007 – September 30, 2008

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## **Abstract**

The Grande Ronde Basin (GRB) in Northeast Oregon is a moderately dry climate receiving between 10 and 20 inches of precipitation per year with surrounding mountains accumulating up to 100 inches. Irrigated agriculture is a major part of the economy with water being diverted or pumped from surface and ground sources from April through October. Several ESA listed species exist in the basin including Chinook, steelhead, and bulltrout. Agriculture and ESA (Endangered Species Act) listed aquatic species combined with a dry climate demonstrate the need for a network of stream gauges.

The GRB covers over 5,000 square miles and includes several thousand miles of perennial flowing streams. This project is in place to operate 12 existing stream gauges in combination with USGS (4 gauges) and OWRD (one gauge) who, independent of this project, operate five additional gauges (Grande Ronde at Troy, Imnaha R. at Imnaha, Minam R. at Minam, Lookingglass Creek, and Upper Catherine Cr.) to characterize flow in both the Grande Ronde and Imnaha subbasins. These gauges are intended to assist in irrigation water management, fisheries management, long term flow and trend analysis, TMDL and SB1010 water quality management plan effectiveness, subbasin plan implementation, and provide essential information regarding cumulative effects response to conservation in the GRB. Headwater characteristics, land management influence, and basin outlet data are all selectively collected in this network of 17 flow gauges.

Prior to the 2007 water year there were three separate stream gauging programs with similar objectives, protocol, and funding sources in the GRB. Each of these programs for the past ten years has operated under separate administration consuming more time and administrative money than is necessary to accomplish stated objectives. By combining all programs into one project costs have been reduced, each funding source has one contract instead of three, and the same amount of work has been done accomplishing the same objectives. This objective has been continued and realized in the 2008 water year.

## **Introduction**

### **Wallowa County Gauges**

An effort was initiated in Wallowa County in 1995 to determine water use and movement in the central portion of Wallowa Valley. All irrigation diversions in Bear Creek, the Lostine River, and most in the Wallowa River between the Cross Country Canal and Water Canyon were gauged with the support of the irrigators (32 ditch companies). Two mainstem gauges were reinstalled, one in the Lostine River (79 years of record) and one in Bear Creek (69 years of record). Five additional mainstem gauges were installed, two in the Lostine River, one in Bear Creek, and two in the mainstem Wallowa River. The following gauges were installed in 1995:

#### Bear Creek

Gauge #13330500: Bear Creek near Wallowa.

Gauge #13330700: Bear Creek at Wallowa (discontinued).

#### Lostine River

Gauge #13330000: Lostine R. near Lostine.

Gauge #13330050: Lostine R. at Caudle Lane at Lostine (discontinued).

Gauge #13330300: Lostine R. at Baker Road near Lostine.

#### Wallowa River

Gauge #13329770: Wallowa R. above Cross Country Canal near Enterprise.

Gauge #13331450: Wallowa R. below Water Canyon near Wallowa.

The Bureau of Reclamation (BOR) funded the initial gauging from 1995-1999. At present (Fall 2008) all production partnerships remain in place. Oregon Water Resources Department (OWRD) is responsible for all field operation and maintenance and produces provisional record, and USGS conducts all quality assurance quality control and publishes final flow records.

#### Union County Gauges (USFS)

The five stream gauging stations listed below have been in operation for twelve water years. Cooperators in this program of operation include USFS - La Grande Ranger District, OWRD Watermaster's District 6 office and the Confederated Tribe of the Umatilla Indian Reservation. The Bureau of Reclamation (BOR) was instrumental in the installation of the gauging stations and OWRD continues to accomplish all field work and record production.

Gauge #13317850: Grande Ronde River below Clear Creek near.

Gauge #13318060: Meadow Creek above Bear Creek near Starkey.

Gauge #13318210: Meadow Creek below Dark Canyon Creek near Starkey.

Gauge #13318920: Five Point Creek at Hilgard.

Gauge #13319900: North Fork Catherine Creek near Medical Springs.

#### Union County Gauges (OWRD)

In addition to the two gauging station programs detailed above OWRD operates two additional gauges in Union County. Two sites; Catherine Creek at Union, and Grande Ronde River near Perry are cooperative stations operated out of the local Watermaster Office. Union County provides administrative support and a Watermaster Assistant position using funding from the cooperative program to run and maintain the cooperative stations under the supervision of the local Watermaster. This project addresses the two gauges below.

Gauge #13320300: Catherine Cr. at Union.

Gauge #13318960: Grande Ronde River near Perry.

#### Objectives

Monitoring objectives include a combination of short (annual), medium (5-10 years), and long term (>10 years) objectives. Continuous flow gauging provides the opportunity to access watershed conditions in real time as well as long term and is a valuable watershed management tool. Project objectives include:

1. Provide flow data to assist in irrigation water management for both irrigators and OWRD. Time coordinated fish flushes between irrigators, ODFW and Tribes by which irrigation ditches are turned off to accomplish fish passage in seasonally low irrigation influenced streams. Short term (annual).
2. Provide flow data to assist ODFW and Tribes fisheries in the safe and effective operation of trap & haul, screw trap, weir, and hatchery facilities. Short term (annual).
3. Provide flow data to assist in conservation project development. Medium term (5-10 years).
4. Provide flow data to correlate with existing and on-going atmospheric data collection in the GRB. Long term (>10 years).
5. Provide flow data for basin wide management plans cumulative effects response to conservation including TMDL, SB1010, Forest Plan, Grande Ronde Subbasin Plan, and agency action plans. Long term (>10 years).

Monitoring question: Through cumulative effects response analysis do short term management actions, medium term project implementation, and long term management strategies have an effect on magnitude, timing and duration of stream flow?

We believe the continued acquisition of flow data in the GRB will assist in the analysis of the monitoring question posed above.

### **Work performed**

This project continued the operation, maintenance, record production and review of twelve flow gauges in the GRB. The intent of this project is to produce the highest quality data possible. This has been achieved through a production partnership between the GRMW and OWRD where OWRD completes all work and GRMW pays for work done. OWRD follows USGS standard protocol in fieldwork, record production, record review and publishing. The result of following the USGS protocol is data of the highest quality.

USGS remained a production partner for the 2007-8 water year and will remain so for the 2008-9 water year for the five gauges in Wallowa County. This is necessary because they provide gauge house equipment (rental), data collection platform by which real time data is posted on the internet (<http://waterdata.usgs.gov/or/nwis/current/?type=flow>), final record review, and publishing. In coming years as this program can purchase equipment and OWRD can post real time data on the internet USGS will be phased out.

The project follows accepted USGS standards and protocols for flow measurement, data collection, analysis and reporting. This protocol is the standard flow gauging technique, rigorous, and is accepted in the scientific community. For more information regarding the protocol see “Measurement and Computation of Streamflow” (<http://pubs.usgs.gov/wsp/wsp2175/>).

The five gauges operating in Wallowa County have been strategically placed to document several flow characteristics including:

1. Bracket the effects of irrigation withdrawal on the Lostine River, Bear Creek, and the Wallowa River (above Cross-Country Canal to lower end of Wallowa Valley below all irrigation withdrawal). These gauges document water in and out of irrigation influenced reaches.
2. Gauges 13330000 (Lostine R. near Lostine) and 13330500 (Bear Cr. near Wallowa) are long term installations established in the early 1900's. Their continued operation strengthens a data set by which cumulative effects can be accessed.
3. Gauge 13331450 (Wallowa R. below Water Canyon) documents water leaving the Wallowa Valley.

The five USFS gauges in Union County on National Forest land have been strategically placed for the following reasons.

1. The data will characterize the hydrographs for long term monitoring of the potential effects of management activities on stream flow and the effectiveness of restoration activities directed at meeting desired conditions.
2. Stream flow data will be used to correlate monitoring parameters such as air temperature, solar radiation, relative humidity and yearly variation in instream habitat parameters.
3. These data, in conjunction with historical records of stream flow for the Grande Ronde River near Perry (gauge #13318960), provide for long term, comprehensive characterization of stream flow for the Upper Grande Ronde River Drainage.

The two OWRD gauges in Union County have been placed to document the following flow characteristics.

1. When compared to the Upper Catherine Creek gauge Catherine Creek at Union brackets irrigation withdrawal above the town of Union.
2. The Grande Ronde R. near Perry site documents the amount of water leaving the Upper Grande Ronde above the town of La Grande. This site is critical to four of the five USFS sites and its continued operation strengthens a long term data set by which cumulative effects can be accessed.

In addition to the above stations five additional gauges exist that strengthen the overall flow monitoring network.

1. Station #13292000 (Imnaha R. at Imnaha) documents flow at the lower end of the Imnaha subbasin, is a long term installation, and is important to fisheries and watershed management in the basin. USGS funded and operated.
2. Station #13331500 (Minam R. nr. Minam) characterizes flow in the Minam River, a stream in the Eagle Cap Wilderness, the serves as a reference data set. USGS funded and operated.
3. Station #13324300 (Lookingglass Cr. near Looking Glass). This installation assists in the management of Lookingglass fish hatchery and also characterizes flow in a mid-elevation stream in the GRB. USGS funded and operated.

4. Station #13333000 (Grande Ronde R. at Troy). This station near the bottom end of the GRB, below most major tributary influence, is a good indicator of flow leaving the basin. USGS funded and operated.
5. Station #13320000 (Catherine Cr. near Union). This station is necessary for bracketing an irrigation influenced reach on Catherine Creek above the town of Union and has been in operation since 1912. OWRD funded and operated.

### **Flow Data Availability**

All data, including daily, monthly, and annual statistics generated from this project and previously collected flow data are available upon request from OWRD, USGS, and GRMW. All current and historical data is retrievable from either USGS (<http://waterdata.usgs.gov/or/nwis/current/?type=flow> ) or OWRD (<http://www.wrd.state.or.us/OWRD/SW/streamflow.shtml> ) via an internet based data clearinghouse. The continued compilation of flow data augments water quality monitoring efforts undertaken by DEQ, SWCD's, ODA, GRMW, Forest Service and others.

As previously stated all current and historic data is available upon request or via the internet. Examples of entities commonly requesting flow data and examples of use in the GRB include:

1. Nez Perce Tribe. Fisheries and project development.
2. Confederated Tribe Umatilla Indian Reservation. Fisheries and project development.
3. Natural Resources Conservation Service. Project development.
4. Soil and Water Conservation Districts. Project development.
5. GRMW. Project development.
6. Municipalities. Safety and storm water management.
7. Irrigation districts/companies. Irrigation water management.
8. Consultants. Project development & research.
9. Academia. Research.
10. ODFW. Fisheries and project development.
11. ODEQ. TMDL development and permitting.
12. ODSL. Permitting.
13. USFWS and NMFS. Consultation.

Entities requesting data are typically sent to the web-based data clearinghouse as this is the easiest way to obtain the data of interest. Project staff presents data at irrigation district and agency meetings, conferences, or project development discussions.

### **Quality Assurance/Quality Control**

The quality control/quality assurance program is built into the standard protocol for flow data collection. Program elements include:

1. Duplicate flow measurements.

2. Peer review of provisional flow record.
3. Peer review of final record.
4. Duplicate electronic and paper copies of raw and final data.
5. Periodic survey of known elevation control points correlated with stage measuring device.

All data collection and quality control/quality assurance are conducted by OWRD and USGS staff hydrologists.

**Cooperators**

Cooperator	Role & Responsibility
GRMW	<ol style="list-style-type: none"> <li>1. Project coordinator.</li> <li>2. Funding acquisition.</li> <li>3. Contract development and management.</li> <li>4. Fiscal administration.</li> </ol>
BPA	Funding source.
OWEB	Funding source.
US Forest Service	Funding source.
OWRD	<ol style="list-style-type: none"> <li>1. Field data collection, gauging station maintenance and repair.</li> <li>2. Data management software maintenance.</li> <li>3. Produce provisional flow record for 12 stations.</li> <li>4. Produce final flow record for 12 stations.</li> </ol>
USGS	<ol style="list-style-type: none"> <li>1. Make available gauging equipment for rent.</li> <li>2. Review flow record for 5 stations in Wallowa County.</li> <li>3. Publish flow record for 5 stations in Wallowa County.</li> <li>4. Upload and maintain internet real time data sites for 4 stations in Wallowa County.</li> <li>5. Inspect and provide technical support for 5 stations in Wallowa County.</li> </ol>
Union County	Administer Union County Assistant Watermaster staff that operates gauging stations in Union County.

**Fiscal Year 2008 (10/1/2007 – 9/30/2008) Deliverables**

1. Field work and gauging station maintenance for 12 flow gauging stations in the Grande Ronde Basin.
2. Provisional flow record for 2007 water year for 12 flow gauging stations in the Grande Ronde Basin.
3. Final flow record for 2007 water year for 12 flow gauging stations in the Grande Ronde Basin.
4. Published flow record for 2007 water year for 12 flow gauging stations in the Grande Ronde Basin.
5. Data uplink and real time data transmission for 4 flow gauges in Wallowa County.

6. Gauge #13329770: Wallowa R. above cross country canal. Station rebuilt with new equipment and USGS rental equipment returned.
7. Gauge #13330300: Lostine R. at Baker Road. Station rebuilt with new equipment and USGS rental equipment returned.

## Final Budget

<b>Project #199202601 GRMW Subbasin Gauging Station Operations</b>					
<b>BPA Contract # 34944</b>					
<b>Performance Period: October 1, 2007 - September 30, 2008</b>					
<b>Performance Period Covered for this Invoice: July 1, 2008 - September 30, 2008</b>					
<b>Invoice Number: 3494404 Final - Prepared: November 5, 2008 by Mary Estes</b>					
	<b>Approved Budget</b>	<b>Total of Previous Invoices</b>	<b>Total for This Invoice</b>	<b>Total Invoices to Date</b>	<b>Total Remaining</b>
<b>OWRD:</b>					
Measuring	\$7,170.00	\$3,925.00	\$3,245.00	\$7,170.00	
Service Equipment	\$2,880.00	\$1,625.00	\$1,255.00	\$2,880.00	
Data Download	\$2,880.00	\$1,625.00	\$1,255.00	\$2,880.00	
Routing Maintenance	\$2,880.00	\$1,625.00	\$1,255.00	\$2,880.00	
Trav Exp.7/08-9/08 Nudd/Hattan	\$2,070.00	\$571.14	\$1,350.75	\$1,921.89	
Data Processing	\$7,680.00	\$4,284.50	\$3,395.50	\$7,680.00	
Provisional Record	\$3,840.00	\$1,987.50	\$1,852.50	\$3,840.00	
Rating Table Maintenance	\$3,840.00	\$1,977.25	\$1,862.75	\$3,840.00	
Annual Report	\$5,760.00	\$2,212.80	\$3,547.20	\$5,760.00	
<b>Subtotal</b>	<b>\$39,000.00</b>	<b>\$19,833.19</b>	<b>\$19,018.70</b>	<b>\$38,851.89</b>	<b>\$148.11</b>
<b>USGS:</b>					
Field Station Inspection	\$1,160.00	\$858.50	\$301.50	\$1,160.00	
Review of Telemetry Records	\$1,715.00	\$1,269.10	\$445.90	\$1,715.00	
Administrative Support	\$1,440.00	\$1,065.60	\$374.40	\$1,440.00	
Travel Expenses	\$210.00	\$155.40	\$54.60	\$210.00	
Supplies and Equipment	\$1,460.00	\$1,080.40	\$379.60	\$1,460.00	
Support Costs	\$2,605.00	\$1,927.70	\$677.30	\$2,605.00	
Headquarters Technical Service	\$1,545.00	\$1,143.30	\$401.70	\$1,545.00	
<b>Subtotal</b>	<b>\$10,135.00</b>	<b>\$7,500.00</b>	<b>\$2,635.00</b>	<b>\$10,135.00</b>	<b>\$0.00</b>
<b>GRMW</b>					
Gauging Station Rep.&Maint	\$6,000.00	\$5,591.68	\$184.16	\$5,775.84	
<b>Subtotal</b>	<b>\$6,000.00</b>	<b>\$5,591.68</b>	<b>\$184.16</b>	<b>\$5,775.84</b>	<b>\$224.16</b>
<b>Direct Project Costs</b>	<b>\$55,135.00</b>	<b>\$32,924.87</b>	<b>\$21,837.86</b>	<b>\$54,762.73</b>	<b>\$372.27</b>
Administration	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total</b>	<b>\$55,135.00</b>	<b>\$32,924.87</b>	<b>\$21,837.86</b>	<b>\$54,762.73</b>	<b>\$372.27</b>

**Budget Notes:**

1. For work done in FY08 BPA paid \$54,762.73.
2. For work done in FY08 US Forest Service paid Union County \$0.00 for Assistant Watermaster position.
3. For work done in FY08 OWEB paid \$54,560.62.
4. Total funds spent in FY08 = \$109,323.35.

# Map

## Grande Ronde Basin Gauging Stations Operation Station Location

