



**AMENDED**  
**AGENDA**

**IDAHO WATER RESOURCE BOARD**  
**Work Session for MEETING NO. 1-16**  
**January 21, 2016 at 1:00 pm**

***C.L. "Butch" Otter***  
*Governor*

Idaho Water Center  
Conference Rooms 602 B,C,D  
322 East Front Street, Boise, Idaho 83720

***Roger W. Chase***  
*Chairman*  
*Pocatello*  
*District 4*

***Jeff Raybould***  
*Vice-Chairman*  
*St. Anthony*  
*At Large*

***Vince Alberdi***  
*Secretary*  
*Kimberly*  
*At Large*

***Peter Van Der Meulen***  
*Hailey*  
*At Large*

***Charles "Chuck"***  
***Cuddy***  
*Orofino*  
*At Large*

***Albert Barker***  
*Boise*  
*District 2*

***John "Bert" Stevenson***  
*Rupert*  
*District 3*

***Dale Van Stone***  
*Hope*  
*District 1*

- 
1. Roll Call
  2. Mark Solomon – Interim Director of IWRI
  3. Water District 02 Update
  4. Idaho Snow Survey Program – Ron Abramovich
  5. ESPA Aquifer Level Monitoring Update
  6. Loan Request - Outlet Water Association at Priest Lake
  7. Cloud Seeding Update
  8. Big Timber Creek

---

Americans with Disabilities

The meeting will be held in facilities that meet the accessibility requirements of the Americans with Disabilities Act. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email [jennifer.strange@idwr.idaho.gov](mailto:jennifer.strange@idwr.idaho.gov) or by phone at (208) 287-4800.



## **Idaho Water Resources Research Institute**

Dr. Mark Solomon, Interim Director

### **Moscow**

UI Morrill Hall 105  
875 Perimeter Dr.  
MS 3010  
Moscow, ID 83844-3010

### **Coeur d'Alene**

1031 N. Academic Way  
Coeur d'Alene, ID 83844

### **Boise**

322 Front Street  
Suite 242  
Boise, ID 83720

Phone: (208) 664-7027 Email: [iwrri@uidaho.edu](mailto:iwrri@uidaho.edu)

**University of Idaho**

January 14, 2016

### **Idaho Drought Planning**

Prepared by IWRRI for the Idaho Water Resources Board

#### **Introduction**

Idaho is experiencing rapid growth that is transforming its economies and societies. This transformation is most easily seen, and most readily affected by the availability of a safe and reliable water supply. Idaho's water supply is a vital resource for a wide range of economic activities that not only include irrigated agriculture and hydropower production, but also supports water based recreation, fishing, growing municipal populations, new light industries and the simple aesthetic value that people place on viewing a healthy body of water. All of these uses and interests are in peril if long-term drought (>3 years) asserts itself in Idaho, a probability raised significantly by global climate change. A small sample of what may be in store for the state became clearly evident during the 2015 water year: historically low flows, reduced crop yields, widespread large-scale wildfire.

Meetings between IWRRI, state and federal agencies, industry and NGOs have revealed the need and desire to engage in drought planning for Idaho. Drought planning typically focuses on aspects of water supply - local and generalized scarcity, distribution, irrigation demand, municipal use, and water rights administration (in prior appropriation states) – and organizing governmental response (Wilhite 2000; IDWR 2001). This level of planning is appropriate to the short-term (1-3 year) historical duration of North American droughts (e.g. Wheaton 2008), but is not sufficient to plan for a long-term drought cycle or condition.

Comprehensive drought planning may be distinguished from planning for water scarcity attributable to consumptive use. Idaho has proven adept at managing consumptively driven scarcity through a water right administration approach and targeted expenditure of public and private funds to reduce or mitigate bottlenecks in local water distribution. Drought, however, is a climatic landscape scale condition of which water scarcity is one of myriad effects, as evidenced in Idaho during WY 2015: widespread high-intensity wildfire, high in-river salmon mortality, reduced crop yields, etc. Comprehensive drought planning should, to the extent possible, look beyond water scarcity to broader terrestrial, social, and economic effects of long-term drought.



No single state or federal agency in Idaho is tasked with comprehensive drought planning outside of its specific mission, nor is there an assemblage of agencies with drought planning as their objective. As a respected, impartial and trusted statewide water resource research institute, IWRRI is uniquely positioned to facilitate comprehensive Idaho drought planning.

### **Statement of Benefits**

This project will provide benefits in four main areas:

1. Planning for optimal use of Idaho's water resources in a changing climate driven by long-term drought.
2. Planning for drought-induced changes in economic application of Idaho's water resources.
3. Planning for drought-induced changes in land use activity and patterns.
4. Improved cooperation and coordination among state and federal agencies, industry, and public interest organizations.

### **Approach**

IWRRI will continue one-on-one direct meetings with representatives of state agencies, federal agencies, agricultural water users, energy companies, NGOs, cities, counties, and other critical stakeholders to secure willingness of entities to engage in comprehensive drought planning. If sufficient interest is evidenced (and all indications are that the interest is there), IWRRI will design a planning process, enlist university researchers in relevant topics, secure agreement from cooperating entities, secure funding/in-kind resource commitment, and lead/facilitate research and development of the plan. It is anticipated that the research/planning process will be a three-five year effort.

### **Budget**

It is not known at this time what the funding requirements for the full process will be as it is dependent on the number, type and complexity of questions requiring additional research. IWRRI has requested funds as part of its annual support package from the USGS for initial expenses to:

- Secure engagement
- Design the planning process
- Identify research needs
- Identify resources needed and sources

### **IWRB Considerations**

- Does IWRB wish to engage in comprehensive Idaho drought planning?
- Is IWRRI's outline an appropriate starting place?
- If IWRB wishes to engage, how?
  - Expression of support?
  - Funding commitment?
  - Direct engagement?
- Other?

## Memorandum



To: Idaho Water Resource Board (IWRB)

From: Neeley Miller, IDWR Planning & Projects Bureau

Date: January 8, 2016

RE: WaterSmart Grant Status Report (WD 02 Phase-One & Phase-Two)

---

Water District 02 was created in July, 2012. The district provides for the administration of water rights from the Snake River between Milner Dam and Swan Falls Dam. Measurement and regulation of diversions in the district is one of a number of tools that the State can employ to help maintain the Idaho Water Resource Board's (IWRB) minimum in-stream flow at the Murphy Gage in accordance with the Swan Falls Agreement.

### WaterSmart Phase-One

At the January 2013 meeting of the Idaho Water Resources Board (Board), Board members were briefed on the creation of WD02 and a coordinated effort among district water users and both IDWR and IWRB staff to secure cost share funding through a US Bureau of Reclamation (BOR) WaterSmart grant to assist with the installation of measuring devices and telemetry equipment for diversions in the district.

In May 2013 the BOR announced that the IWRB WaterSmart proposal for phase-one would receive funding in the amount of \$151,425. The total budget for phase-one is \$352,152, with \$200,726 coming from water users and \$151,425 coming from the BOR.

Purchasing and installation of measurement devices and telemetry equipment began in November 2013. Installation and calibration of measurement devices is mostly complete. On-going telemetry installation will continue through spring 2016.

### WaterSmart Phase-Two

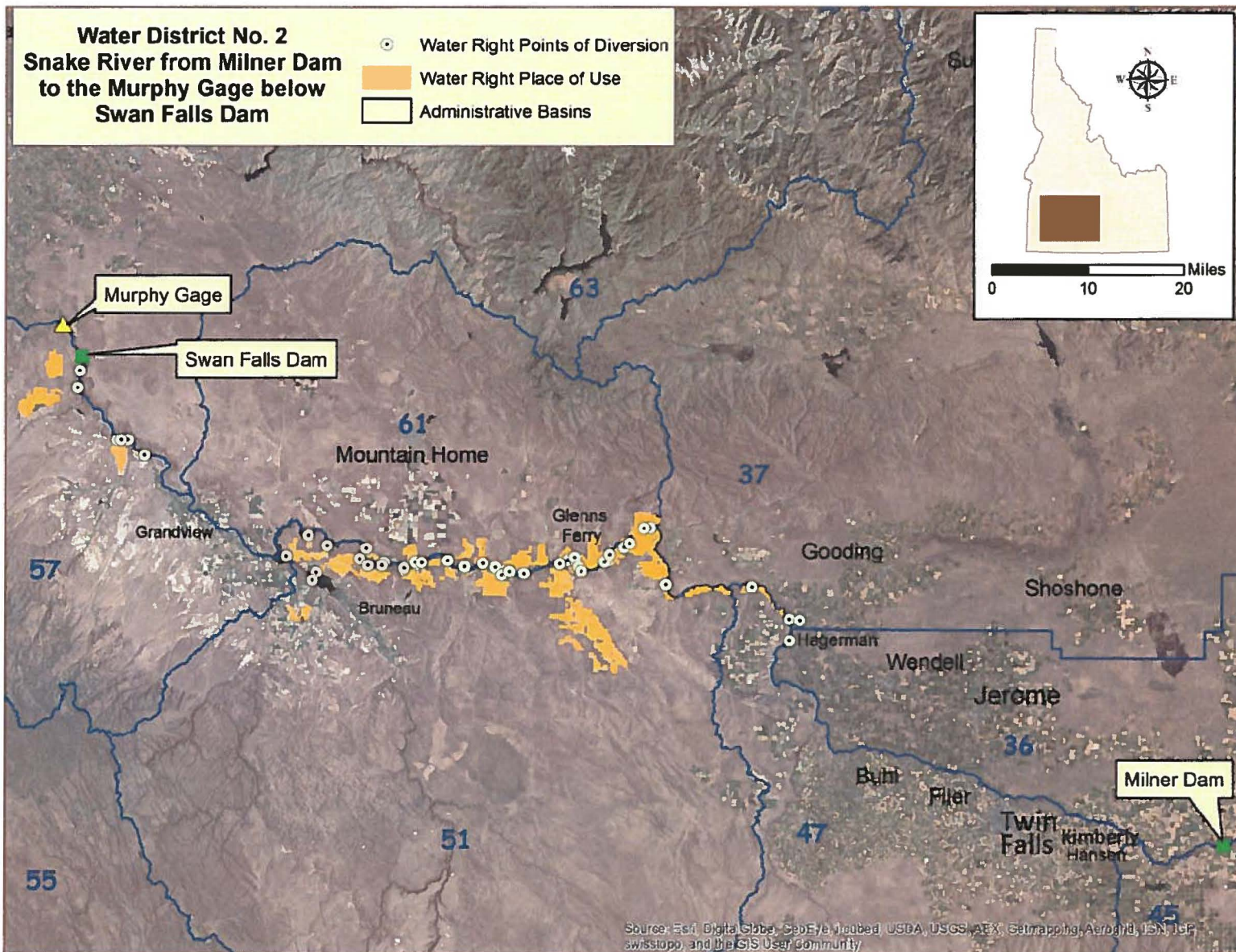
At the January 2014 Board meeting, Board members were briefed on phase-two of this project. Board staff worked with WD02 and BOR to submit a second grant application in January 2014 to address many of the remaining diversions in the district.

In July 2014 the BOR announced that the IWRB WaterSmart proposal for phase-two would receive funding in the amount of \$295,176. The Financial Assistance Agreement with the BOR was finalized in July 2014. The total budget for phase-two is \$655,947, with \$360,771 coming from water users and \$295,176 coming from the BOR. Installation and calibration of equipment will continue through September 2016.

### Attachments

1) Map of Water District 02, Snake River from Milner Dam to Murphy Gage, and 2) Phase-One Performance Report: April 1, 2015 through September 30, 2015, and 3) Phase-Two Performance Report: April 1, 2015 through September 30, 2015.





Map of Water District 02, Snake River from Milner Dam to Murphy Gage

**PERFORMANCE REPORT FOR THE PERIOD April 1,  
2015 THROUGH September 30, 2015**

**Phase-One: Irrigation Flow Measurement Device and  
Monitoring Project for Water District 02 (WEEG)**

**Agreement # R13AP11021**



**Idaho Water Resource Board (IWRB)  
322 East Front Street  
Boise, Idaho**



## **Purpose**

The purpose of this Performance Report is to fulfill the State of Idaho's commitment under the terms and conditions of its agreement dated September 2013 with United States Department of Interior concerning performance under the Idaho Water Resource Board's Phase-One Irrigation Flow Measurement Device and Monitoring Project for Water District 02 (WEEG).

The objective of phase-one of this project is to provide a manageable first year phase-in and demonstration project for installation of measuring devices and telemetry equipment on a number of large irrigation diversions (greater than 1,000 acres) and several smaller or mid-sized irrigation diversions (between 250 and 1,000 acres) in Water District 02. Measurement and monitoring of water diversions from the Snake River in Water District 02 will improve management and regulation of the resource. Measurement and monitoring of diversions in this reach of the Snake River is necessary for the following reasons:

1. Provide protection to minimum stream flow water rights established on the Snake River pursuant to the Swan Falls Agreement between the State of Idaho (State) and the Idaho Power Company (IPC);
2. Ensure that diversions are limited to authorized water rights limits, thereby limiting potential for excess diversions or deliveries and providing potential water savings;
3. Ensure that authorized water uses in areas of the Snake River basin tributary to the Snake River above Swan Falls are not prematurely curtailed in times of water shortage;
4. Provide for protection and improved delivery of water supplies rented from the Upper Snake River Basin (Water District 01 Rental Pool) and/or the Idaho Water Supply Bank (WSB or Bank) that are delivered through Water District 02 for downstream purposes.

The work under this grant is providing for installation of measuring devices, primarily closed conduit ultrasonic and magnetic flow meters, on 22 irrigation diversions in the water district. Diversions in the newly created Water District 02 have not historically been regulated. Prior measurement of diversions in this area has been very limited. Accordingly, water users in this reach of the Snake River are not accustomed to water measurement, monitoring or regulation. In addition to installing accurate measuring devices on the selected 22 diversions, the grant also provides for the installation of monitoring and telemetry equipment at most of the diversion sites in order to provide real time measurement data and regulation while minimizing the labor necessary to collect frequent measurement data.



# **Water District No. 2 Snake River from Milner Dam to Murphy Gage below Swan Falls Dam**

**Irrigation Diversion Locations  
for 2013 Reclamation Grant**

## **Legend**

● Diversion Locations 2013 ROR Grant

△ Cities

## **Major Roads**

— Interstate

== U.S.

— State

■ WD 02: Snake R - Milner to Murphy

■ IDWR Administrative Basins

0 2.75 5.5 11 13.5 22 Miles



Prepared by: IDWR/T. Luke/Jan. 2013  
Imagery: 2009 NAIP

Location of irrigation diversions proposed for measuring device/telemetry installations

## **Proposed work (as described in the application)**

### **Flow meters:**

Measurement of high lift pump and closed conduit systems will be accomplished by installation of ultrasonic clamp-on meters or electromagnetic flow meters that are flanged into the piping system. For project budgeting purposes, proposed ultrasonic meters include General Electric (GE) Panametric AT868 units with a transducer frequency of either 0.5 or 1 Mega Hertz. The GE flow meter can be used on small diameter pipes (14"-20") and very large pipes (up to 96" diameter) connected to river station pump within Water District 02. These systems will be installed and programmed by a GE representative and guaranteed to comply with  $\pm 2\%$  IDWR water measurement accuracy standards for ultrasonic flow meters. This meter met third party accuracy testing by the Utah Water Research Laboratory (UWRL) in Logan Utah in April, 2012 across flows ranging from 5,500 gallons per minute up to 93,000 gallons per minute in a 48" diameter pipe. Stated manufacturer accuracy for the GE ultrasonic meter listed is  $\pm 1-2\%$ . The ultrasonic unit can measure up to two pipes at a time with one processing unit and an additional set of transducers. This approach will be used to minimize costs to end users and will also give proper discharge of the diversions to a secondary data logging device using either pulse output or a 4-20 milliamp signal to be used by the watermaster of the district for regulatory purposes.

For purposes of project budgeting, IDWR proposes using the Badger M-2000 electromagnetic flow meter. The M-2000 is built in sizes ranging in diameter from  $\frac{1}{4}$ " to 96" and will cover flows ranging from 0.1 -39 feet per second. The M-2000 exceeds IDWR's  $\pm 2\%$  adopted accuracy standards. This meter was third party tested and verified for accuracy by the (UWRL) in Logan Utah in April of 2011. Stated manufacturer accuracy for the M-2000 meter is  $\pm 0.25\%$ . A remote mounted set of electronics will be installed for the M-2000 and housed in a waterproof rated enclosure. This flow meter option will include the submersible option of the flow tube to protect from vandalism and the elements of varying weather and temperature throughout the year. Upon installation of magnetic flow meters, water district staff will verify the installed accuracy of the meters using portable ultrasonic flow meters.

Piping systems for diversions within Water District 02 and the 22 diversions identified in this grant proposal vary in size from 10" to 48" diameter. The larger diameter pipes typically have a poured in place concrete liner less than  $\frac{5}{8}$ " in thickness. These liners help to protect the inside wall of the pipe and help assure that a clean ultrasonic sound wave is present when using ultrasonic flow meter technology. Installation of flow meters for this project will require approximately 1 day for each set up, including on-site excavation and fabrication to properly protect valuable flow measuring equipment and achieve the overall objective of high quality flow data collection.



## **Telemetry:**

This project will include the option of remote telemetry and data retrieval. This will include the use of Campbell Scientific CR1000 data loggers (up to 5 channel input) coupled with Campbell 950 MHz radios (line of site range of up to 65 miles) to send and receive information according to the specific needs of the district. This will require the proper infrastructure and frame work (computer network) to accommodate data used for water management within this river section. This network would dovetail into the already existing IDWR telemetry system used to monitor spring discharges and return flows within Water Districts 01 and 02, and within the ESPA. These data would be retrieved at a designated time interval to assist the watermaster in delivery of water in Water District 02 on a daily basis. Additionally the structure of the system will allow water users feedback about their diversions and provide opportunities for better water management. Each site within the network will be built to be both a primary and slave type station in which other water measurement data may be transmitted or passed through as a means to retrieving data from difficult or remote locations within the system. This option will be a big help to the watermaster in managing diversion data collection. It provides a daily tool to manage district staff time in acquiring necessary data for proper water distribution, and it will also provide an annual report generating tool with consistent file structure and processing protocol for collected data.

## **Performance update on Proposed Work – April 1, 2015 through September 31, 2015**

### **Salmon Falls Land and Livestock**

Prior project completion included the installation of a flow meter and equipment panels were installed to accommodate flow and telemetry equipment along with wiring of radios, installation of yagi antennas and site modems. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Black Mesa Farms**

Prior project completion included the installation of a flow meter and equipment panels were installed to accommodate flow and telemetry equipment along with wiring of radios, installation of yagi antennas and site modems. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve



flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Ryan and Andy Johnson**

Project completion during this review period included installation of two Badger M2000 flow meters along with remote mounting of the display electronics in a weather proof enclosure. No data logging equipment has been ordered for these smaller sites due to focus on the projects with larger irrigated parcels (greater than 500 acres). No additional work was completed on this site and still has a 90% project completion.

### **Flying H Farms: Browns Creek diversion**

Project completion in the previous review period included the installation of a dual channel flow meter for the two 24" PVC pipes installed at this site along with manhole and equipment panels. Installation of telemetry equipment occurred during this review period along with wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Indian Cove Irrigation District**

In previous review period the following items were completed. Crews installed a dual channel ultrasonic flow meter on the two 30" concrete penstocks using wetted transducers. Programming of the flow meter was done by FloSonics Inc, along with installation of telemetry equipment including mounting of yagi antenna within the pump station. AC power and wiring of radios, modems and completion of data logger tie in to the radio and modem package was also completed. Previous completion was approximately 85%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Clover Hollow**

Project completion for Clover Hollow in the previous review period included the installation of a wetted ultrasonic flow meter along with conduit for the cables. Installation of telemetry equipment occurred during the previous review period wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Additionally a voltage regulator was replaced on this DC powered system due to failure. Previous completion was approximately 90%.

Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **South Elmore**

Project completion of South Elmore in the previous review period included the installation of telemetry equipment, wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Additionally a voltage regulator was replaced on this DC powered system due to failure. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **JR Simplot Company**

The JR Simplot Company includes 5 different farms using ultrasonic, magnetic and acoustic Doppler technology for measurement. **Farm 3** During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

**Farm 2** located in CJ Strike pool on the south side of the reservoir previously had work completed including the installation of new pipe, an ultrasonic flow meter and equipment panels. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site and connection to the networking system. Currently data from this site is retrieved remotely by the IDWR in Boise Idaho. 100% project completion at this site.

**Farm 9** is a 30 inch penstock that is pumped near the town of Grand View Idaho. The location of the measurement point is downstream of the station approximately one mile with previous work completed including the installation of new pipe, an ultrasonic flow meter and equipment panels. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site and connection to the networking system. Currently data from this site is retrieved remotely by the IDWR in Boise Idaho. 100% project completion at this site.

**Farm 4** previously had an Acoustic Doppler flow meter installed in the trapezoid ditch near the Strike Dam road. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Remaining items include finishing the cell phone modem testing and tie in to the other telemetry being used for this project. 95% project completion at this site.

**Big Foot Bar** is located 12 miles downstream of Grand View Idaho on the north side of the river. Five magnetic flow meters were installed in the previous review period with one of these being installed at the Boltz diversion upstream of Big Foot Bar. Meters were installed prior to the irrigation season but AC power was hooked up in early June 2014. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Work completed in this review period was limited to the completion of FCC approved license for this site and connection to the networking system. Remaining work to be completed at these sites includes programming of hardware (datalogger, radios and modems) and testing for connectivity with the network. 90% project completion at this site.

### **Little Valley Mutual**

Little Valley Mutual located in CJ Strike pool on the south side of the reservoir near the Bureau of Land Management Cove campground previously had work completed including the installation of new pipe, an ultrasonic flow meter and equipment panels. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data.

Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Bybee Lateral Association**

Construction of a broadcrested weir was completed in January of 2014. Other items completed for this site in the previous review period included the installation of a stilling well and pressure transducer. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site confirmed this equipment is operating and working according to design. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Currently data from this site is retrieved remotely by the IDWR in Boise Idaho. 100% project completion at this site.

### **Grandview Irrigation District**

Grand View Irrigation District is one of three large canal systems out of CJ Strike reservoir. This site constructed in the 50's does have a suppressed weir blade installed that would be considered non standard by the BOR due to shallow weir pool and downstream conditions directly below the weir blade. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Previous project completion was approximately 80%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.





*Grand View Irrigation District gauge hut with new telemetry equipment and panel*

### **Grand View Mutual**

Grand View Mutual Canal Company (GVMCC) is the second of the two large canals that divert out of the Idaho Power canal on the south side of CJ Strike reservoir. This diversion has had a concrete slip and an RDI Acoustic Doppler Channel Master installed. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Previous project completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data and conduct manual measurements of the site. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Snake River Irrigation District**

SRID diversion has had a RDI Acoustic Doppler Channel Master installed. During the previous review period installation of telemetry equipment occurred including wiring of

radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data and conduct manual measurements of the site. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Upper Grand View Mutual**

Upper Grand View previously had work completed including the installation of ultrasonic flow meter and equipment panels. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Work completed in this review period was limited to the completion of FCC approved license for this site but does include the programming of the data logger along with multiple on site visits by the Water District Watermaster to retrieve flow data. Remaining items include programming of the radio and modem system and testing through the network. 95% project completion at this site.

### **Mike James**

Mike James or War Eagle Farms previously had work completed including the installation of ultrasonic flow meter and equipment panels. During the previous review period installation of telemetry equipment occurred including wiring of radios, installation of yagi antennas and site modems and completion of data logger tie in to the radio and modem package. Project manager follow up with start up of this site and confirmed meter(s) being used is still operable and working according to design. Previous completion was approximately 90%. Work completed in this review period was limited to the completion of FCC approved license for this site and connection to the networking system. Currently data from this site is retrieved remotely by the IDWR in Boise Idaho. 100% project completion at this site.



### Indian Cove Irrigation District photos

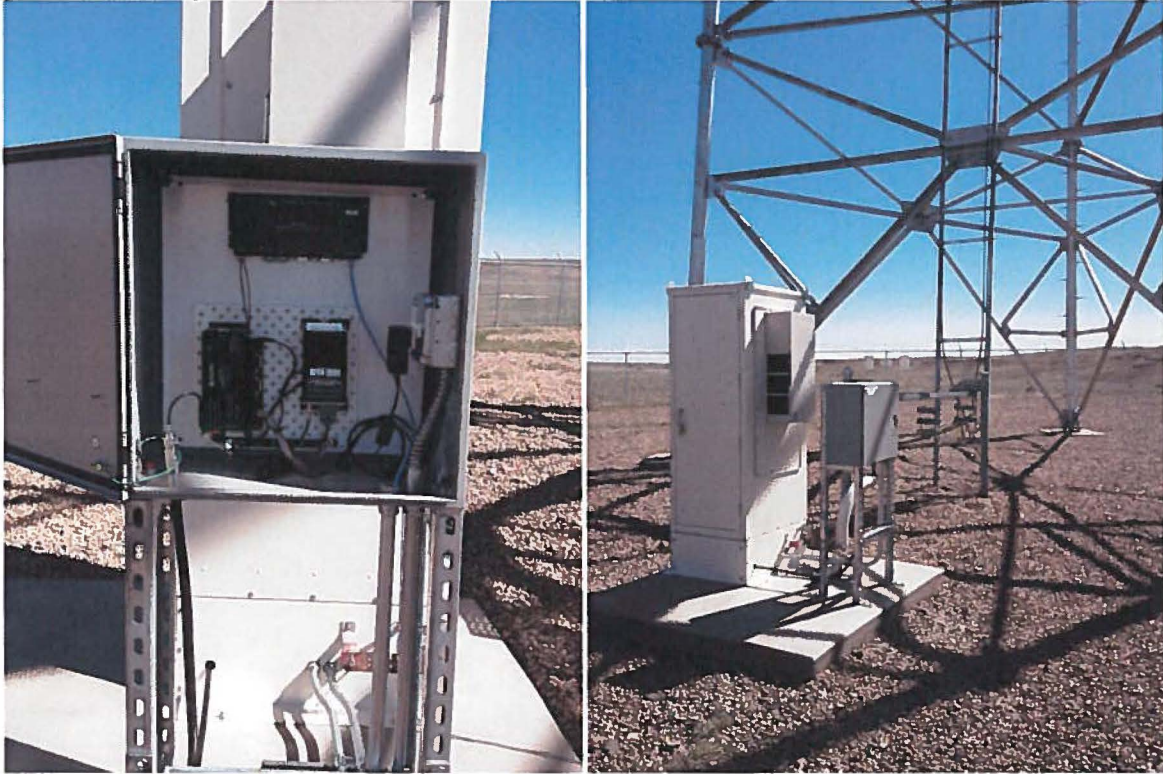


*Indian Cove flow meter and telemetry installation*

### Telemetry Update

This project proposed the use of telemetry to retrieve data from sites within the project. Originally the project objective was to use spread spectrum radios (900 MHz) that are easily set up and not regulated by the Federal Communication Commission (FCC). This project with a network of sites after careful consideration by consulting colleagues in the industry of telemetry determined that low frequency VHF radio's would provide the best coverage within the project area due to topography all while minimizing overall cost. In September of 2014 orders were placed for Ritron radios paired with Campbell Scientific modems (lower cost than the spread spectrum technology) to push data across a frequency between 150-174 MHz. This frequency band is heavily regulated and would require FCC licensing. Since September 2014 work has been started in obtaining an FCC licensed frequency within the band identified above that added additional work for project management to insure rules of the FCC were followed. The licensing process has slowed down the completion of the project but will provide a better overall product once completed. Additionally Syringa Networks during the project time has installed a 300' transmission tower on privately held lands placed near Grand View Idaho in which a base station and antenna have been attached that will help ensure success of this telemetry network. Base station equipment has been installed (see attached photos), along with access to the internet. IDWR staff have been working

to program and create channels internally to retrieve data via static IP addresses assigned at the tower in which these data that can be accessible to the public in a similar format used by the USGS. During this review period IDWR staff was able to successfully retrieve data from a PC computer in Boise on 6 sites. Additional work to connect the 22 sites originally under the phase I grant has been slowed due to other projects internally at IDWR.



*Grand View Syringa tower with Network link and radio receiver*



**PERFORMANCE REPORT FOR THE PERIOD April 1,  
2015 THROUGH September 30, 2015**

**Phase-Two: Irrigation Flow Measurement Device and  
Monitoring Project for Water District 02 (WEEG)**

**Agreement # R14AP00063**



**Idaho Water Resource Board (IWRB)  
322 East Front Street  
Boise, Idaho**

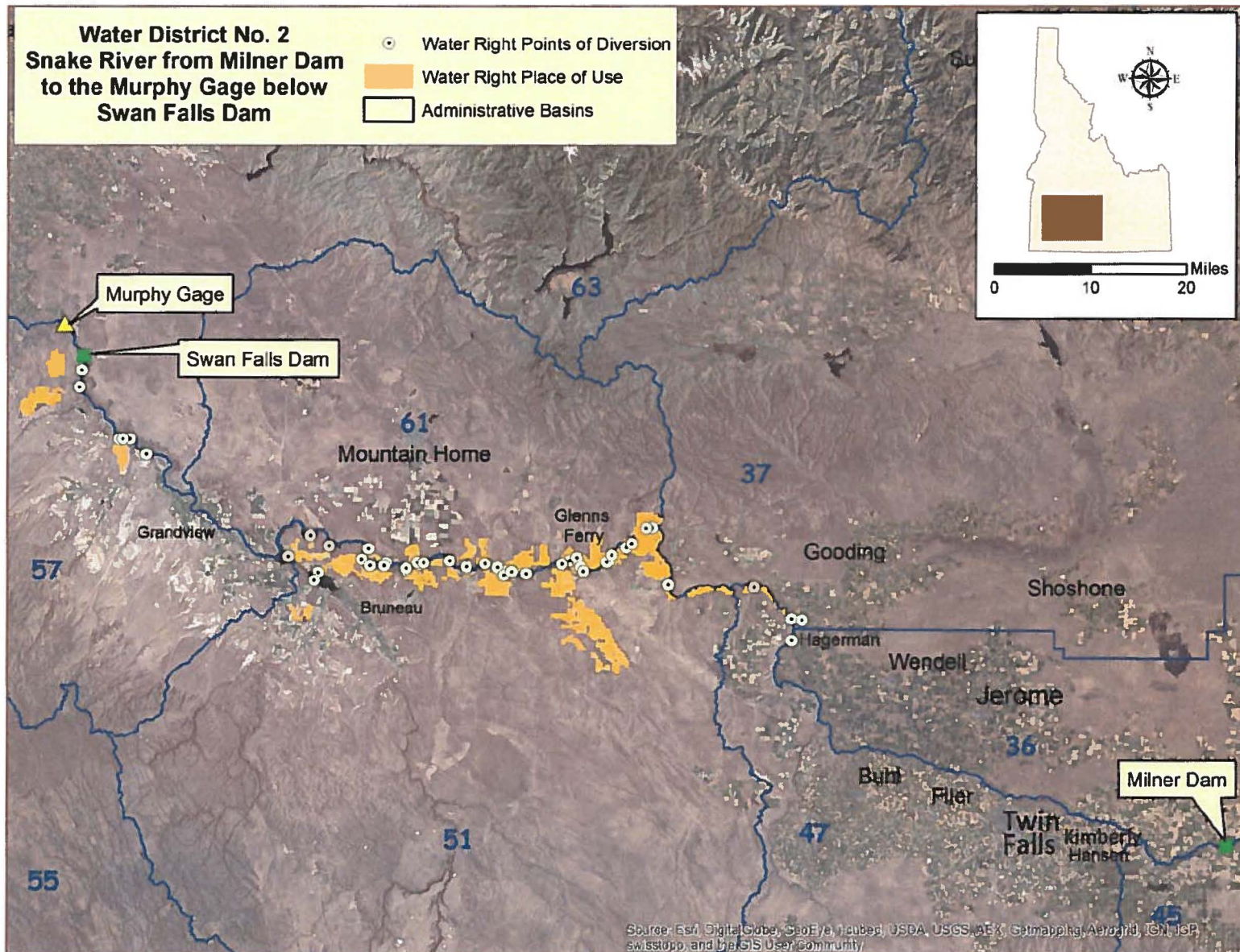
## Purpose

The purpose of this performance report is to fulfill the State of Idaho's commitment under the terms and conditions of its agreement dated July 2014 with the United States Department of Interior concerning performance under the Idaho Water Resource Board's Phase-Two Irrigation Flow Measurement and Device and Monitoring Project for Water District 02 (WEEG)

The objective of phase-two of this project is to provide remaining water users and diversions in Water District 02 that were not included in the FY2013 grant an opportunity to benefit from Reclamation cost share monies while better improving overall water management in the water district. Phase One is almost complete. Phase Two includes both large and small farms ranging in size from 12 acres up to about 10,000 acres. Measurement and monitoring of water diversions from the Snake River in Water District 02 will improve management and regulation of the resource. Measurement and monitoring of diversions in this reach of the Snake River is necessary for the following reasons:

1. Provide protection to minimum stream flow water rights established on the Snake River pursuant to the Swan Falls Agreement between the State of Idaho ("State") and the Idaho Power Company ("IPC");
2. Ensure that diversions are limited to authorized water rights limits, thereby limiting potential for excess diversions or deliveries and providing potential water savings;
3. Ensure that authorized water uses in areas of the Snake River basin tributary to the Snake River above Swan Falls are not prematurely curtailed in times of water shortage;
4. Provide an overall water budget of all water use within the water district that in turn will maximize the available water within the river reach.
5. Provide for protection and improved delivery of water supplies rented from the Upper Snake River Basin (Water District 01 Rental Pool) and/or the Idaho Water Supply Bank ("WSB" or "Bank") that are delivered through Water District 02 for downstream purposes.

The work under this grant is providing for installation of measuring devices, primarily closed conduit ultrasonic and magnetic flow meters, on 48 irrigation diversions in the water district by the 2016 irrigation season. Diversions in the recently created Water District 02 have not historically been regulated. Prior measurement of diversions in this area has been very limited. Accordingly, water users in this reach of the Snake River are not accustomed to water measurement, monitoring or regulation. In addition to installing accurate measuring devices on the selected 48 diversions, the grant also proposes to provide monitoring and telemetry equipment at most of the diversion sites in order to provide real time measurement data and regulation while minimizing the labor necessary to collect frequent measurement data.





## **Work Proposed for Phase-Two in Funding Proposal**

### **Flow meters:**

Measurement of high lift pump and closed conduit systems will be accomplished by installation of ultrasonic clamp-on meters or electromagnetic flow meters that are flanged into the piping system. For project budgeting purposes, proposed ultrasonic meters include General Electric (GE) Panametric AT868 units with a transducer frequency of either 0.5 or 1 Mega Hertz. The GE flow meter can be used on small diameter pipes (14"-20") and very large pipes (up to 96" diameter) connected to river station pump within Water District 02. These systems will be installed and programmed by a GE representative and guaranteed to comply with  $\pm 2\%$  IDWR water measurement accuracy standards for ultrasonic flow meters. This meter met third party accuracy testing by the Utah Water Research Laboratory (UWRL) in Logan Utah in April, 2012 across flows ranging from 5,500 gallons per minute up to 93,000 gallons per minute in a 48" diameter pipe. Stated manufacturer accuracy for the GE ultrasonic meter listed is  $\pm 1-2\%$ . The ultrasonic unit can measure up to two pipes at a time with one processing unit and an additional set of transducers. This approach will be used to minimize costs to end users and will also give proper discharge of the diversions to a secondary data logging device using either pulse output or a 4-20 milliamp signal to be used by the watermaster of the district for regulatory purposes.

For purposes of project budgeting, IDWR proposes using the Badger M-2000 electromagnetic flow meter. The M-2000 is built in sizes ranging in diameter from  $\frac{1}{4}$ " to 96" and will cover flows ranging from 0.1 to 39 feet per second. The M-2000 exceeds IDWR's  $\pm 2\%$  adopted accuracy standards. This meter was third party tested and verified for accuracy by the (UWRL) in Logan Utah in April of 2011. Stated manufacturer accuracy for the M-2000 meter is  $\pm 0.25\%$ . A remote mounted set of electronics will be installed for the M-2000 and housed in a waterproof rated enclosure. This flow meter option will include the submersible option of the flow tube to protect from vandalism and the elements of varying weather and temperature throughout the year. Upon installation of magnetic flow meters, water district staff will verify the installed accuracy of the meters using portable ultrasonic flow meters.

Piping systems for diversions within Water District 02 and the 48 diversions identified in this grant proposal vary in size from 6" to 48" diameter. The larger diameter pipes typically have a poured in place concrete liner less than  $\frac{5}{8}$ " in thickness. These liners help to protect the inside wall of the pipe and help assure that a clean ultrasonic sound wave is present when using ultrasonic flow meter technology. Installation of flow meters for this project will require approximately 1 day for each set up, including on-site excavation and fabrication to properly protect valuable flow measuring equipment and achieve the overall objective of high quality flow data collection.

**Telemetry:**

This project will include the option of remote telemetry and data retrieval. This will include the use of Campbell Scientific CR1000 data loggers (up to 5 channel input) coupled with Campbell 900 MHz radios (line of site range of up to 65 miles) to send and receive information according to the specific needs of the district. This will require the proper infrastructure and frame work (computer network) to accommodate data used for water management within this river section. This network would dove tail into the already existing IDWR telemetry system used to monitor spring discharges and return flows within Water Districts 01 and 02, and within the ESPA. These data would be retrieved at a designated time interval to assist the watermaster in delivery of water in Water District 02 on a daily basis. Additionally the structure of the system will allow water users feedback about their diversions and provide opportunities for better water management. Each site within the network will be built to be both a primary and slave type station in which other water measurement data may be transmitted or passed through as a means to retrieving data from difficult or remote locations within the system. This option will be a big help to the watermaster in managing diversion data collection. It provides a daily tool to manage district staff time in acquiring necessary data for proper water distribution, and it will also provide an annual report generating tool with consistent file structure and processing protocol for collected data.

## Performance Update on Proposed Work - April 1, 2015 through September 30, 2015

### Grindstone Butte Mutual Canal Company

The previous progress of this project was about 70% completion with the Grindstone Butte Mutual Canal Company (GBMCC) installing a flow meter and providing power to the site for monitoring equipment. Additional work in the previous review period included an onsite visit from a GE representative to certify the installation of the flow metering equipment has been on site and certified this installation for accuracy. During this review period included the completion of FCC approved license for this site along with installation of most of the telemetry hardware that includes the programming of a datalogger. The Water District Watermaster retrieved flow data multiple times throughout the season starting in about July from this equipment. Remaining items include programming of the radio and modem system and testing through the network. 85% project completion at this site.



*Grind Stone Butte and ATN Holdings flow meter and telemetry installation*



## **King Hill Irrigation District**

In the previous review period King Hill Irrigation District (KHID) installed ultrasonic Fuji meters on all 4 diversions out of the Snake River. These meters were installed and programmed by KHID staff and verified for installation minimums by Corbin Knowles. During this review period work on this site was limited due to KHID not budgeting for telemetry equipment but includes the completion of FCC approved license for these sites. Work remaining under this project included verification of accuracy, telemetry equipment installation along with programming of telemetry equipment. Completion on this project is about 65%.

## **SV Ranch LLC**

In the previous review period SV Ranch LLC installed two clamp-on Fuji ultrasonic flow meters on the middle river station (pump 2) approximately 2250 feet below the pump station. Corbin Knowles has verified installation of these meters on two 24" PVC pipe. Additionally stations 1 and had the NetaFim Octave flow meter (IDWR approved as standard meter) installed.

During this review period work on this site was limited to the completion of the FCC approved license for the three sites and the installation of pump site 3 having a Netafim Octave installed. Telemetry hardware has been mounted in panels and bench tested and awaits field installation. Completion of this project is about 75%.



*SV Ranch Site 2 two flow meters for dual penstock*

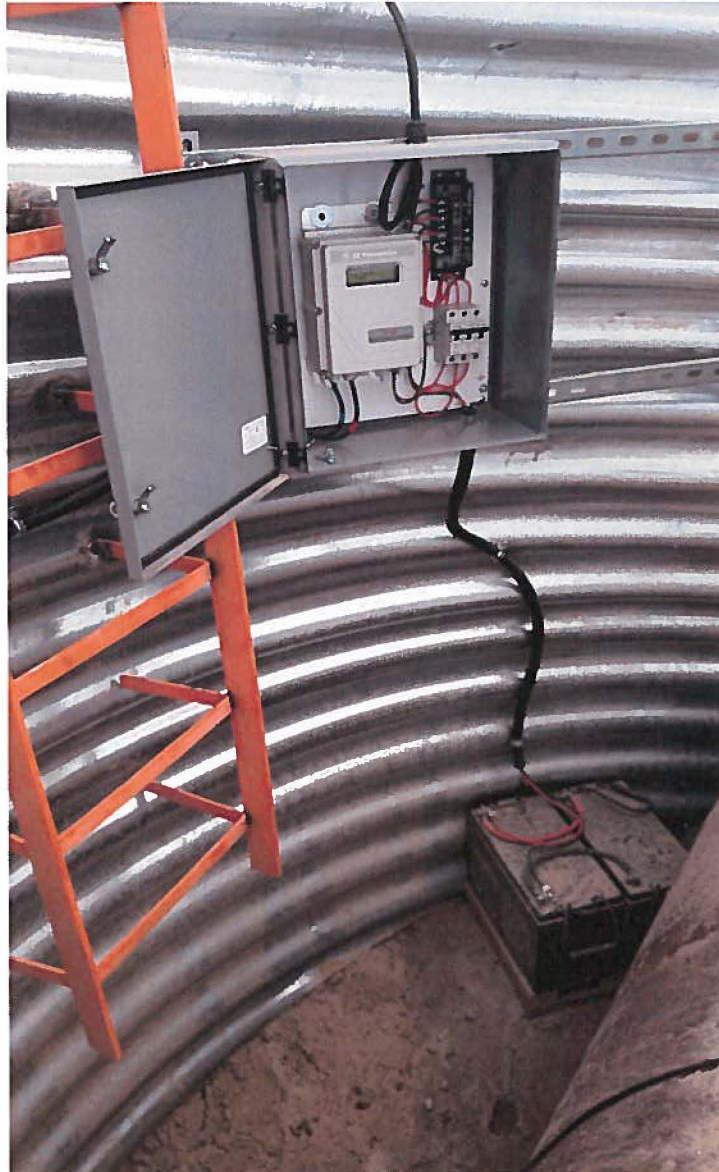


*SV Ranch 3 with flow meter installed on the left side of the photo*

### **Dale Van Es**

In the previous review period the project for Dale Van Es had a wetted GE Panametrics AT868 ultrasonic flow meter installed along with a DC power supply. Telemetry equipment has been ordered for this site along with FCC licensing for this site. Additional work remaining on this site is mounting of telemetry hardware and programming of telemetry networking with the Grand View tower to the east. Completion of this project is about 70%.





*Dale Van Es Falcon Butte Installation*

**Greg Mellum**

Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work has been completed at this site during this period.

**TR Investments (TRI)**

Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work has been completed at this site during this review period.

**Walker Plow LLP**



Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work has been completed at this site during this review period.

### **James Wolfe**

In the previous review period work included the installation of two Netafim flanged ultrasonic flow meters on two diversions for James Wolfe. The two diversions are less than 100 acres individually and may or may not require additional equipment to be installed. The direction adopted by the water users within the district may require data logging equipment and possibly telemetry. The two units installed are equipped with output capability and can easily be hooked up within the telemetry network if deemed necessary. Further follow up needs to be completed to insure diversion rates for these two smaller diversions are not exceeded. Project completion is about 95% with the remaining items to include site visit/flow meter accuracy check by the water master for the district.

### **Dale Hooley**

Progress on diversions owned and operated by Mr. Hooley has started. Two diversion one of which does not require a flow meter until the 2016 season based on the IDWR Final Order is for 145 acres near the Bruneau Dunes State Park. The dunes diversion has had no work completed as of the end of this review period.

The second diversion irrigates in excess of 500 acres and has had a Fuji Ultra Sonic flow meter installed to date with the excavation of penstock and installation of panels to enclose the new equipment. Telemetry equipment has been ordered for this site along with FCC licensing for this site.. Additional work remaining on this site is mounting of telemetry hardware and programming of telemetry network connectivity. Completion of this project is about 70%.

### **Louis Jeffery**

Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work has been completed at this site during this review period.

### **ATN Holdings LLC & Man Farms LLC**

ATN Holdings LLC installed a GE Panametrics AT868 single channel ultrasonic flow meter in the previous review period. This flow meter is installed in a 36" penstock approximately 3200 pipe feet below the river station. The use of wetted transducers on this installation was used to insure accuracy in a mortar lined heavy walled carbon steel pipe. During this review period work included the completion of FCC approved license

for this site along with installation of most of the telemetry hardware that includes the programming of a datalogger. The Water District Watermaster retrieved flow data multiple times throughout the season starting in about July from this equipment. Remaining items include programming of the radio and modem system, yagi antenna installation and testing through the network. 85% project completion at this site.

### **Merrill Brown**

During the previous review period Mr. Brown installed a ten inch Siemens Mag 5100 flow meter with panels to enclose the flow meter display and datalogging equipment that will be required for this site. Datalogging equipment needs to be ordered along with some follow up accuracy testing. Project manager followed up on this installation and found the installation of the flow meter to exceed the minimum requirements. Project completion is about 75% with flow meter installed but has data logger equipment yet to purchase and install on this system.

### **Leland Shetler (Neva Hamilton)**

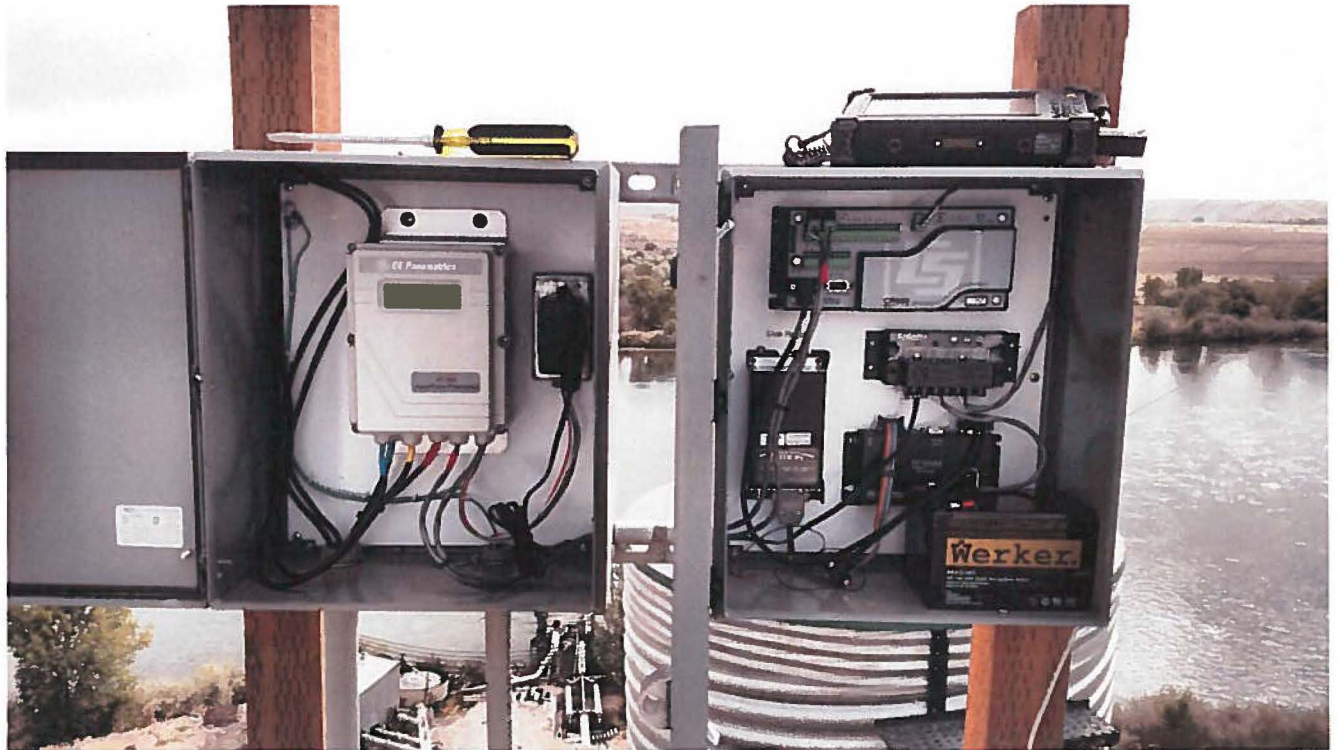
Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

### **Peter Sturdivant**

Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

### **Midnight Sun VIII LLC**

Midnight Sun VIII LLC installed a GE Panametrics AT868 dual channel ultrasonic flow meter. This flow meter is installed on a two penstock systems (18" and 20") approximately 200 feet below the river station. The use of wetted transducers on this installation was used to insure long term accuracy in carbon steel pipe exposed to hard water and electrolysis. This system runs off of an AC power supply and two enclosures have been installed with the flow meter wired. The original design for meter installation was to use the clamp on style transducers but after site inspection it was determined that a wetted transducer setup would work better. The wetted transducers were ordered after the original order of the flow metering equipment for clamp on style and have delayed the full deployment of this site for measurement. Estimated delivery of the wetted transducers equipment is for April of 2015. Telemetry equipment has been delivered but awaits installation as time permits through the 2015 irrigation season. This project is about 65% completed with transducer installation, flow meter programming, data logging equipment and radio telemetry equipment yet to be installed.



*MidnightSun Dual channel flow meter with telemetry equipment installation*

### **Eagle Creek North West LLC**

Eagle Creek North West LLC installed a GE Panametrics AT868 single channel ultrasonic flow meter in the previous review period with a large enclosure to expose the pipe longterm. In this review period the telemetry equipment was installed with the datalogger programmed recording flow data. Also the water master for WD 02 downloaded flow information beginning in July and collected the last 3-4 months of the irrigation season. Remaining items for this site include programming of the radio and modem along with hanging of a Yagi antenna. Site work for network testing will also be completed in the next review period. Previous progress was estimated at about 65% completion, this site is now approximately 85% completed.





*Eagle Creek flow meter with telemetry equipment installation*

### **West Indian Cover Water Company**

Work during this review period included the installation of a Fuji Ultrasonic flow meter on a 24" penstock that was excavated in the previous review period. Project completion in the last review period was estimated at approximately 25% due to earlier than normal dry conditions at the beginning of the irrigation season. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 65% with remaining items including telemetry equipment install, programming and testing of this site



*West Indian Cove flow meter installation*

### **Robert Meyer**

As in the first review period, this project has not had anything completed. Operator running the farm has a couple of contractors he is working with on this project and is waiting on bids to revamp the pumping plant along with the installation of a flow meter and telemetry equipment. Project manager did follow up with the operator and has been working with contractors to facilitate project completion prior to the 2016 irrigation season.

### **Blanksma Land & Storage**

Work during this review period included the installation of a Fuji Ultrasonic flow meter on a 24" penstock that was excavated in the previous review period. Project completion in the last review period was estimated at approximately 25% due to earlier than normal dry conditions at the beginning of the irrigation season. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 65% with remaining items including telemetry equipment install, programming and testing of this site

### **Gardner Brown**

Installation on this small use was completed during this review period with the water master following up on the installation of a 4 inch Badger M2000 flow meter. This site covers 18 acres under the water rights and will not require any additional work to be completed under the grant. Project completion is 100%.



### **Rocking S Ranch**

Installation and field check of a 10" Seametrics AG2000 flow meter was done during this review period. Additional items needing completed for this site include the installation of a datalogger along with programming and tie in to the flow meter.

### **Donna and Emma (and Robert) Bledsoe**

Progress on this project during the previous review period included installation of an ultrasonic Fuji installed by a contractor. Previous estimated project completion was about 65%. Site verification was completed by the project manager in June of 2015. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 75% with remaining items including telemetry equipment install, programming and testing of this site

### **Roger Young, Jacob & Clay Atkins**

Progress on this project during the previous review period included installation of an ultrasonic Fuji installed by a contractor. Previous estimated project completion was about 65%. Site verification was completed by the project manager in June of 2015. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 75% with remaining items including telemetry equipment install, programming and testing of this site.

### **Riverdale LLC**

Installation on this smaller use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

### **Sherwin Sunberg**

Installation on this smaller use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

### **Quey Johns**

Previous work on this project included trenching and installation of measurement ports in the 22 inch penstock off this pumping station. This review period the flow meter was installed and is operating correctly along with receiving telemetry equipment for this site.



Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 75% with remaining items including telemetry equipment install, programming and testing of this site.

#### **Wilson & Wilson Company Inc**

Progress on this project during the previous review period included installation of an ultrasonic Fuji installed by a contractor. Previous estimated project completion was about 25%. Site verification was completed by the project manager in June of 2015. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 75% with remaining items including telemetry equipment install, programming and testing of this site.

#### **Edge Water Ranches & Alonzo Leavell**

This project according to the water rights was identified as two separate owners/projects. After further review these two owners are now one owner and the project is being combined into to one site. No installation of flow metering equipment has taken place as of the date of this review period. Although excavation of pipe lines occurred fall of 2014 to provide measurement sections for the water master of water district 02. Completion on this project is less than 25% with installation of flow meter to occur sometime around the middle of May 2015.

#### **David Ayarra Jr. Trust**

Installation on this small use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

#### **Deruyter Properties LP**

This review period the flow meter was installed and is operating correctly along with receiving telemetry equipment for this site. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 70% with remaining items including telemetry equipment install, programming and testing of this site.

#### **Gingerich Brothers Farms**

Progress on this project during the previous review period included installation of an ultrasonic Fuji installed by a contractor. Previous estimated project completion was about 65%. Site verification was completed by the project manager in June of 2015. Additional work at this site has included the acquisition of telemetry equipment, radio

bench testing and FCC licensing for this site. Current project completion is approximately 70% with remaining items including telemetry equipment install, programming and testing of this site.



*Gingerich  
Brothers*

*flow meter install*

### **Verlin Gingerich**

Installation on this smaller use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.

### **William Wolfe**

Flow meter installation was completed on this site with flow meter working prior to the end of the 2014 irrigation season. This site will require a CR200X data logger to be installed during the winter months between the 2015-2016 irrigation seasons. This project is about 80% completed with data logger and programming remaining for this site.

### **Murphy Flats Water Company**

This review period the flow meter was installed and is operating correctly along with receiving telemetry equipment for this site. With the remote location of this site a solar array was installed and provides adequate power for flow measurement equipment. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 70% with remaining items including telemetry equipment install, programming and testing of this site.

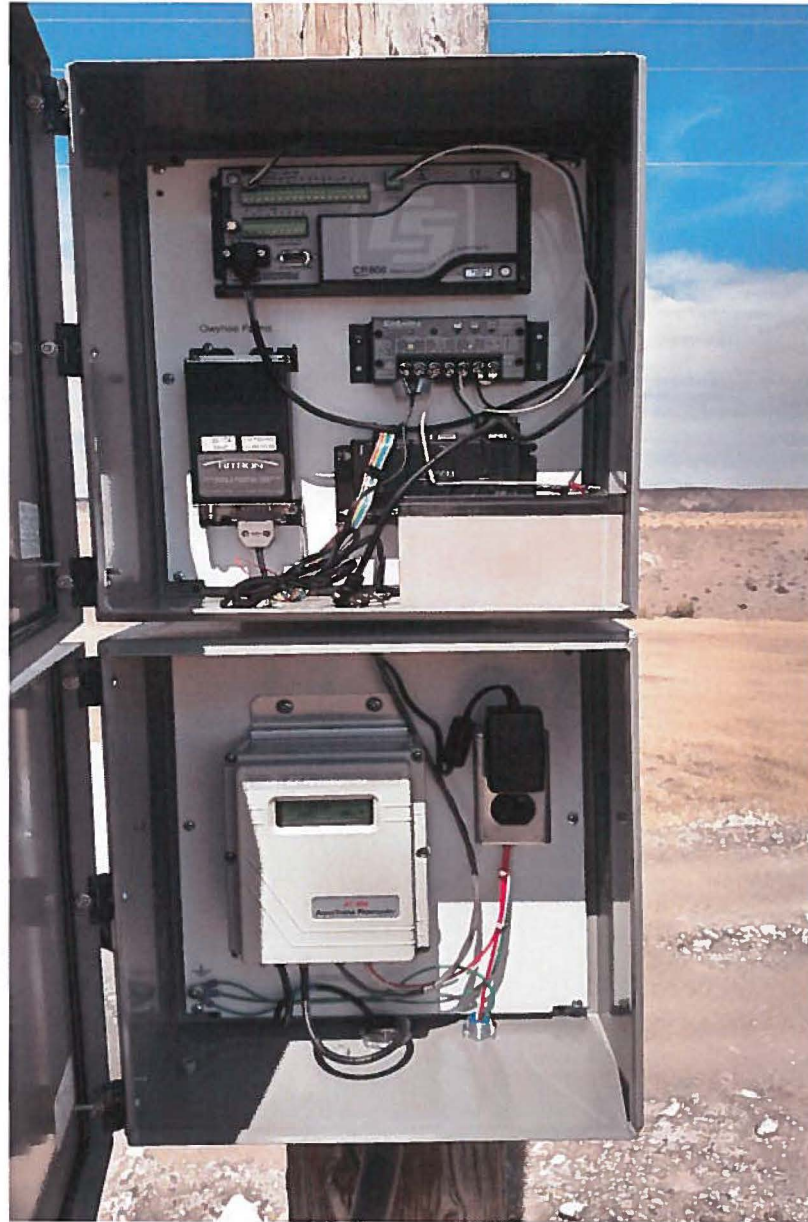


*Murphy Flats flow meter and telemetry installation*

### **Murphy Land Company LLC**

This project includes four pumping stations that have had GE Panametrics flow meters and are operable. Three sites were hard wired using AC power with a remote site having DC power installed using a solar array and 12 volt battery supply. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 70% with remaining items including telemetry equipment install, programming and testing of this site.





*Murphy Land  
Black Sands  
meter and  
installation*

*Company  
flow  
telemetry*



*Murphy Land Company Cove Arm flow meter and telemetry installation*

### **Frank Tiegs LLC**

This review period the flow meter was installed and is operating correctly along with receiving telemetry equipment for this site. 450 feet of flow meter cable was pulled along with installation of telemetry equipment and programming of a data logger. Also the water master for WD 02 downloaded flow information beginning in July and collected the last 3-4 months of the irrigation season. Remaining items for this site include programming of the radio and modem along with hanging of a Yagi antenna. Site work for network testing will also be completed in the next review period. Previous progress was estimated at about 25% completion, this site is now approximately 85% completed..

### **Donald Schiermeier**

Previous progress on this project included the installation of an ultrasonic Fuji installed by a contractor. Previous estimated project completion was about 40%. Site verification was completed by the project manager in June of 2015. Additional work at this site has included the acquisition of telemetry equipment, radio bench testing and FCC licensing for this site. Current project completion is approximately 70% with remaining items including telemetry equipment install, programming and testing of this site..





*Donald Schiermeier flow meter installation*

**Conrad Thomas**

Installation on this smaller use is not required until the 2016 irrigation season based on the IDWR Final Order requiring flow metering devices. No work was completed at this site during this review period.



**Idaho Water Resource Board  
Work Session Meeting  
January 21, 2016**

**Idaho  
Snow Survey & Water Supply  
Forecasting Program Overview**



**Ron Abramovich  
Water Supply Specialist  
Snow Survey  
Boise, Idaho**

# A Century of Snow Surveys

- 1916 – First Snow Surveys at Lewis Lake Divide in Yellowstone NP
- 1928 – First Idaho Snow Survey in Coeur d'Alene basin
- Morley Nelson, Columbia Basin Snow Survey Supervisor 1948-1972, located many of the snow measuring sites still used today.





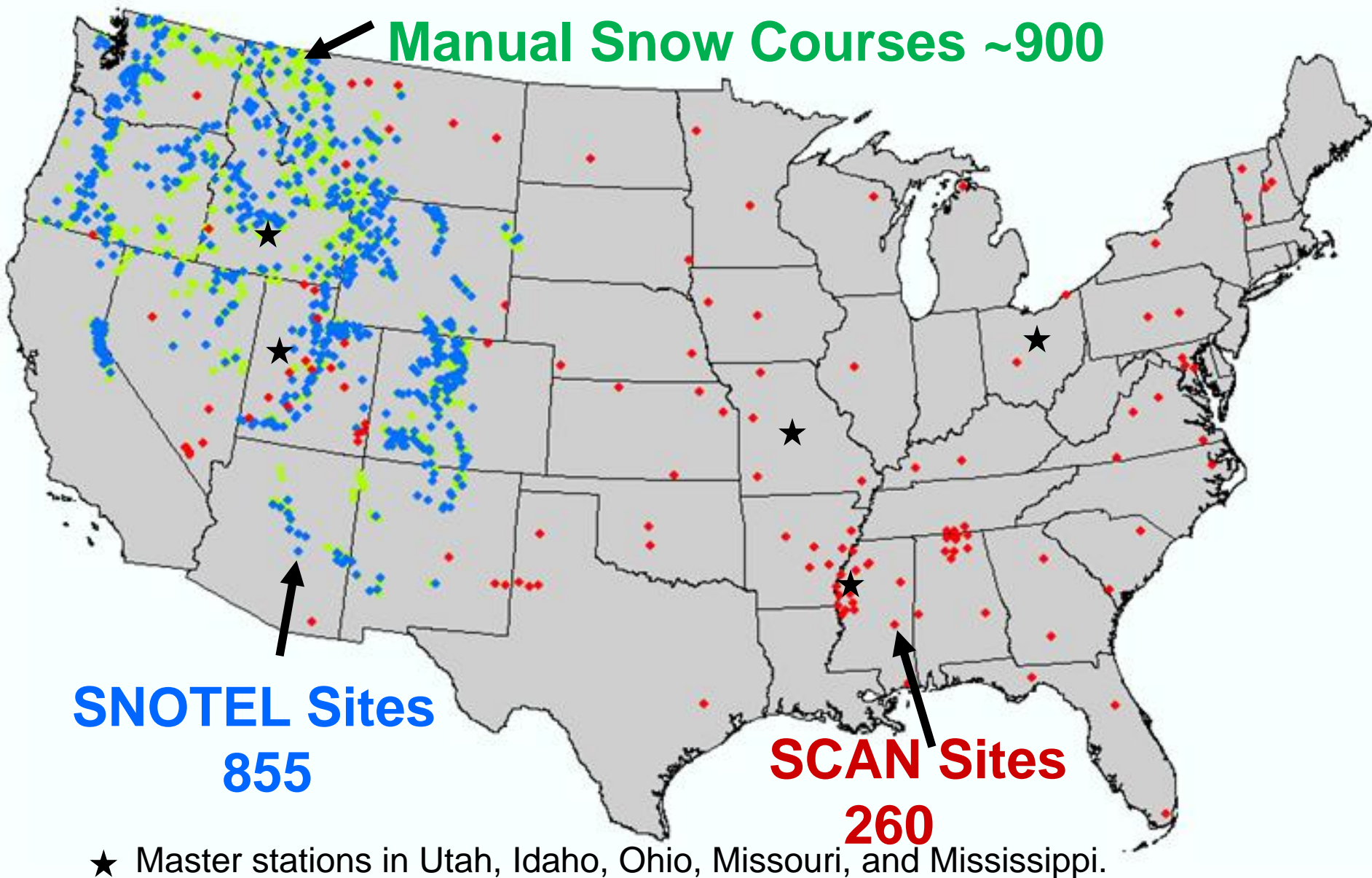
## Looking into Salmon River headwaters June 12, 2008



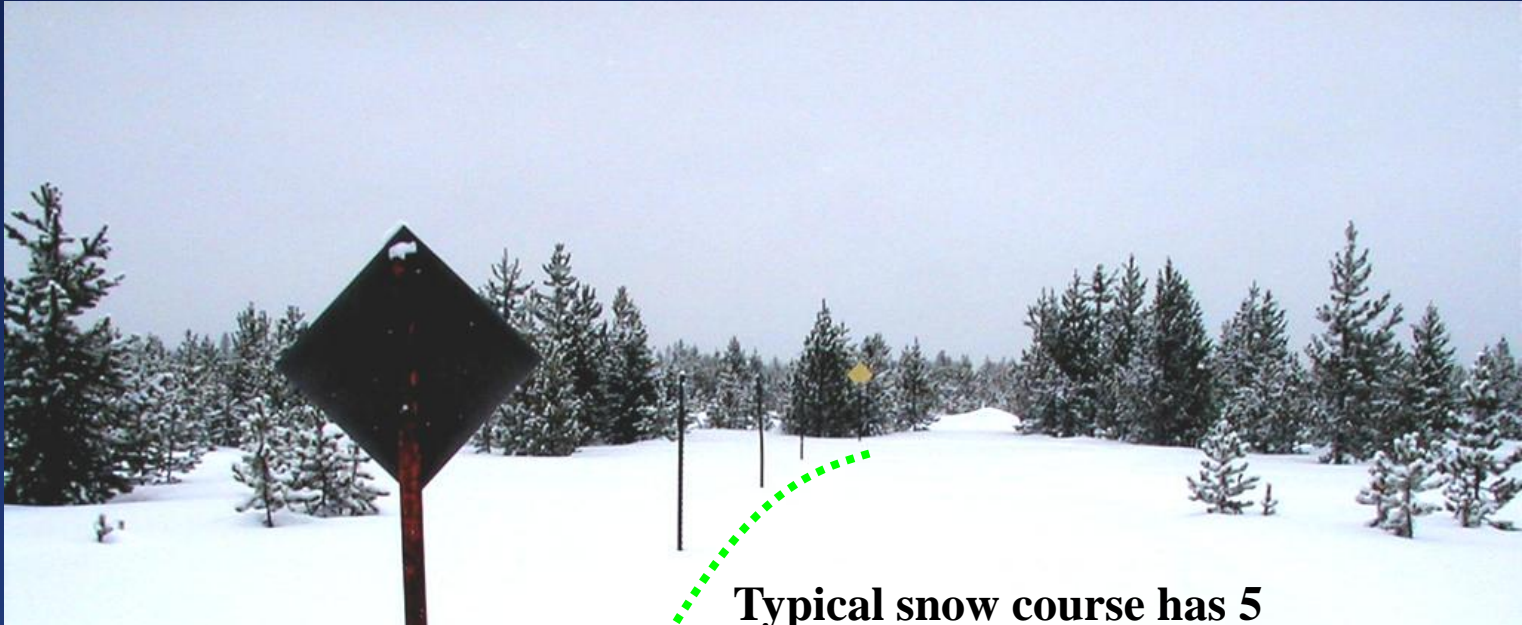
**Typical Idaho Snow Courses and SNOTEL Sites are located 6,000 - 8,000 feet in the snow accumulation zone that stores the greatest snow water amounts and provides our annual water supply.**

**We have learned, weather happens above & below these elevations. Sites are added slowly based on requests/funding/resources.**





# 100 Manually Measured Snow Courses in Idaho



**Typical snow course has 5 measurement points**

**Generally in high elevation areas**

**Monthly Measurements Jan/Feb to May**

**Measure Snow Depth & Snow Water Equivalent**



## **Idaho Cooperative Snow Survey Program**

- **100 Manually Measured Snow Courses**
  - **10 NRCS Offices – 29 Sites    18 Snow Surveyors**
  - **19 COOP Offices – 42 Sites    38 Snow Surveyors**
  - **10 Contractors    – 29 Sites    20 Snow Surveyors**
  - 100 sites    76 Snow Surveyors**
- **Snow course maintenance backlog of due to limited resources, need for 1 Seasonal Hydro Tech to coordinate the project**
- **Last year: 456 snow course measurements made (91% success rate, challenge was access in low snow year)**



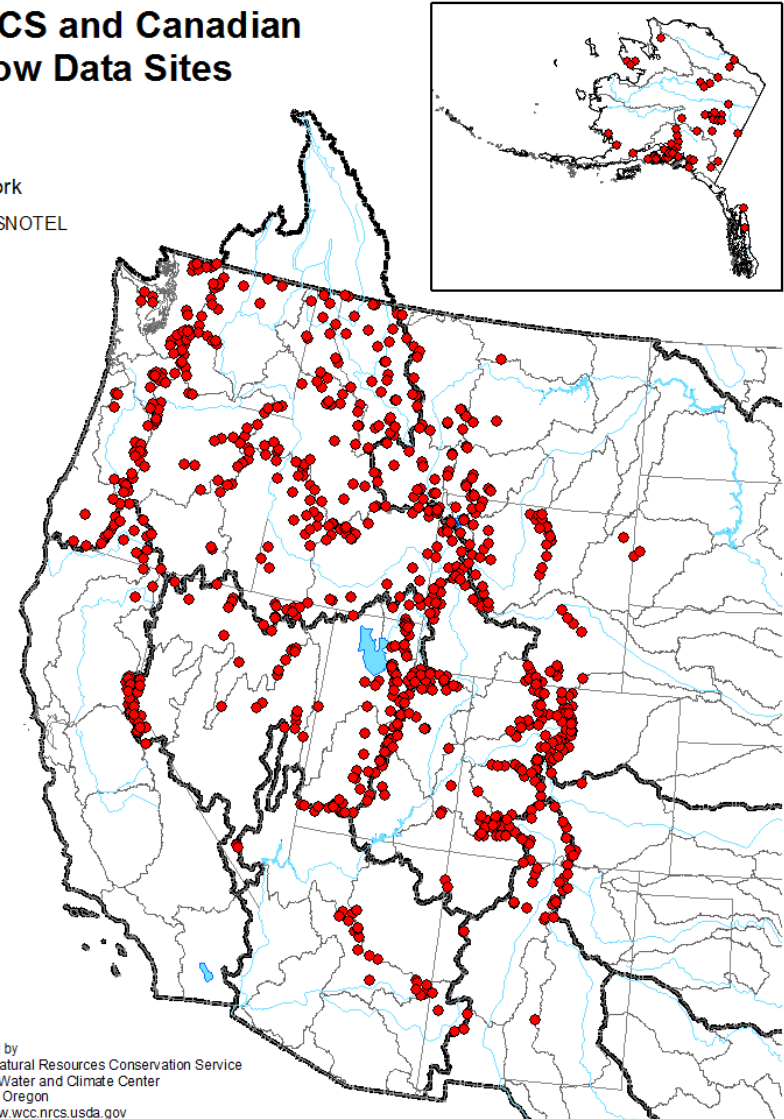
# NRCS SNOTEL Network

- SNOTEL network
  - 13 Western States
  - 885 sites (includes SnoLite)
  - More than 16 million observations/year
  - Data transmitted hourly in near real time

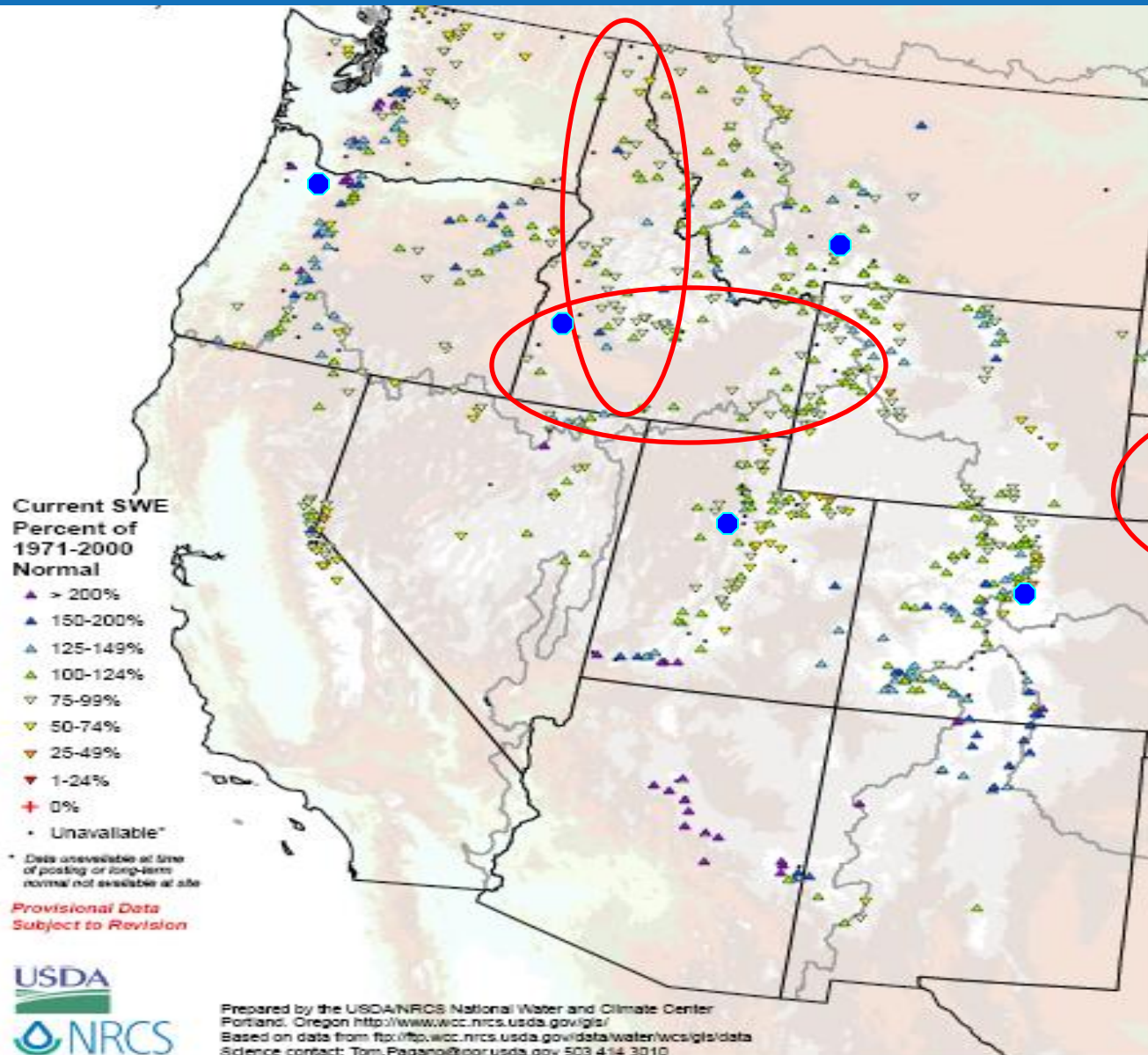
## NRCS and Canadian Snow Data Sites

Network

• SNOTEL



Prepared by  
USDA, Natural Resources Conservation Service  
National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>



## Snow Survey Data Collection Offices (DCO)

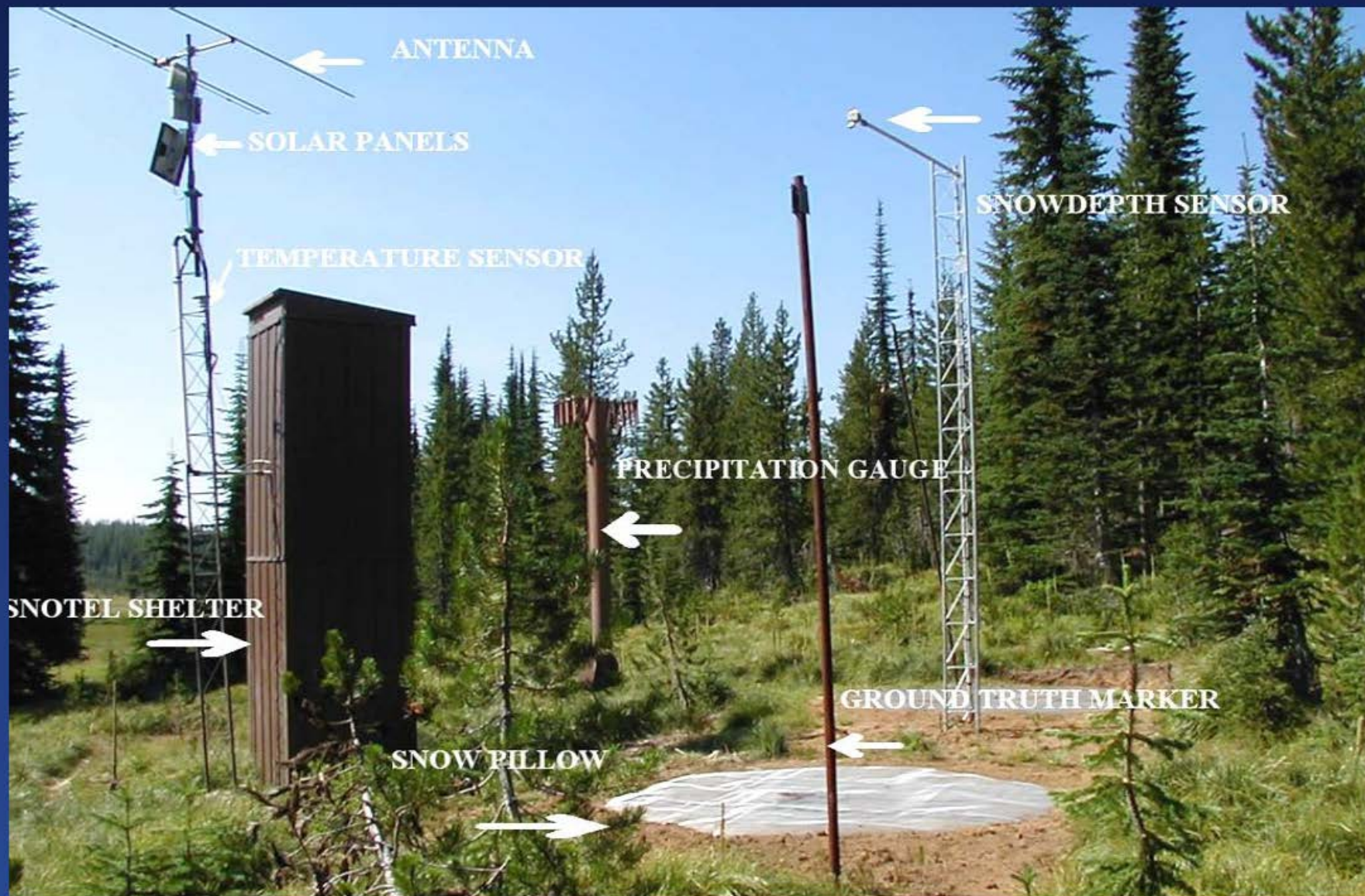
● **Boise Data  
Collection Office  
Jurisdiction**

**Other DCOs:**

- Salt Lake
- Denver
- Bozeman
- Portland



## Typical SNOTEL Site: Crater Meadows, Clearwater Basin



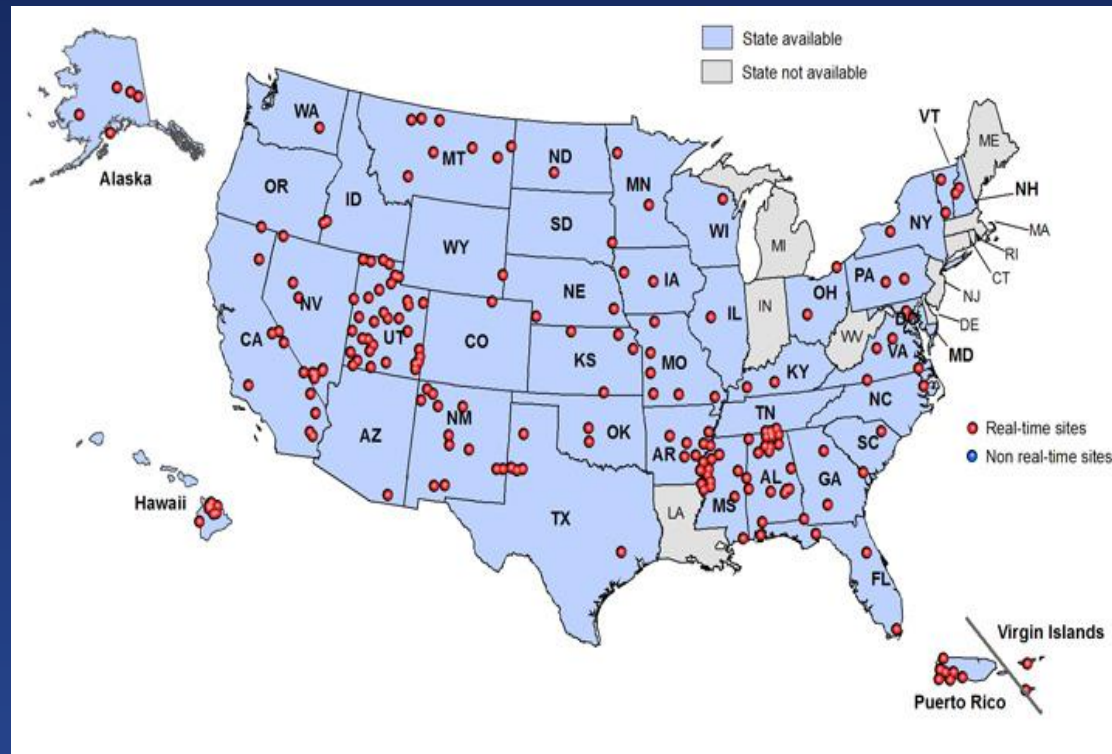


## **Idaho DDCO SNOTEL Network Summary**

- **118 SNOTEL Sites from Pinedale WY to Jarbidge NV to Spokane WA**
  - **Short Maintenance Season June – September**
  - **Field Crews are:**
    - Two 2-person crews with occasional local assistance**
  - **Office Hydrologists spend most of summer on SNOTEL O & M**
  - **Need for Two Seasonal Full Time Hydrologic Technicians**

# Soil Climate Analysis Network (SCAN)

- **SCAN (Soil Climate Analysis Network)**
  - 221 sites in 40 States and US Territories
  - Soil-climate monitoring
  - Uses cell or and meteor burst telemetry
  - Critical for drought monitoring



# Soil Moisture/Soil Temperature Sensors installed at 2, 8 & 20" deep

## Long Valley SNOTEL Site



### Idaho DCO

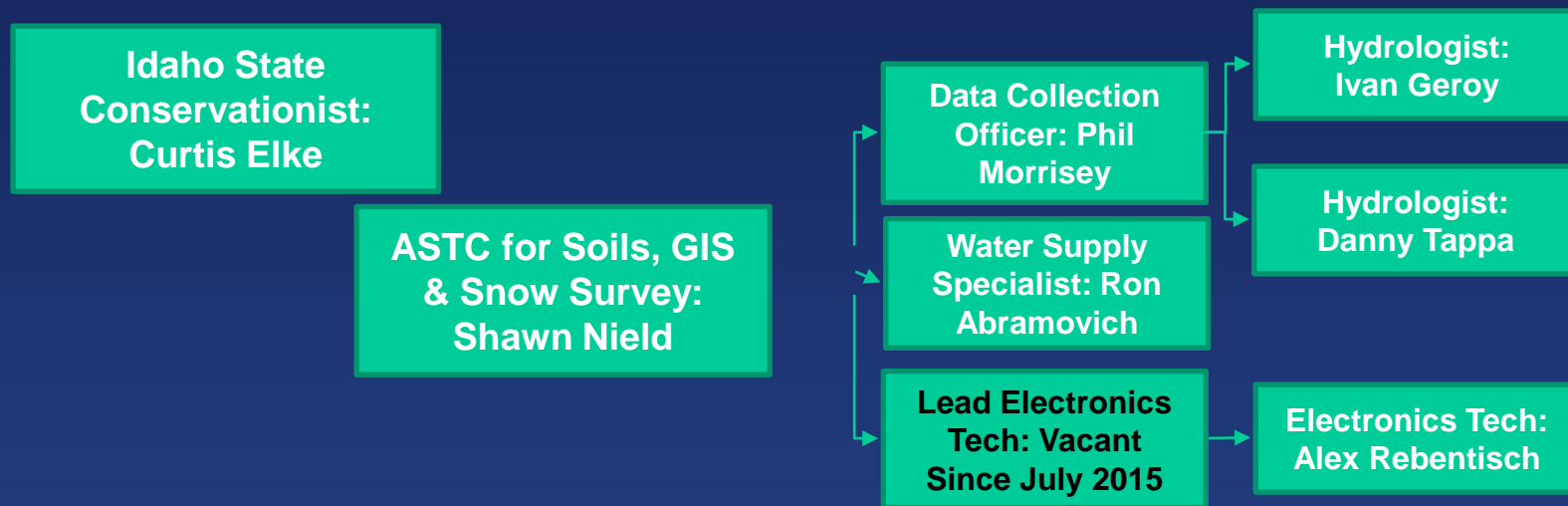
1 SCAN Site in Idaho  
36 SM/ST Sites in Idaho  
17 SM/ST in WA NV WY  
53 Total sites maintained  
by Idaho DCO

23 Sites with wind sensors

Boise soil moisture report showed  
streamflow forecast accuracy can  
be improved by 12% using Atlanta,  
Jackson & Bogus Basin, based on  
**ONLY** the 8" soil moisture data



# Idaho Snow Survey Staff January 2016



- 7 FTEs prior to 2013
- Process of filling Electronic Technician vacancy and hiring one seasonal temporary for summer 2016

## Idaho Snow Survey Water Supply Summary

### Staff:

- Provides ~100 News Media interviews a year
- Provides ~30 presentations a year
- Water Supply Forecasts Published in 2015
  - 77 Streamflow Forecast Points
  - 924 Forecasts Published Jan-Jun
  - 190 Surface Water Supply Index Jan-Oct
  - 1250 Streamflow Timing Forecasts, Recession Graphs
  - 39 Daily Water Supply Forecasts

## Idaho Snow Survey Water Supply Summary

- **Water Supply Outlook Report is emailed to:**
    - 250 Idaho Water Supply distribution list**
    - 200 Idaho NRCS employees**
    - ~ 150 US Drought Monitor email group**
    - 250+ Snow, Weather & Flow email group**  
**which is often forwarded to others**
    - ~ 2500 Idaho Whitewater Association email group**
- Total ~3,350 January to June**



## Current Partnerships CESU Agreements



Updating Snow to Flow Relationship for 13 Basin for use Spring 2016

1. Estimating the timing of peak streamflow using SNOTEL ablation curves  
(Kara Ferguson & Dr. Jim McNamara)

2. Estimating critical flow magnitudes using SNOTEL data  
(Becca Garst & Dr. Jim McNamara)

Start with Natural Flow for Boise River at Lucky Peak

Predicting Days above:

High Flows	8500 cfs
Surplus Volumes	6500 cfs
Day of Allocation	2200 cfs

**IDAHO SURFACE WATER SUPPLY INDEX (SWSI) January 1, 2016**

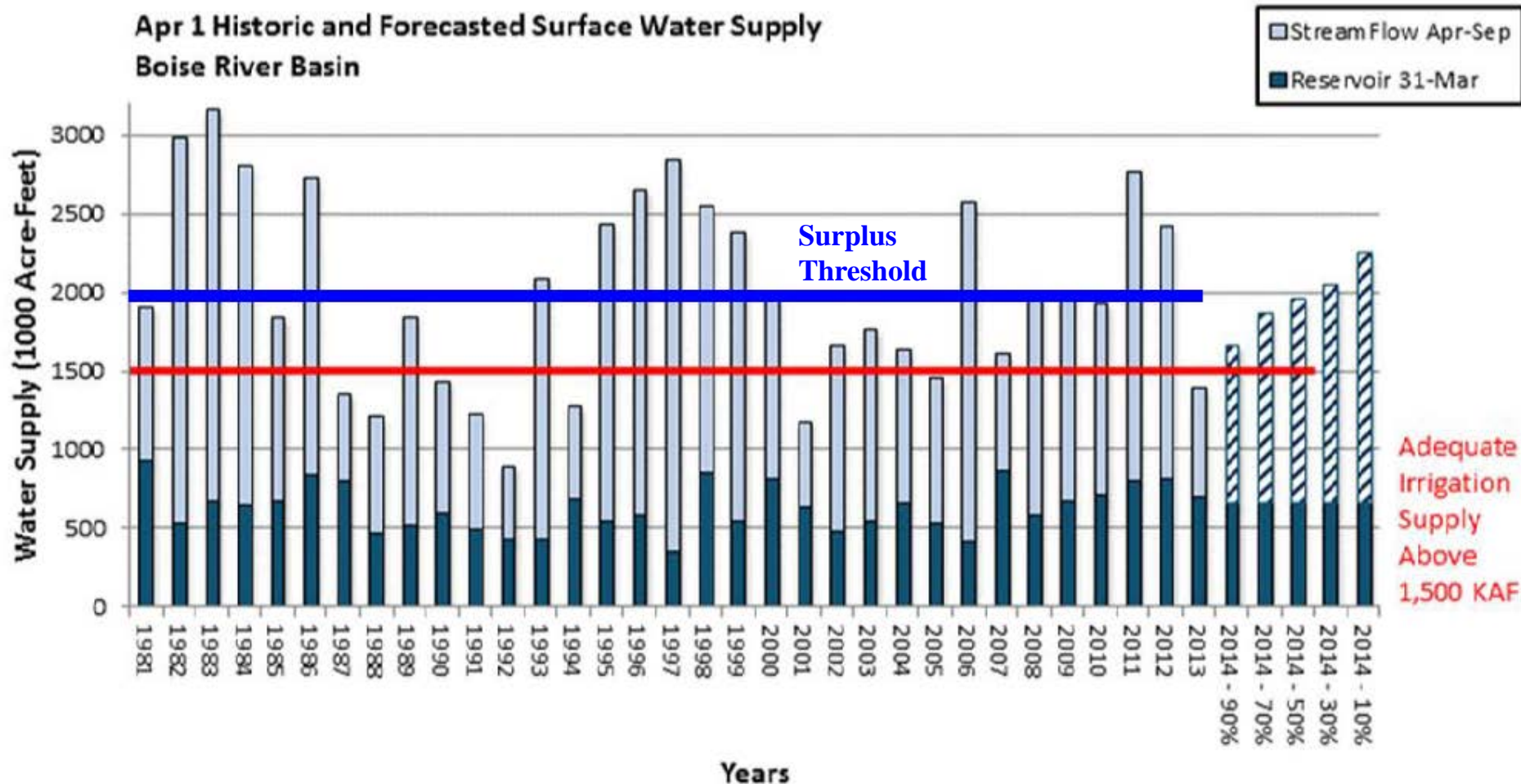
The Surface Water Supply Index (SWSI) is a predictive indicator of surface water availability within a watershed for the spring and summer water use season. The index is calculated by combining pre-runoff reservoir storage (carryover) with forecasts of spring and summer streamflow. SWSI values are scaled from +4.0 (abundant supply) to -4.0 (extremely dry), with a value of zero indicating a median water supply as compared to historical occurrences. The SWSI analysis period is from 1981 to present.

SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for some basins to indicate the potential for agricultural irrigation water shortages.

**Requests to  
expand the  
Idaho Surface  
Water Supply  
Index to better  
monitor  
droughts and  
surplus  
volumes**

<i>BASIN or REGION</i>	<i>SWSI Value</i>	<i>Most Recent Year With Similar SWSI Value</i>	<i>Agricultural Water Supply Shortage May Occur When SWSI is Less Than</i>
Spokane	-0.3	2013	NA
Clearwater	0.8	2006	NA
Salmon	0.6	2010	NA
Weiser	1.5	2010	NA
Payette	1.0	2008	NA
Boise	1.5	2012	-1.4
<b>Big Wood</b>	<b>0.8</b>	<b>2012</b>	<b>0.7</b>
Little Wood	1.3	2012	-1.2
<b>Big Lost</b>	<b>0.8</b>	<b>2010</b>	<b>0.7</b>
<b>Little Lost</b>	<b>0.8</b>	<b>2006</b>	<b>1.3</b>
Teton	0.3	2010	-3.9
Henrys Fork	-0.3	2012	-3.5
Snake (Heise)	-0.3	2010	-1.6
Oakley	1.3	2005	0.7
Salmon Falls	1.7	1993	-0.5
Bruneau	3.1	2006	NA
Owyhee	1.0	2005	-3.0
Bear River	-0.8	2015	-3.7

## Example of Boise River Surplus Volumes, based on when flows are greater than 6500 cfs Glennwood gage





## Reservoir Operating Guides (ROG)

Idaho Snow Survey provides assistance to private reservoir operators

### Status of current ROGs

- Magic & Salmon Falls ROG are current, need updated peak flow information
- Mackay & Oakley ROG – needs updating to finalize
- Montpelier Reservoir ROG – needs updating and flow data
- Possible partnerships to accomplish



## **Future Work**

**2016 Potential to install 2 SNOTEL sites pending permit approval, staff resources, and O&M**

- **Iron Mine in Fish Creek basin – funding from irrigation district, no O&M**
- **O'Neil Creek in Salmon Falls basin in northern Nevada – funding from NRCS fire funds several years ago.**

**Typical SNOTEL site costs \$30,000 for equipment, does not include site investigation, 2-3 days to install, or \$3,000 O&M**

**Idaho's Reimbursables bring in ~\$90,000**

**\$70,000 from COE, \$20,000 from private entities**

## **Opportunities to Partner on Future Work**

**Idaho State Technical Committee – suggestion from  
State Conservationist to form Sub-Committee for  
Hydrology / Snow Survey**

**Committee would provide input to State Technical  
Committee that prioritizes Idaho's conservation needs**

**Looking for partners and support to get things done. We  
have the technical expertise but limited resources.**



## **Opportunities to Partner on Future Work**

### **Projects Might Include:**

- **Install New SNOTEL or SCAN Sites**
  - Coordinate installs with MT & OR
- **Summer SNOTEL or Snow Course Maintenance**
- **Water Supply Products / Tools**
- **Reservoir Operating Guides**
- **Incorporate Soil Moisture Data into Useable Products**
- **Better use of Current / New Technology**
  - Daily MODIS Snow Cover Area Maps
- **Continue Ongoing Projects with BSU:**
  - Snowmelt Timing Products to assist water users & water managers in their water resources decisions

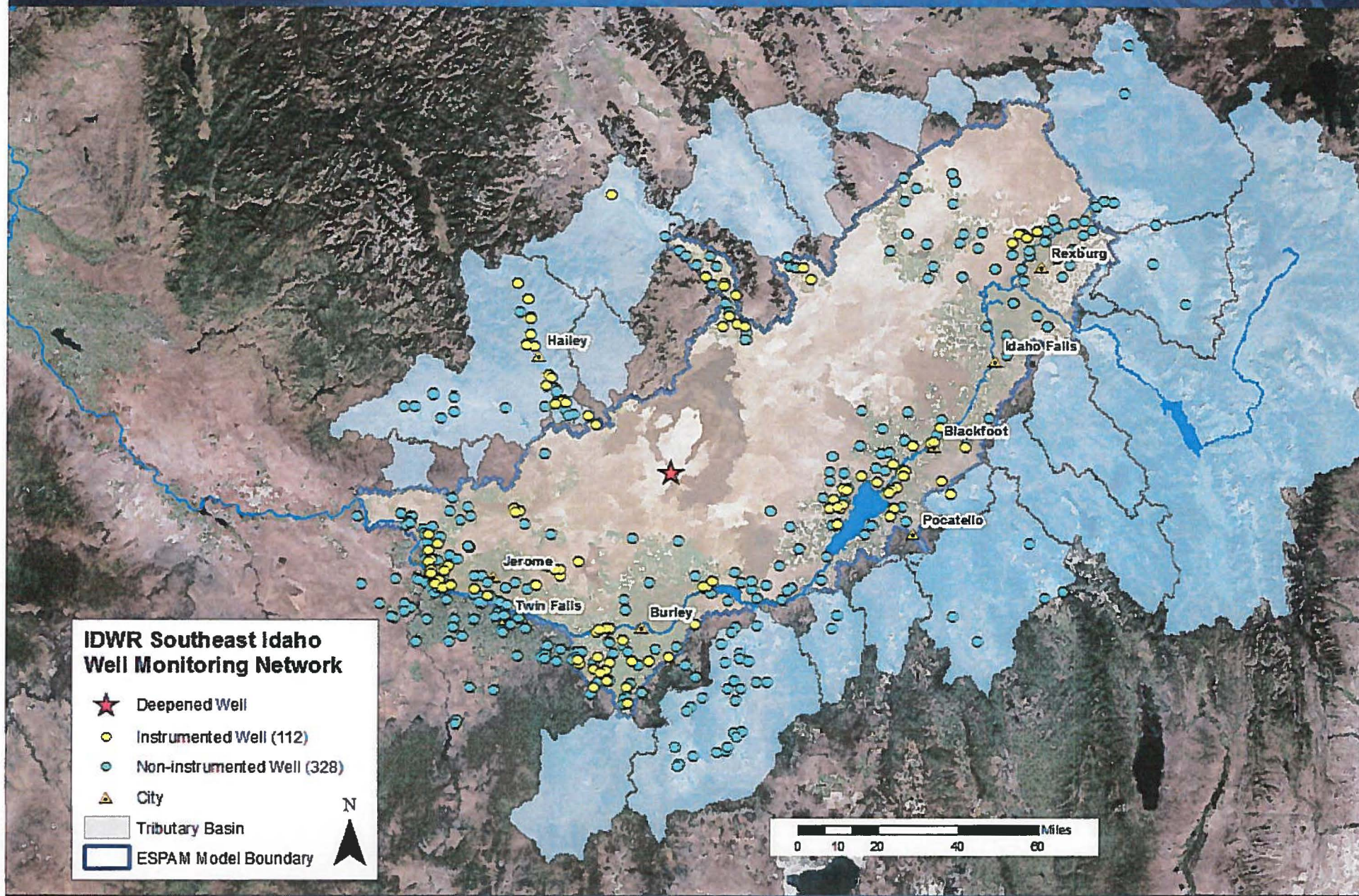
## Data Collection & Analysis Issues

- More timely water level data collection and database entry needed for:
  - Assessment of recharge impacts/aquifer health
  - Low-flow period Adjusted Average Daily Flow predictions
- ESP Monitoring System in maintenance mode → additional resources may be necessary for:
  - Designing/implementing monitoring system upgrades
  - Site-specific recharge monitoring
  - Statistical analyses of water level and springflow trends
- Proposed elimination of Rule 50
  - GW and SW resources in tributary basins generally not well characterized



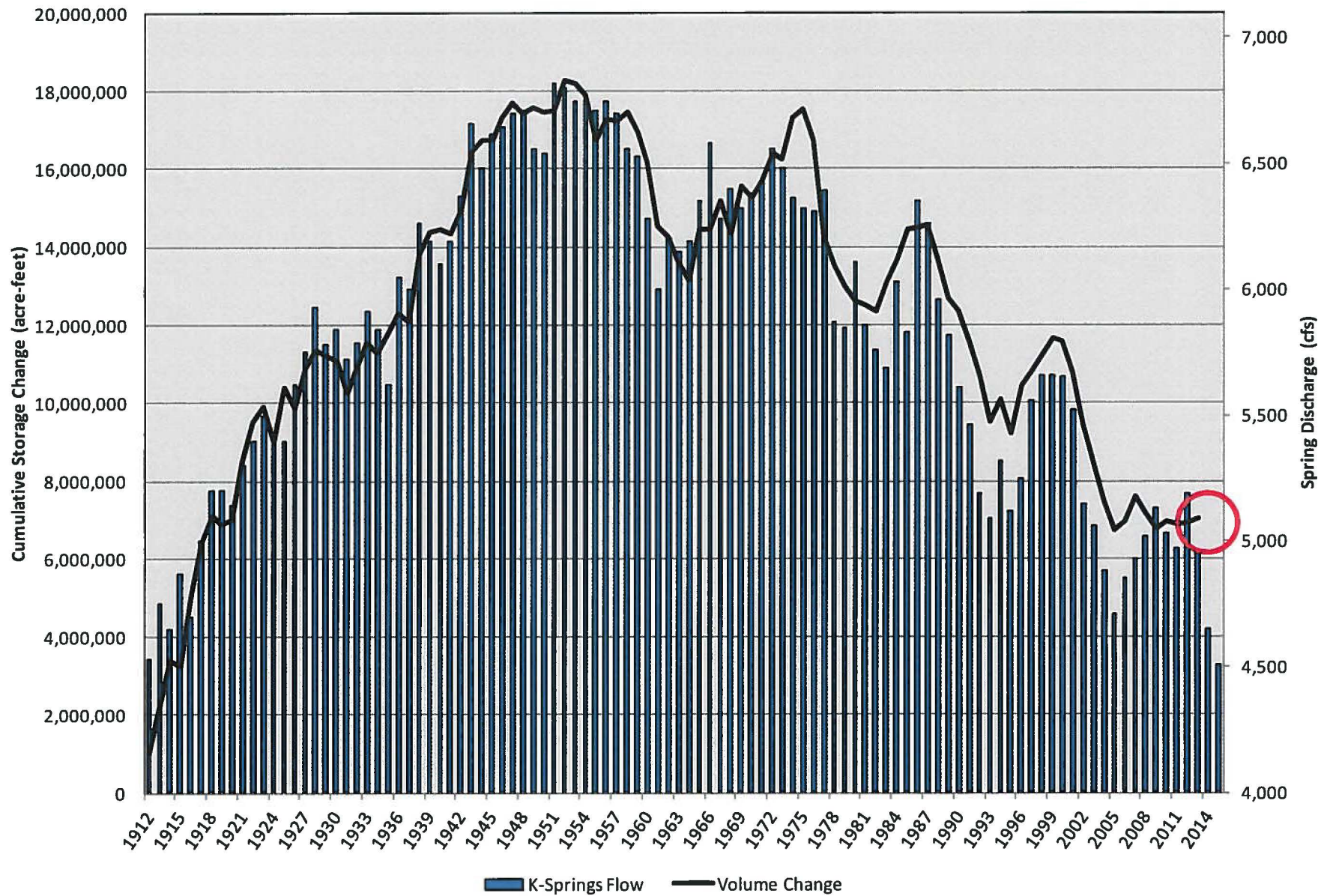


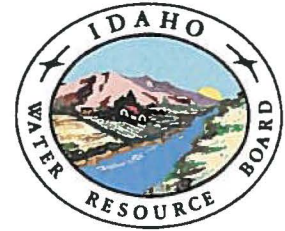






## Change in ESPA Aquifer Storage with Discharge at Thousand Springs





# MEMO

**To:** Idaho Water Resource Board

**From:** Rick Collingwood

**Date:** January 22, 2016

**Subject:** Outlet Water Association – Domestic Water Supply Improvements

---

---

## **Action Item: \$100,000 loan**

---

### **1.0 INTRODUCTION**

The Outlet Water Association (OWA) is requesting a \$100,000 loan at 3.5% interest with a 20-year term to drill a second well, and construct a new access road to the well site, larger supply line, and complete water system additions and upgrades to the existing pumping station (project).

### **2.0 BACKGROUND**

The OWA is located in Bonner County near the Outlet Bay Area of Priest Lake, Idaho (see Project Area map). OWA provides domestic water to 88 residences and a USFS campground. The OWA provides water service to 78 seasonal and 9 year round residences. In addition, a single service line to the Kokanee Park Homeowners Association provides supplemental water to the Association to serve 35 seasonal households during high demand during the summer months.

The OWA owns and operates a domestic water supply system for the residences of the Outlet Bay area. The domestic water supply system is comprised of a single well and pump house, two water storage tanks (60,000 and 18,000 gallon), and approximately ½ mile of 3-inch supply line to the water storage tanks.

OWA's well and pump house are located on USFS land approximately ½ mile from the service area. The association renewed a special use permit with the USFS in 2015 for a 30-year period. The two water storage tanks and approximately one-half of the 3-inch supply line is located on land owned by the Outlet Bay Sewer District. The OWA has secured a permanent easement across the Outlet Bay Sewer District land for operation and maintenance of OWA's water supply pipeline, pump house, and water tanks.

### **3.0 PROPOSED PROJECT**

The project includes the following:

- drilling of a new 65-foot deep well
- installation of two 10-hp pumps (one for the existing well and one for the new well)
- burying of approximately 400-feet of 3-inch electrical conduit to replace a section of an overhead power line which runs through a wooded area to the pump house



- pump house manifold and piping modifications
- water system control upgrades for operation of the new well
- construction of approximately ¼ mile of new access road to the well and pump house site

In the future, OWA plans to install a stand-by generator for a backup power source. The stand-by generator would allow water system operations to continue during power outages.

James A. Sewell & Associates, LLC, Newport, Washington, is providing the engineering and design services for the project. The project cost estimate is \$231,000. Currently, the OWA has paid approximately \$76,500 for engineering and design, and the first phase of the new access road construction, which commenced in late October and is 80% complete. Final grading of the access road is scheduled to be completed in the spring of 2016. As soon as funding is secured, the new well will be drilled and the related pump station and pump house improvements will be completed. The remaining project costs will be budgeted and paid for by OWA.

#### **4.0 BENEFITS**

The Idaho Department of Environmental Quality (DEQ) and Panhandle Health have recommended for several years that OWA develop a second water source. By drilling a second well, installing a larger supply pipeline, and removing overhead power lines in a wooded area to reduce power outages caused by trees falling on the power lines, this project will create a more reliable water system for the residents served by the OWA water system.

#### **5.0 FINANCIAL ANALYSIS**

OWA is requesting a loan of \$100,000 at 3.5% interest for a 20-year term. The annual loan payment will be \$7,036.11.

The current quarterly assessment is \$54 for the OWA and \$45 for the Kokanee Park development. The OWA does not anticipate an increase to the current quarterly assessments to meet its yearly loan payment obligation.

In reviewing OWA's revenues and expenses, it appears that OWA can absorb the annual loan payment under the current rate structure. However, the cash balance at the end of each year will be reduced significantly due to the annual loan payment. OWA may need to modify the assessment rate structure to maintain a higher cash balance at the end of the year.

<b>Year</b>	<b>Revenue</b>	<b>Expenditures</b>	<b>Cash</b>
2012	\$20,826.00	\$16,377.00	\$57,625.00
2013	\$26,735.00	\$13,847.00	\$70,595.00
2014	\$27,117.00	\$18,515.00	\$67,672.00
2015 (YTD)	\$29,916.00	\$88,345.00	\$10,379.00

Note: The substantial increase in expenditures for 2015, is due to the project engineering and Phase 1 of the access road construction costs totaling \$76,526.46.

**Loan History:****Current**

This is OWA's first loan request from the Idaho Water Resource Board. Currently, the OWA has no outstanding debt.

**6.0 WATER RIGHTS**

The OWA water rights are summarized in the following table. Ground water permit 97-7521 (permit for a new well), and ground water right 97-7291 will be the two sources of potable water for the OWA. The two spring water rights, 97-7013 and 97-2053, are not currently used as additional sources of water for the OWA, and the OWA has no plans to use the springs for the potable water system.

<b>WATER RIGHT</b>	<b>SOURCE</b>	<b>FLOW (cfs)</b>	<b>WATER USE</b>	<b>BASIS</b>	<b>PRIORITY DATE</b>
97-7291	Ground Water	0.27	Domestic	License	3/25/1989
97-7521	Ground Water	0.56	Domestic	Permit	2/27/2015

**7.0 SECURITY**

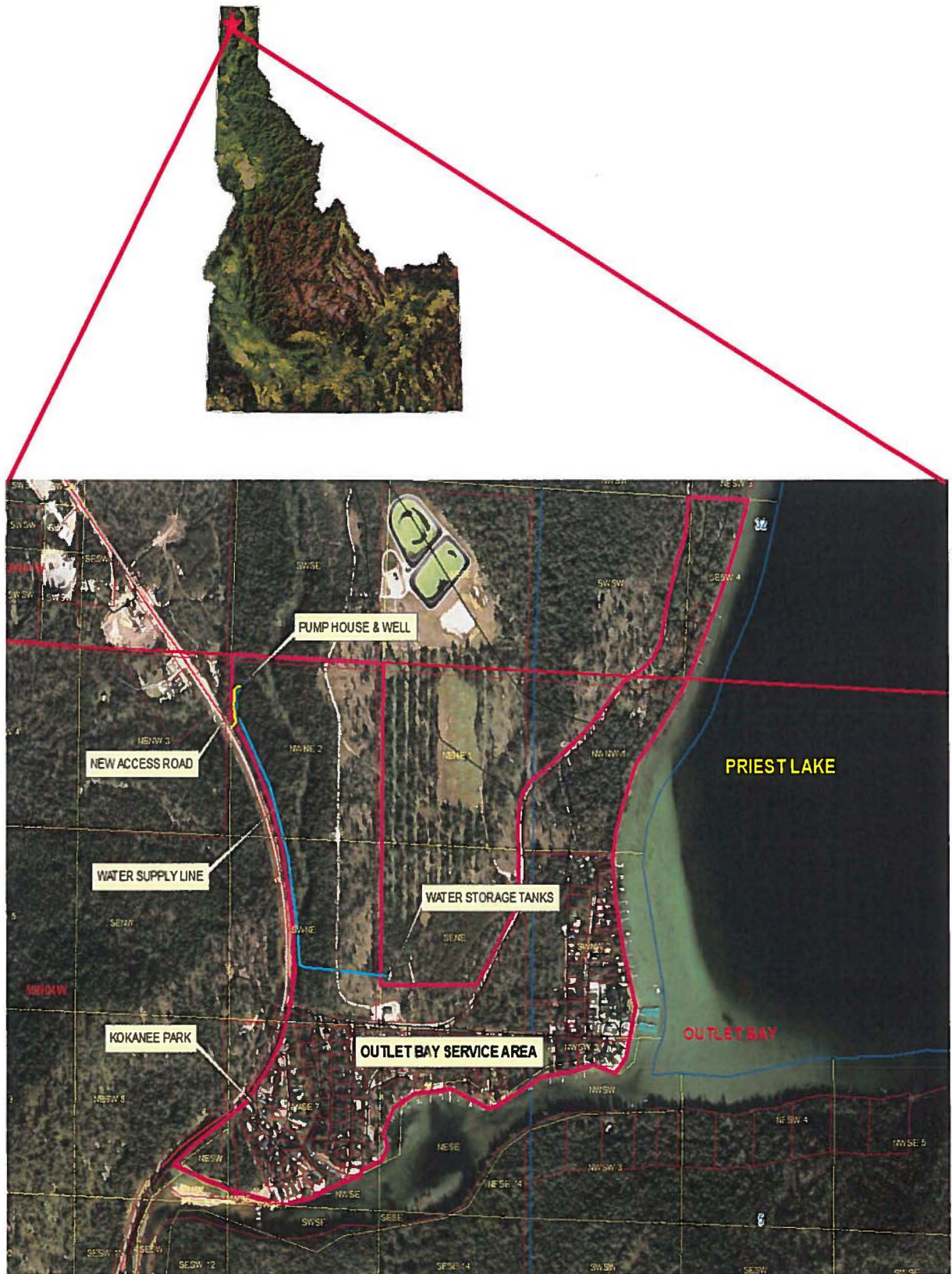
The Board will hold Outlet Water Association water rights, including two spring water rights, 97-7013 and 97-2015, which are not connected to the domestic water system, newly constructed facilities and equipment, and existing water system facilities as security for the loan.

**8.0 CONCLUSION AND RECOMMENDATION**

This loan will be used to drill a second well, complete pump station modifications and upgrades, install a larger supply line to the water storage tanks, bury an overhead power line, and construct a new access road to the pump house and well site.

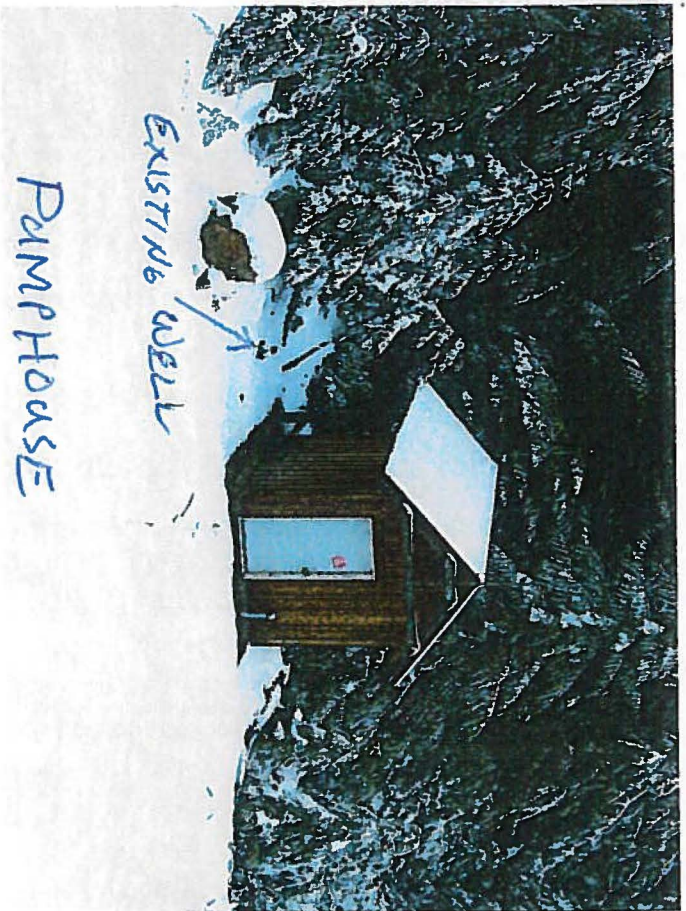
The project will benefit the OWA and the residents served by the OWA water system. Staff recommends approval of the requested loan.

## Map of Project Area



(See additional photos of the project facilities included with attached application.)



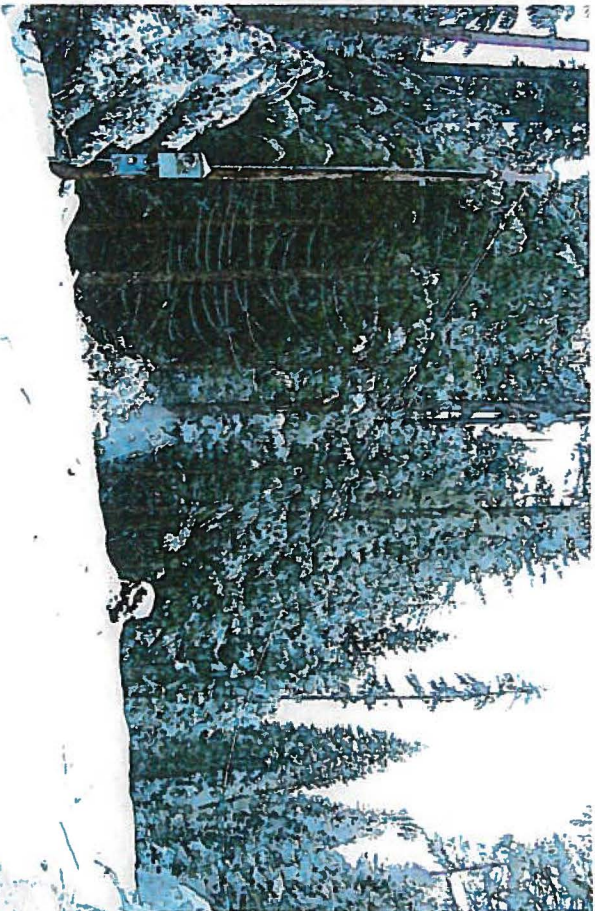


PAMPHOUSE

EXISTING WELL



OVERHEAD POWER LINE

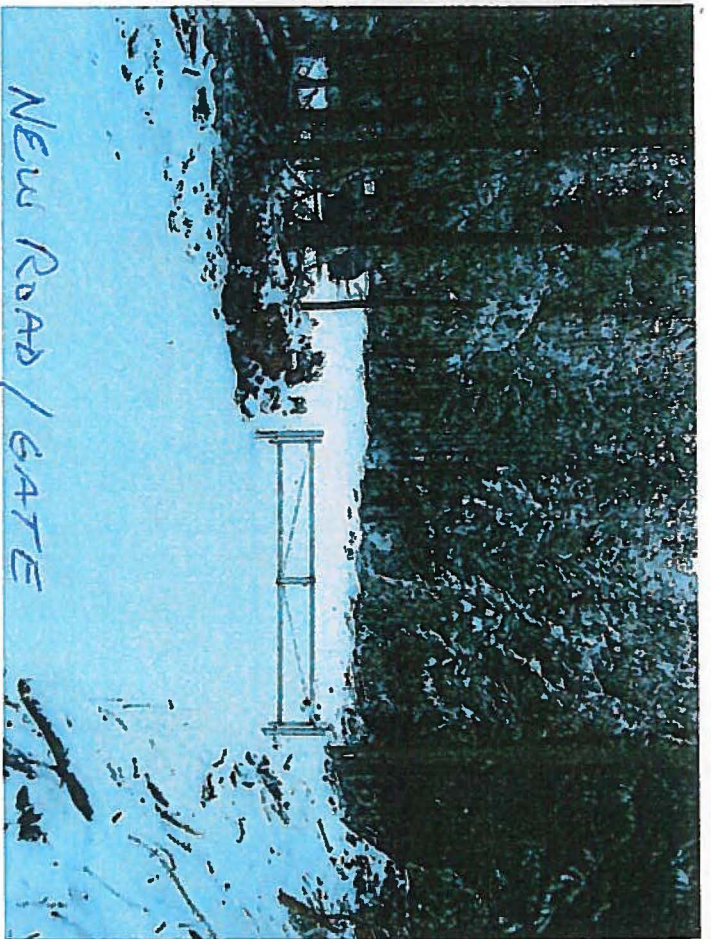


OVERHEAD POWER LINE



NEW ACCESS ROAD





New Road / GATE



New Road



STORAGE TANKS



10' X 20'  
EQUIPMENT STORAGE BUILDING



BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF THE )  
OUTLET WATER ASSOCIATION )  
\_\_\_\_\_)

A RESOLUTION TO MAKE  
A FUNDING COMMITMENT

WHEREAS, on December 11, 2015, a Letter of Intent and Loan Application from the Outlet Water Association (Association) were submitted to the IDAHO WATER RESOURCE BOARD (Board) requesting a loan in the amount of \$100,000; and,

WHEREAS, the Association provides domestic water to 88 residents and a USFS campground in the Outlet Bay Area of Priest Lake, Bonner County; and,

WHEREAS, the Association needs to undertake several improvement projects, which include drilling a secondary well and construction of a new access road to the well and pump house site; and,

WHEREAS, these additional funds will be used to undertake the needed improvements to the system; and,

WHEREAS, the Association is a qualified applicant and the proposed project qualifies for a loan from the Revolving Development Account; and,

WHEREAS, the proposed project is in the public interest and is in compliance with the State Water Plan.

NOW THEREFORE BE IT RESOLVED that the Board approves a loan for \$100,000 at 3.5% interest with a 20 - year repayment term, and provides authority to the Chairman of the Idaho Water Resource Board or his designee to enter into contracts with the Association on behalf of the IWRB.

BE IT FURTHER RESOLVED that this resolution and the approval of the loan are subject to the following conditions:

1. The Association shall provide acceptable security for the loan to the IWRB including, but not limited to the Association's water rights, property, and facilities.
2. The Association shall establish a reserve account in an amount equal to one annual payment.
3. The Association shall comply with all applicable rules and regulations that apply to the proposed project.



DATED this 22<sup>th</sup> day of January, 2016.

---

ROGER W. CHASE, Chairman  
Idaho Water Resource Board

ATTEST \_\_\_\_\_  
VINCE ALBERDI, Secretary

# **Loan Document of New Well and Associated Improvements**

**Sponsored by the  
Outlet Water Association  
In conjunction with the  
Idaho Water Resource Board**

**December 2015**

## **Outlet Water Association**

Bill McInerney; President

Vern Melvin; Vice President

Office Services; Treasurer

## **Attorney for the Outlet Water Association**

Brian M. Werst

K&L Gates LLP

618 West Riverside Ave

Spokane Washington 99210-5102

(509) 624-2100

## **Engineering and Technical Support**

Eric Eldenburg, Principal PE

James A. Sewell & Associates, LLC

600 - 4th Street West

Newport Washington 99156

(509) 447-3626



# **Loan Document of New Well**

## **Outlet Water Association**

### **New Well and Associated Improvements**

#### **Introduction (Need for the Project)**

The Outlet Water Association (OWA) located in Bonner County, operates a water supply system to supply domestic water to the residences of the Outlet Bay Area of Priest Lake Idaho. The current well, with 7-1/2 hp pump, has managed to keep up with demand, however, during summers of high demand, the well runs almost continuously during the day. It pumps water to 2 storage tanks, a 60,000 gallon and an 18,000 gallon, located approximately half mile away. The DEQ and Panhandle Health have been suggesting for several years that OWA develop a second water source. OWA wishes to drill a new well with a 10 hp pump, and purchase a second 10 hp pump to be installed in the existing well when the 7-1/2 hp fails. OWA currently cannot run 2 pumps simultaneously because the 1/2 mile long line to our storage tanks is too small, but we can run a single 10 hp.

#### **Project Sponsor**

The Outlet Water Association is registered with the State of Idaho. There are currently 9 year round households, 78 part-time households, and a US Forest Service campground, which is part time. OWA also furnishes a single 3/4" connection to Kokanee Park Homeowners Association, a neighboring development with 35 seasonal households, for supplementing their potable water system when their supply has difficulty meeting their demand. We consider this as a single connection. Kokanee Park has a separate irrigation system which uses lake water. OWA is authorized to do projects and assess fees as voted on by its directors. OWA has the power to discontinue water delivery to the residences if they fail to pay their bill. A copy of the incorporation and by-laws are included in Appendix B.

#### **Project Service Area and Facilities**

The OWA provides water for 88 residences and a USFS campground in Bonner County. The OWA is located 26 miles north of Priest River Idaho on Highway 57 and covers a service area of approximately 200 acres. The residences serviced by OWA include 78 seasonal and 9 year round with approximately 5 acres of irrigation for lawns and gardens. The USFS Campground is also seasonal, and is furnished water for flushing toilets and drinking only. Kokanee Park Homeowners Assn, a neighboring development with 35 seasonal households, is furnished with a single 3/4" connection for supplementing their potable system during high demand. Kokanee Park has a separate irrigation system which uses lake water. A map of the service area is included in Appendix G.

OWA's well and pump house are located approximately 1/2 mile away from the service area on property that is used under special use permit with the USFS. This special use permit was renewed in 2015 for a 30 year period. Approximately half of OWA's line to the storage tank is also on permitted USFS property. The second half, including the storage tanks is on a permanent easement with the Outlet Bay Sewer District.

In the 80's when OWA's first well was developed, the access into the well site was a cow trail through the property of the Priest Lake Lumber Company. Under the best conditions it required 4 wheel drive and adverse conditions required a Caterpillar tractor to tow equipment in and out. One of the priorities of OWA was to build a new access road into the site, which required 5 years of negotiating with the USFS, since it is on USFS property.

## **Hydrology and Water Rights**

The source of water that serves the residences is a groundwater well. The water right for the well, #97-07291, appropriation date of 1989, and #97-07521, appropriation date of 2015, total 0.56 cfs and a total annual volume of 142.1 acre feet. Records show that the draw on the well for the last 3 years has averaged 23,430,000 gallons per year. A copy of the water rights is found in Appendix A.

OWA continues to maintain old water rights for a spring source (#97-7013 and 97-2053), but has no intention of using that source again. Copies of these water right permits are included for informational purposes only.

## Project Description and Alternatives

The purpose of this project is to provide a means for OWA to continue providing water for domestic use to the residents more reliably and lessen the possibility of outages which would impact the quality of life of residents. The only other alternative was to do nothing. Finding a different location for a well has not been successful. The current well location is over an proven aquifer with an abundant water supply. Utilizing our current pump house by redesigning the interior plumbing is the most cost effective.

The project involves drilling a new 65 ft deep well, 50 feet to the south of our existing well. The new well with 10 hp pump will feed into the pump house where the existing well, with 7-1/2 hp pump, feeds. It will tie into the existing manifold, and will include its own blow off and meter. Controls will be added which will automatically start the idle pump, should the pump that is being used fail. Currently, OWA has capacity in its line to the storage tanks to run only one pump. The second pump will serve as back-up. Eventually the plan calls for upgrading the line to the tanks from a 3" to 4" so that 2 pumps can be utilized should it be needed. It should be noted that our existing well operated with a 10 hp pump for ten years until it failed in 2014. It was replaced with the 7-1/2 hp which we had in stock.

The current electric service comes in overhead to the pump house. It is 240V 3 phase insulated line which is run through the trees and is owned and serviced by Northern Lights Utility. It is not unusual for a tree to blow down and take out the line. We are eliminating this overhead hazard by burying 400 feet of 3" conduit through the wooded area and burying our electric service. Eventually OWA plans on installing a 30kw stand-by generator to lessen the chance of outages due to extended power outages.

The project includes building 1/4 mile of new access road into the well site. It involved a new approach from Highway 57, the removal of thick timber and the application of heavy rock fill and gravel. This portion of the project is approximately 90% complete.

## New Well Project - Cost Estimate

Engineering	\$10,000
Well Drilling	50,000
New Pump and Plumbing	15,000
Pump Controls	10,000
Bury Electric Service	6,000
New Access Road	80,000
New 4" Line to Tank	40,000
Stand-by 30kw Generator	20,000
<hr/>	
Total:	\$231,000



## **Implementation Schedule**

James A. Sewell engineering firm has completed the water right update and the well and pump house engineering. Construction on the new access road commenced in late October and is 80% complete. The final gravel and grading will take place in the spring of 2016. Documentation of Engineering and road construction are included in Appendix H. OWA plans on putting in the new well, with related pump house improvements, as soon as funding is acquired.

## **Permitting**

A new updated water right has been obtained and is included in Appendix A. An encroachment permit for our approach off highway 57 was obtained prior to the start of road construction. The well site has been approved by Panhandle Health and the Well Drilling permit has been issued by DEQ. All of this documentation is included in Appendix E.

## **Institutional Considerations**

Entities that are, or may be involved in the design, construction, and financing of the project include:

OWA; project manager

James A. Sewell & Associates, LLC Engineering Firm; design and construction

IWRB; financing and construction

OWA will be the lead for the financing, design, and construction of the project and will be the entity entering into contracts and agreements with the various entities for the services provided by each.

## **Financial Analysis**

Two entities will be involved in financing the estimated project cost of \$231,000. The OWA has already paid \$69,189.75 for the first phase of road construction. OWA has also paid \$7336.71 in engineering fees. Documentation of these expenditures are included in Appendix H. OWA is applying for a loan from IWRB for \$100,000. Additional costs will be budgeted and paid for by OWA through normal revenue as costs are incurred.

### **Sources of funding;**

IWRB; Loan for \$100,000

OWA; \$76,526.46 already spent on road construction and engineering

OWA; Additional costs as funds accrue.

OWA is requesting a 20 year loan from the IWRB in the amount of \$100,000. OWA requests monthly or quarterly payments. OWA assesses its 87 regular customers at the rate of \$54 per quarter and assesses the 35 residents of Kokanee Park at the rate of \$45 per quarter.



IDAHO WATER RESOURCE BOARD  
322 East Front Street, Statehouse Mail  
Boise, Idaho 83720  
Tel: (208) 287-4800  
FAX: (208) 287-6700



APPLICATION FOR FINANCIAL ASSISTANCE FOR POTABLE WATER  
SYSTEM CONSTRUCTION PROJECT

Answer the following questions and provide the requested material as directed. All pertinent information provided. Additional information may be requested by the Idaho Water Resource Board (IWRB) depending on the scope of the project and amount of funding requested. For larger funding amounts an L.I.D. may be required.

**Incomplete documents will be returned and no further action taken will be taken by IWRB staff. All paperwork must be in twenty eight (28) working days prior to the next bi-monthly Board meeting.**

Board meeting agendas can be found at: <http://www.idwr.idaho.gov/waterboard/>

**I. Prepare and attach a "Loan Application Document".**

The Loan Application Document requirements are outlined in the Water Project Loan Program Guidelines. The guidelines can be found at:

<http://www.idwr.idaho.gov/waterboard/Financial%20program/financial.htm>.

You can also obtain a copy by contacting IWRB staff.

**II. General Information:**

**A. Type of organization: (Check box)**

- ☐ Municipality  
☐ Water and/or Sewer District  
☐ Non-Profit Water Company  
☐ For-Profit Water Company

- ☐ Homeowner's Association  
☒ Water Association  
☐ Other

Explain: \_\_\_\_\_

OUTLET WATER ASSN.

Organization name

172 OUTLET BAY RD

PO Box/Street Address

PRIEST LAKE ID 83856

City, County, State, Zip Code

BILL MCINERNEY

Name and title of Contact Person

(208) 443-3146

Contact telephone number

BILLMCPRIESTLAKE@SISNA.COM

e-mail address

Project location legal description SW 1/4 NE 1/4 SEC. 6 TWP 59N, R6E 04W, B.M. BONNER CO.

**B. Is your organization registered with the Idaho Secretary of State's office? Yes ☒ No ☐**

C. Purpose and name of project for this loan application.

☐ New Project

☐ Rehabilitation or replacement of existing facility

☐ DEQ requirement

☒ Other: ADDITION & IMPROVEMENT OF EXISTING SYSTEM.

D. Briefly describe the existing water supply facilities and describe any existing operational or maintenance problems. Attach map of the service area and a separate sheet if necessary to complete the explanation.

PLEASE SEE ATTACHED

**III. WATER SYSTEM:**

A. Source of water:

☐ Stream

☒ Groundwater

☐ Reservoir

☐ Other

B. Water Right Numbers:

Water Right	Stage	Priority Date	Source	Amount
97-07521		27 FEB 2015	GROUNDWATER	135 AF
97-07291		25 MAR 1989	GROUNDWATER	42 AF
97-7013		03 MAY 1971	SPRING	.15 AF
97-2053		07 NOV 1966	SPRING	.06 AF

Note: Stage refers to how the water right was issued. (License, Decree, or Permit)

INCLUDED FOR INFORMATIONAL PURPOSE ONLY.

C. Hook-ups on the system:

Approximate number of residential hook-ups: 89

Approximate number of commercial hook-ups: \_\_\_\_\_

Approximate number of industrial hook-ups: \_\_\_\_\_

D. On average, how much water is provided per day? 60,000 GAL.

**IV. USER RATES:**

A. How does your organization charge user rates

☒ Per Hook up

☐ Other

☐ Per Volume Used

Explain: \_\_\_\_\_

B. Current user rate? \$ 54 per QUARTER  
(gallons used, monthly, yearly, etc.)

KOKANEE PARK #45 PER QUARTER (PLEASE SEE ATTACHMENT)

If a graduated or progressive rate structure or different rates for different classes of users are used, attach a separate sheet with explanation.

C. When was the last rate change? JUNE 2007 (month/year)



Attachment for Page 2, section IV: User Rates:

Kokanee Park is a neighboring development consisting of 35 homes, mostly mobile homes. Their water system was having difficulty keeping up with demand during periods of high water use. OWA furnishes Kokanee Park with a single 3/4" connection, which supplements their system when theirs isn't sufficient. OWA has no responsibility for Kokanee's infrastructure and the water is for in-house use only. Kokanee Park has a separate irrigation system which uses lake water, and is maintained entirely by them.

For this service, OWA charges each of the 35 homes in Kokanee Park, \$45 per quarter.

## **Description of Water Supply Facility**

Outlet Water Association (OWA) furnishes domestic water for residences of the Outlet Bay Area of Priest Lake Idaho. We have a total of 89 hook-ups. We pump water from a 65 ft deep well through 1/2 mile of 3" pipe to 80,000 gallons of storage tanks. Our well, and half of the 3" line are on USFS property, which we use under special use permit. The other half of line and our storage tanks are on permanent easement with the Outlet Bay Sewer District. Our major issue is we only have one well and Panhandle Health and DEQ have been pressuring us to develop a second source. We also had very inadequate access to our pump house and need a new access road.

D. Does your organization measure water use? Yes ☒ No ☐

If yes, how?

☐

Meters at User Hook-ups

☒

Master Meter

☐

Other (explain) \_\_\_\_\_

E. Does your organization have a regular assessment for a reserve fund? Yes ☐ No ☒

If yes, explain how it is assessed:

F. Does your organization have an assessment for some future special need? Yes ☐ No ☒

If yes, explain for what purpose and how it is assessed:

---

#### **V. PROPOSED METHOD FOR PAYING LOAN PAYMENTS**

How will you pay the annual loan payments? Check revenue sources below:

☐

Tax Levies

☐

Capital Improvement Reserve Account or Sinking Fund

☒

User Fees and Tap/Hookup Fees

☐

Other (explain) \_\_\_\_\_

Will an increase in assessment be required? Yes ☐ No ☒

When will new assessments start and how long will they last?

---

#### **VI. SECUREMENT OF LOAN**

List all land, buildings, waterworks, reserve funds, and equipment with estimated value that will be used as collateral for the loan:

Property

Estimated Value

PLEASE SEE ATTACHMENT

**Please attach a legal description of the property being offered along with a map referencing the property.**

---

#### **VII. PROOF OF OWNERSHIP**

Please provide proof of ownership, easements or agreements that are held or can be acquired for the construction and operation of the project.

---

#### **VIII. FINANCIAL INFORMATION:**



## Financial Summary

Project Estimated Cost;	\$231,000
Loan amount;	\$100,000
Current quarterly rate of 87 OWA customers;	\$54
Current quarterly rate of 35 Kokanee Park customers;	\$45
Annual gross revenue;	\$27,000

Note: The 35 customers in Kokanee Park each pay a rate of \$45 per quarter because water is only furnished for use inside the homes. They have a separate irrigation system which uses lake water which is maintained entirely by them.

**Credit Worthiness:** OWA has no existing debt. The accompanying financial summary indicates a strong ability to repay the project in place, without raising rates for its customers.

**Alternative financing considerations:** OWA has contacted Columbia Bank and because OWA cannot produce collateral, financing was doubtful. At best, they could loan \$50,000 at 6.5% for a 3 year term.

**Collateral;** Because OWA operates on USFS and Outlet Bay Sewer District property, they have no real property to use for collateral. However, OWA owns and offers for collateral the following:

1. Water right permits # 97-07521, 97-07291, 97-7013, and #97-2053.
2. Existing well with 7-1/2 hp pump and 8' X 10' pump house with pump control equipment, which includes a 2 year old wireless pump control system. (photo is included)
3. Approximately 2600 feet of 3" water line which extends from our well pump to our storage tanks.
4. Two water storage tanks: A 60,000 gallon bolted steel(10 years old) and a 20,000 gallon welded steel(45 years old).(photo included)
5. New (2014) 10' X 20' storage building/office (photo included).

## Economic Analysis

The economic benefit of the project is considerable. Having an abundant and reliable water system in the community adds considerably to the value of property. Individual wells are not a practical option because of the composition of the soil in the service area. That is why OWA's well is a half mile from the service area.

## Social and Physical Impacts

The project will have a social impact in the sense that it will maintain reliable drinking water availability for the residents in the OWA service area. With few other options for residents to obtain an adequate source of drinking water, property values would decrease substantially.

## Conclusions

1. OWA is registered with the State of Idaho and has taken a vote of its directors to allow it to proceed with a contract with the IWRB for the purpose of obtaining funding for construction of a new well and access road. A copy of Corporate Resolution 2015-1 is included in Appendix B.
2. Special use permits and easements are in place for the project, which are included in Appendix E.
3. The project will provide a more reliable source of domestic water to our service area.
4. The total estimated cost of the project is \$231,000 and will be financed by in part by the OWA. OWA is applying for a loan from the IWRB in the amount of \$100,000.
5. This project meets with the requirements of the State of Idaho's Water Plan and is necessary to avoid outages and shortages in the OWA service area.
6. The project is technically and financially feasible.

A. Attach a copy of each of the last 3 year's financial statement. **(Copies must be attached)**

B. Reserve fund (current) \$10,379

C. Current cash on hand \$10,379

D. Outstanding indebtedness:

To Whom	Annual Payment	Amt. Outstanding	Years Left
<u>2</u>			

G. Have you done business with the Idaho Water Resource Board before? Yes ☐ No ☒

If yes what was the loan for? \_\_\_\_\_

How much was the loan for? \_\_\_\_\_

Is the loan paid off? Yes ☐ No ☐

If no what is the payment and expected payoff date. \_\_\_\_\_

I. What other sources of funding have been explored to fund the project? (example: NRCS, USDA Rural Development, Banks, Local Government, etc.)

COLUMBIA BANK - PRIEST RIVER & SANDPOINT ID.

---

**VIII. ORGANIZATION APPROVAL:**

Is a vote of the shareholders, members, etc. required for loan acquisition? Yes ☐ No ☒

If yes, a record of the vote must be attached.

VOTE OF THE 5 DIRECTORS

Amount of funds requested: \$100,000

*By signing this document you verify that all information provided is correct and the document is filled out to the best of your ability.*

Authorized signature & date: Bill McHenry





## OUTLET WATER ASSOCIATION

## WATER SYSTEM IMPROVEMENTS

## WELL NO. 2 CONSTRUCTION

## PRIEST LAKE, IDAHO

**SECTION 6, TOWNSHIP 59 NORTH, RANGE 4 WEST**

## SHEET INDEX TABLE

Sheet #	Sheet Title
1	COVER SHEET
2	PROPOSED ACCESS ROAD & EXISTING PUMPHOUSE
3	PROPOSED PUMPHOUSE PIPING PLAN
4	DETAILS



LAMB CREEK

BRADBURY  
PROPERTY

OUTLET BAY SEWER  
DISTRICT PROPERTY

BRADBURY  
PROPERTY

SHINN  
PROPERTY

PROPOSED ACCESS ROAD,  
SEE SHEET 2 OF 3

U.S. GOVERNMENT  
PROPERTY

## - PROJECT LOCATION

OUTLET BAY SEWER  
DISTRICT PROPERTY



## UNDERGROUND SERVICE ALERT

## ONE-CALL ALERT

1-800-424-5555  
or 811

CALL TWO BUSINESS  
DAYS BEFORE YOU DIG



**ENGINEER'S SIGN**

[illegible]

**James A. Sewell and Associates, LLC**  
CONSULTING ENGINEERS  
NEWPORT, WASHINGTON, 99156  
(509) 447-3626

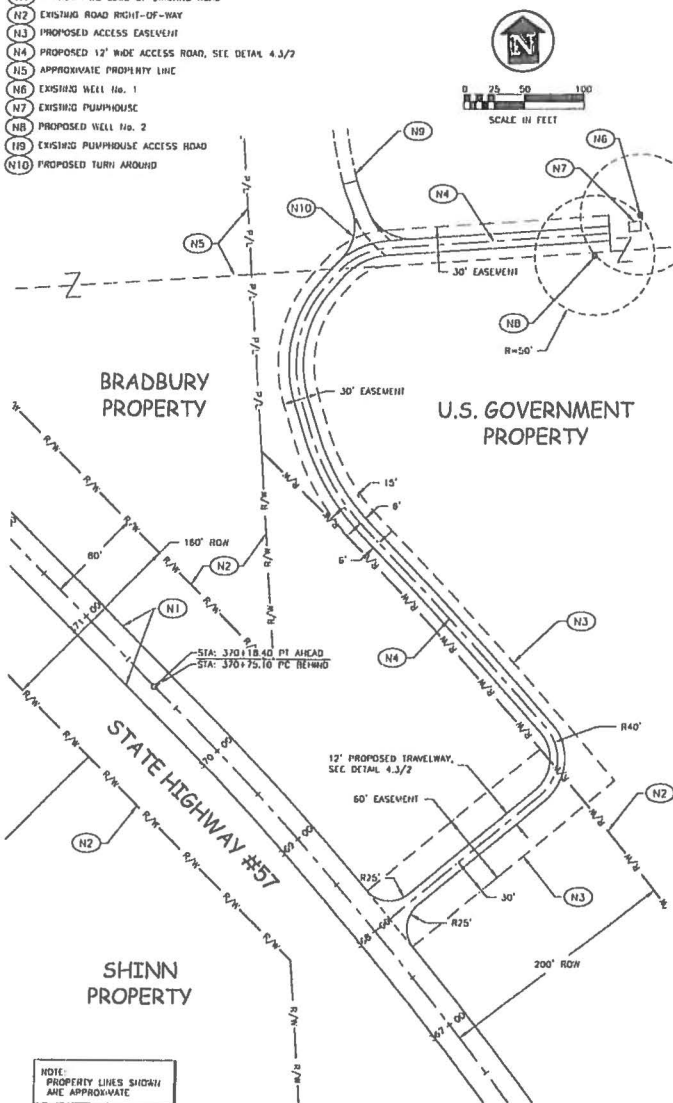


SHEET TITLE:  
VICINITY MAP & SHEET INDEX

DATE:	5-27-15
SCALE:	AS SHOWN
DRAWN BY:	JM
CHECKED BY:	EJ
FILE NAME:	pat plan case A
DATA No.:	1501

SHEET 1 OF 4

(N1) APPROXIMATE EDGE OF EXISTING ROAD  
(N2) EXISTING ROAD RIGHT-OF-WAY  
(N3) PROPOSED ACCESS EASEMENT  
(N4) PROPOSED 12' WIDE ACCESS ROAD, SEE DETAIL 4.3/7  
(N5) APPROXIMATE PROPERTY LINE  
(N6) EXISTING WELL No. 1  
(N7) EXISTING PUMPHOUSE  
(N8) PROPOSED WELL No. 2  
(N9) EXISTING PUMPHOUSE ACCESS ROAD  
(N10) PROPOSED TURN AROUND



4.1 PROPOSED WELL ACCESS ROAD PLAN VIEW  
SCALE: 1" = 50'

(N1) EXISTING 8'10" SINK TRAY PUMPHOUSE, INSULATED, GABLE RUNNING NORTH-SOUTH

(N2) 3'-0" x 6'-8" INSULATED METAL EXTERIOR DOOR

(N3) EXISTING 3" PIPE

(N4) EXISTING BASEBOARD HEATER

(N5) EXISTING ELECTRICAL PANEL

(N6) EXISTING PIPE SUPPORT

(N7) EXISTING 3" BALL VALVE

(N8) EXISTING 3" FEE WITH 1" ADAPTER

(N9) EXISTING 4" FLOOR DRAIN TO DAYLIGHT, SCREENED OUTLET

(N10) EXISTING 3" UNION

(N11) EXISTING 3" FEE WITH 3/4" REDUCER

(N12) EXISTING 2" BALL VALVE

(N13) EXISTING 2" CAP

(N14) EXISTING 110V DUPLEX ELECTRICAL OUTLET

(N15) EXISTING WALL MOUNTED MERCURY PRESSURE SWITCH FOR LEVEL CONTROL

(N16) EXISTING PIPING, ABANDONED

(N17) EXISTING 3" 90° ELBOW

(N18) EXISTING 2" BLOWOFF

(N19) EXISTING CAP

(N20) EXISTING 3" WATER METER, FLANGED

(N21) EXISTING 3" FLANG ADAPTER

(N22) EXISTING 3/4" HOSE DRI

(N23) EXISTING 3/4" BRASS BALL VALVE

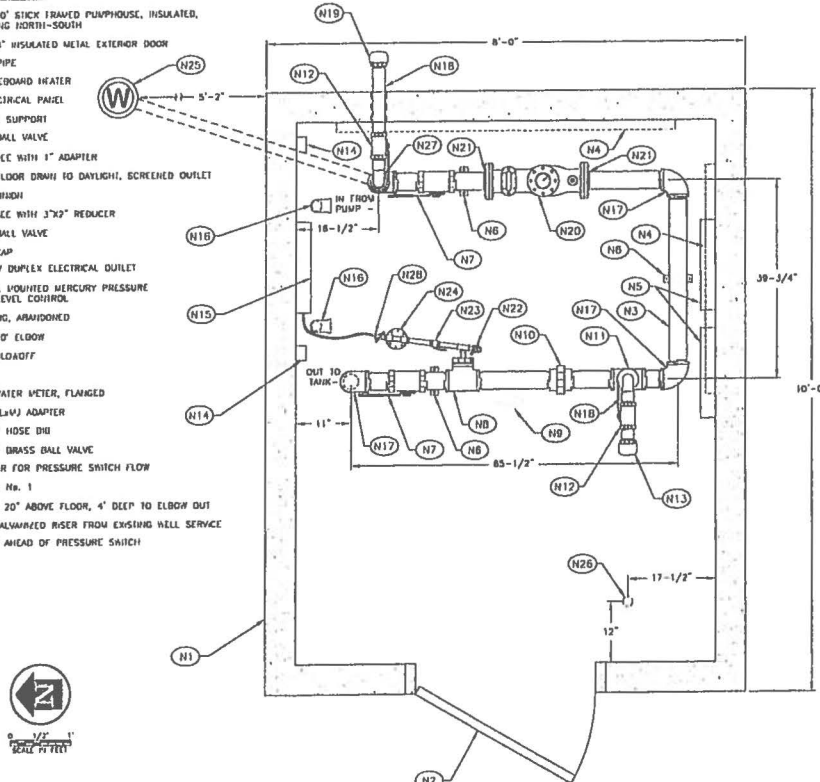
(N24) EXISTING FILTER FOR PRESSURE SWITCH FLOW

(N25) EXISTING WELL No. 1

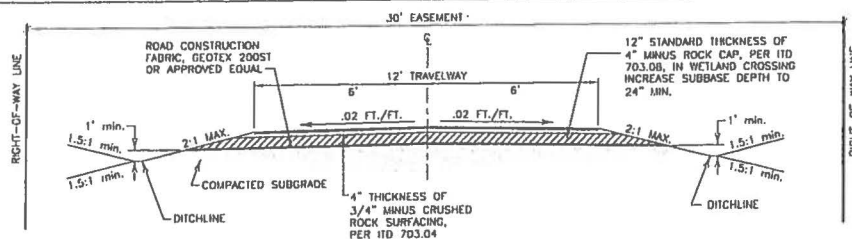
(N26) 2" STUB OUT, 20" ABOVE FLOOR, 4" DEEP TO ELBOW OUT

(N27) EXISTING 3" GALVANIZED IRON FROM EXISTING WELL SERVICE

(N28) HEADLINE VALVE AHEAD OF PRESSURE SWITCH



### 3.3 EXISTING PUMPHOUSE PIPING PLAN



4.3 WELL ACCESS ROAD CROSS SECTION



ENGINEER'S STAMP		
DATE	REVISIONS PER DED	DATE
10-11-12	1	10-11-12
7-18-12	2	7-18-12
1-18-12	3	1-18-12
1-18-12	4	1-18-12
1-18-12	5	1-18-12
1-18-12	6	1-18-12
1-18-12	7	1-18-12
1-18-12	8	1-18-12
1-18-12	9	1-18-12
1-18-12	10	1-18-12
1-18-12	11	1-18-12
1-18-12	12	1-18-12
1-18-12	13	1-18-12
1-18-12	14	1-18-12
1-18-12	15	1-18-12
1-18-12	16	1-18-12
1-18-12	17	1-18-12
1-18-12	18	1-18-12
1-18-12	19	1-18-12
1-18-12	20	1-18-12
1-18-12	21	1-18-12
1-18-12	22	1-18-12
1-18-12	23	1-18-12
1-18-12	24	1-18-12
1-18-12	25	1-18-12
1-18-12	26	1-18-12
1-18-12	27	1-18-12
1-18-12	28	1-18-12
1-18-12	29	1-18-12
1-18-12	30	1-18-12
1-18-12	31	1-18-12
1-18-12	32	1-18-12
1-18-12	33	1-18-12
1-18-12	34	1-18-12
1-18-12	35	1-18-12
1-18-12	36	1-18-12
1-18-12	37	1-18-12
1-18-12	38	1-18-12
1-18-12	39	1-18-12
1-18-12	40	1-18-12
1-18-12	41	1-18-12
1-18-12	42	1-18-12
1-18-12	43	1-18-12
1-18-12	44	1-18-12
1-18-12	45	1-18-12
1-18-12	46	1-18-12
1-18-12	47	1-18-12
1-18-12	48	1-18-12
1-18-12	49	1-18-12
1-18-12	50	1-18-12
1-18-12	51	1-18-12
1-18-12	52	1-18-12
1-18-12	53	1-18-12
1-18-12	54	1-18-12
1-18-12	55	1-18-12
1-18-12	56	1-18-12
1-18-12	57	1-18-12
1-18-12	58	1-18-12
1-18-12	59	1-18-12
1-18-12	60	1-18-12
1-18-12	61	1-18-12
1-18-12	62	1-18-12
1-18-12	63	1-18-12
1-18-12	64	1-18-12
1-18-12	65	1-18-12
1-18-12	66	1-18-12
1-18-12	67	1-18-12
1-18-12	68	1-18-12
1-18-12	69	1-18-12
1-18-12	70	1-18-12
1-18-12	71	1-18-12
1-18-12	72	1-18-12
1-18-12	73	1-18-12
1-18-12	74	1-18-12
1-18-12	75	1-18-12
1-18-12	76	1-18-12
1-18-12	77	1-18-12
1-18-12	78	1-18-12
1-18-12	79	1-18-12
1-18-12	80	1-18-12
1-18-12	81	1-18-12
1-18-12	82	1-18-12
1-18-12	83	1-18-12
1-18-12	84	1-18-12
1-18-12	85	1-18-12
1-18-12	86	1-18-12
1-18-12	87	1-18-12
1-18-12	88	1-18-12
1-18-12	89	1-18-12
1-18-12	90	1-18-12
1-18-12	91	1-18-12
1-18-12	92	1-18-12
1-18-12	93	1-18-12
1-18-12	94	1-18-12
1-18-12	95	1-18-12
1-18-12	96	1-18-12
1-18-12	97	1-18-12
1-18-12	98	1-18-12
1-18-12	99	1-18-12
1-18-12	100	1-18-12

James A. Sewell and Associates, LLC

CONSULTING ENGINEERS  
NEWPORT, WASHINGTON, 99156  
(509) 447-3626



SHEET TITLE: PROPOSED WELL ACCESS ROAD & EXISTING PUMPHOUSE PIPING

PROJECT: WELL NO. 2 CONSTRUCTION  
OUTLET WATER ASSOCIATION  
PRIEST LAKE, IDAHO

DATE: 8-27-15

SCALE: AS SHOWN

DRAWN BY: JUP

CHECKED BY: EJS

TITLE NAME: PUMP HOUSE

DATA H# 15001

8/15  
Accrual Basis

**Outlet Water Association, Inc**  
**Balance Sheet**  
**As of December 8, 2015**

	<u>Dec 8, 15</u>
<b>ASSETS</b>	
<b>Current Assets</b>	
<b>Checking/Savings</b>	
Checking - Panhandle State Bank	7,408.97
<b>Savings</b>	
CD #10444 Panhandle	23,463.82
Savings - Other	<u>-23,463.82</u>
<b>Total Savings</b>	<u>0.00</u>
<b>Total Checking/Savings</b>	<u>7,408.97</u>
<b>Accounts Receivable</b>	
Accounts Receivable	<u>2,484.00</u>
<b>Total Accounts Receivable</b>	<u>2,484.00</u>
<b>Other Current Assets</b>	
Undeposited Funds	<u>486.00</u>
<b>Total Other Current Assets</b>	<u>486.00</u>
<b>Total Current Assets</b>	<u>10,378.97</u>
<b>TOTAL ASSETS</b>	<u><u>10,378.97</u></u>
<b>LIABILITIES &amp; EQUITY</b>	
<b>Equity</b>	
Retained Earnings	79,758.43
Net Income	<u>-69,379.46</u>
<b>Total Equity</b>	<u>10,378.97</u>
<b>TOTAL LIABILITIES &amp; EQUITY</b>	<u><u>10,378.97</u></u>



Outlet Water Association, Inc.  
Balance Sheet  
As of December 31, 2014 and 2013  
(See Accountant's Review Report)

ASSETS

	<u>2014</u>		<u>2013</u>
<u>Current assets:</u>			
Panhandle – Checking	\$ 39,519	\$	42,543
Panhandle – CD	28,153		28,052
Accounts Receivable	<u>1,086</u>		<u>126</u>
Total Current Assets	68,758		70,721
 Total Assets	 \$ <u>68,758</u>	 \$	 <u>70,721</u>

LIABILITIES AND EQUITY

<u>Current Liabilities:</u>	\$ <u>0</u>	\$	<u>0</u>
Total Current Liabilities	0		0
 <u>Long Term Liabilities:</u>	 \$ <u>0</u>	 \$	 <u>0</u>
Total Long Term Liabilities	0		0

Equity

Prior Year Retained Earnings	70,721		57,773
Current Year Net income (Loss)	<u>(1,963)</u>		<u>12,988</u>
Total Stockholder's Equity	68,758		70,721
 Total Liabilities and Equity	 \$ <u>68,758</u>	 \$	 <u>70,721</u>

See notes to financial statements

Outlet Water Association, Inc.  
Balance Sheet  
As of December 31, 2013 and 2012  
(See Accountant's Review Report)

ASSETS

	<u>2013</u>	<u>2012</u>
<u>Current assets:</u>		
Panhandle – Checking	\$ 42,543	\$ 29,674
Panhandle – CD	28,052	27,951
Accounts Receivable	<u>126</u>	<u>108</u>
Total Current Assets	70,721	57,733
 Total Assets	 \$ <u>70,721</u>	 \$ <u>57,733</u>

LIABILITIES AND EQUITY

<u>Current Liabilities:</u>	\$ <u>0</u>	\$ <u>0</u>
Total Current Liabilities	0	0
 <u>Long Term Liabilities:</u>	 \$ <u>0</u>	 \$ <u>0</u>
Total Long Term Liabilities	0	0

Equity

Prior Year Retained Earnings	57,733	51,456
Current Year Net income (Loss)	<u>12,988</u>	<u>6,277</u>
Total Stockholder's Equity	70,721	57,733
 Total Liabilities and Equity	 \$ <u>70,721</u>	 \$ <u>57,733</u>



# Idaho Power Company's Cloud Seeding Program

January 21, 2016

Shaun Parkinson, PhD, P.E.





# Overview

- What is cloud seeding & how is it done
- Idaho Power's history with cloud seeding
- Idaho Power's cloud seeding projects
- Benefit estimates
- Program expansion

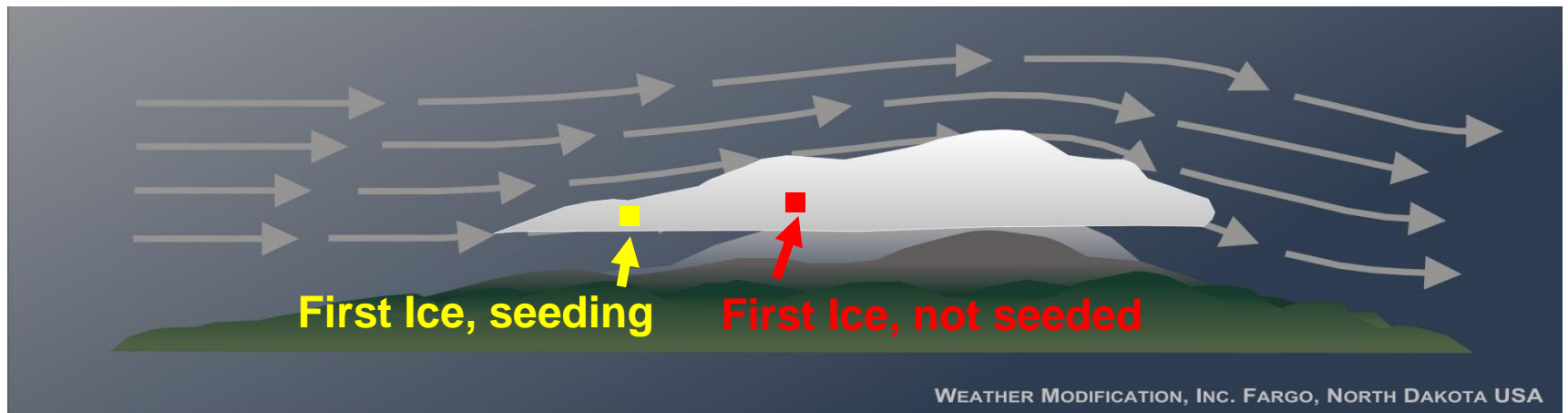


# What is cloud seeding?

- Cloud seeding depends upon an abundance of supercooled liquid water (SLW)
- Cloud seeding provides additional efficient ice nuclei
  - Works at warmer temperatures, allowing ice formation sooner
- The term cloud seeding has been used to describe:
  - Fog suppression (airports)
  - Hail suppression (reduce crop and property damage)
  - Rainfall enhancement (water supply augmentation)
  - Snowpack enhancement (snowpack augmentation)
- Our focus is **snowpack** enhancement
  - In particular – Idaho Power does winter orographic cloud seeding

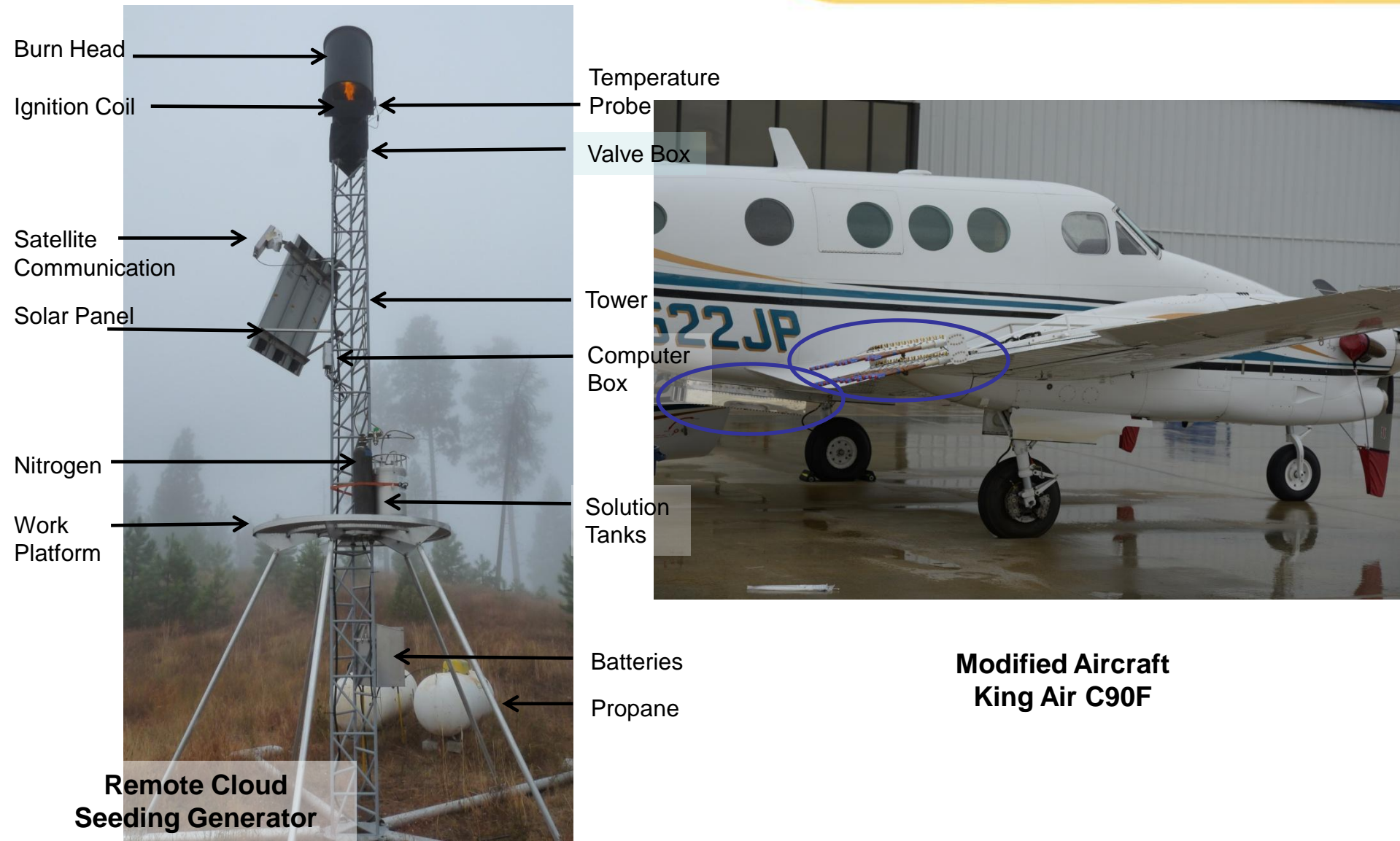
# Winter Orographic Cloud Seeding

- *Cloud seeding* provides storms additional *efficient* ice nuclei that function at warmer temperatures, allowing ice formation to begin sooner
- This occurs at temperatures as warm as 23°F, though more effectively at 17°F or colder
- Natural ice nuclei become effective below 5°F





# Seeding Mechanisms



# Idaho Power's History with Cloud Seeding

- 1993 - Began investigating cloud seeding (shareholder question)
- **2003 - Payette project operational** (7 generators, aircraft, assessment)
- **2008 - Collaborated with HC RC&D** and E Idaho Counties to enhance their program (motivated by ESPA CAMP) – 5 year pilot effort
- 2010 - Started working with WW RC&D to evaluate cloud seeding opportunities in western Wyoming (primarily above Palisades)
- 2011 - Started working with NCAR to develop WRF model to guide and evaluate CS operations and projects
- **2013 – At the request of Big Wood Canal Company** contracted to target Wood River basin (using Payette aircraft only)
- 2014 - Expansion (44 generators, 2 aircraft)
  - **Boise and Wood Basin's** – remote generators and aircraft seeding
  - Continued expansion in Salt and Wyoming Ranges
  - IWRB funding a grant for equipment associated with expansion
- 2015 - Expansion (53 generators, 3 aircraft)
  - Additional remote generators in Central Mountains and Upper Snake (Total of 53)
  - **Third aircraft** based in Pocatello for upper Snake (1 year pilot project with State)
  - Additional meteorological equipment



# Current Program

## Payette, Boise, Wood & Upper Snake

### • Payette

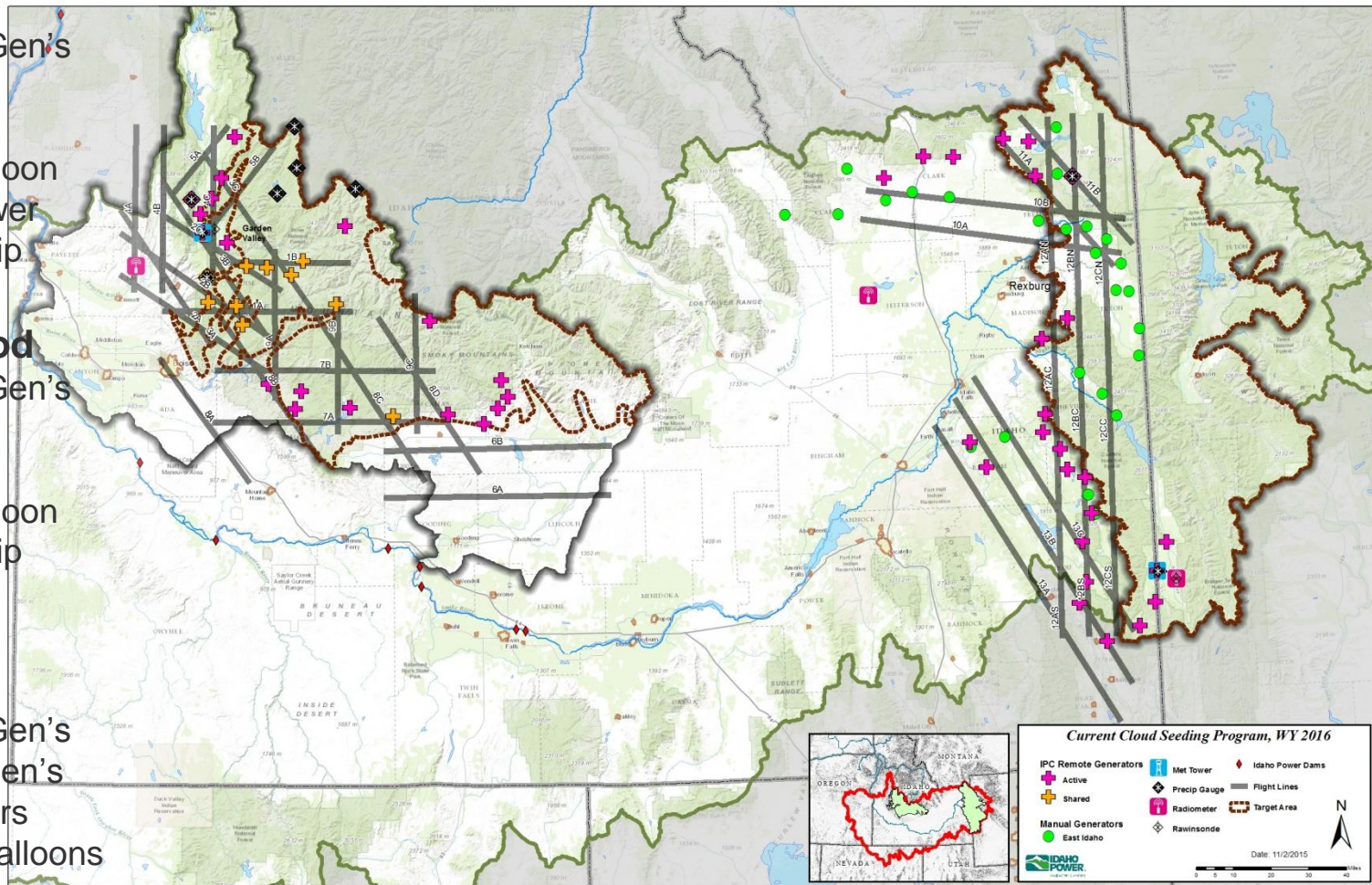
- 17 Remote Gen's
- Aircraft
- Radiometer
- Weather Balloon
- Weather Tower
- 8 hi-res precip gauges

### • Boise and Wood

- 11 Remote Gen's
- Aircraft
- Radiometer
- Weather Balloon
- 2 hi-res precip gauges

### • Upper Snake

- Aircraft
- 25 Remote Gen's
- 25 Manual Gen's
- 2 Radiometers
- 2 Weather Balloons
- Weather Tower
- 2 hi-res precip gauge







# Benefit Estimates

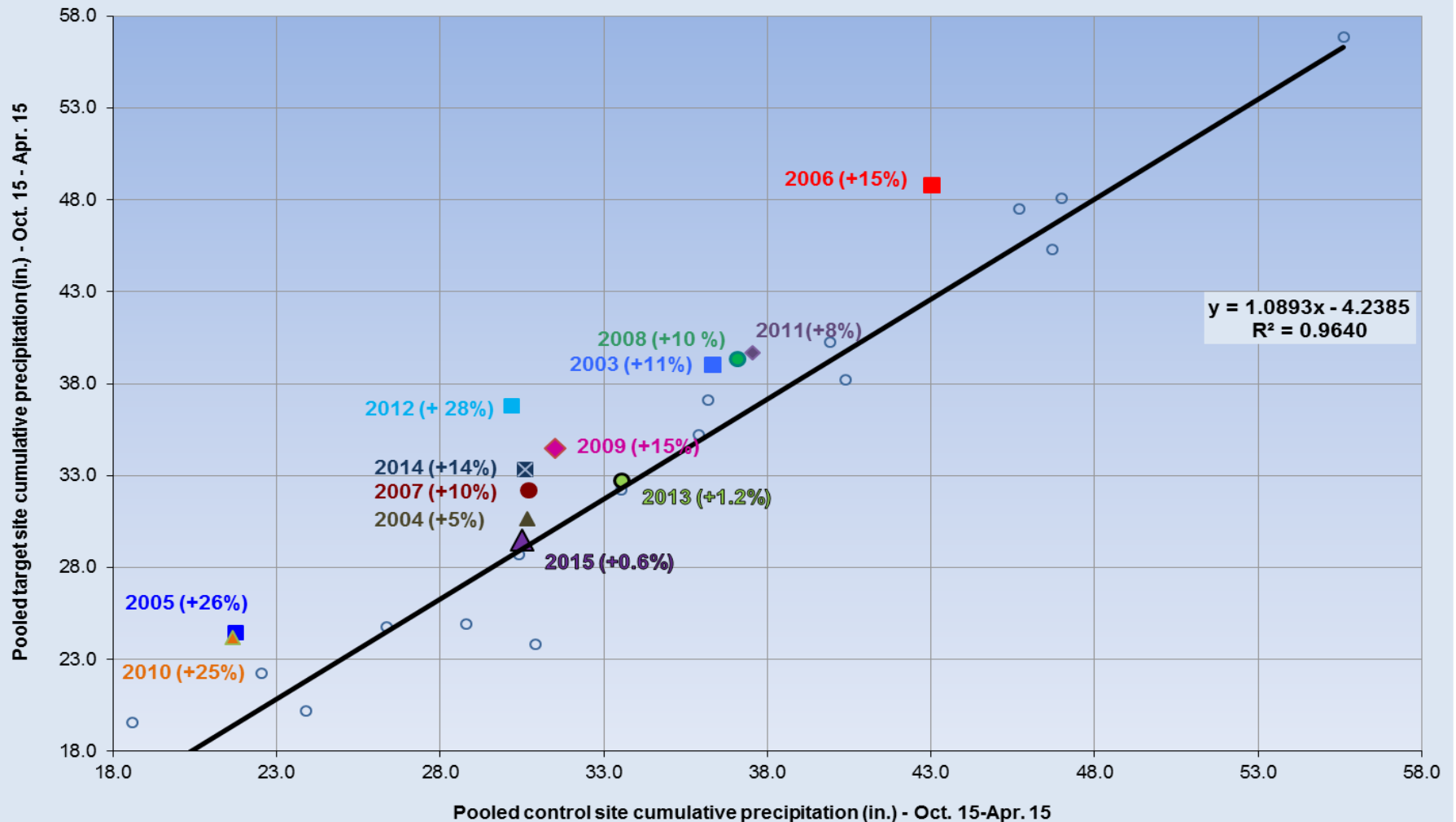
Multiple approaches used to assess benefits:

1. Target-Control
2. Hydrologic modeling using IPC's River Forecast System
3. Weather Modeling (WRF)

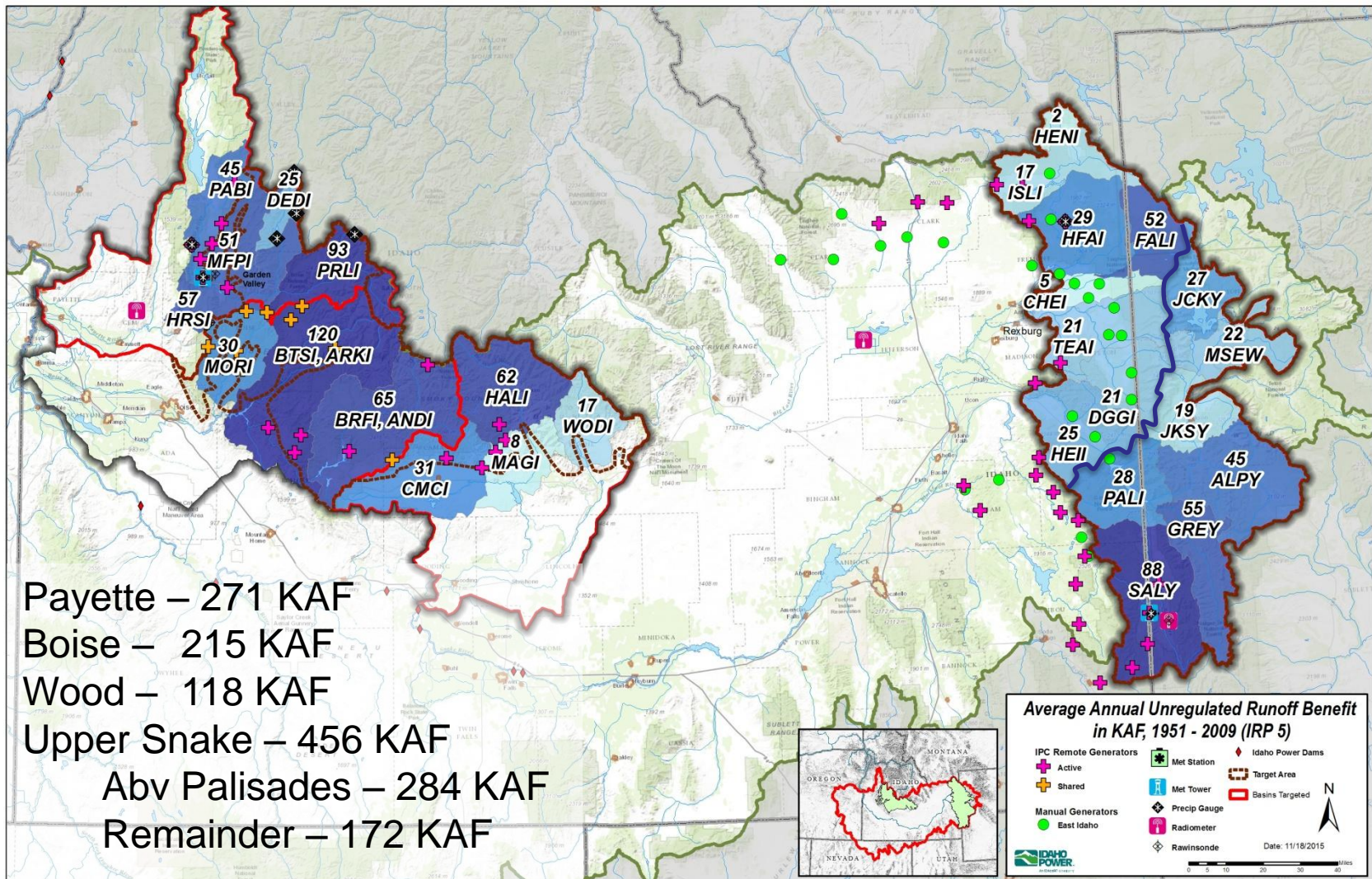
# Target – Control

## Payette

Target vs. Control Cumulative Precipitation  
1987-2002 Historical Relationship and 2003-2015  
Observed



# Benefits at Build-out

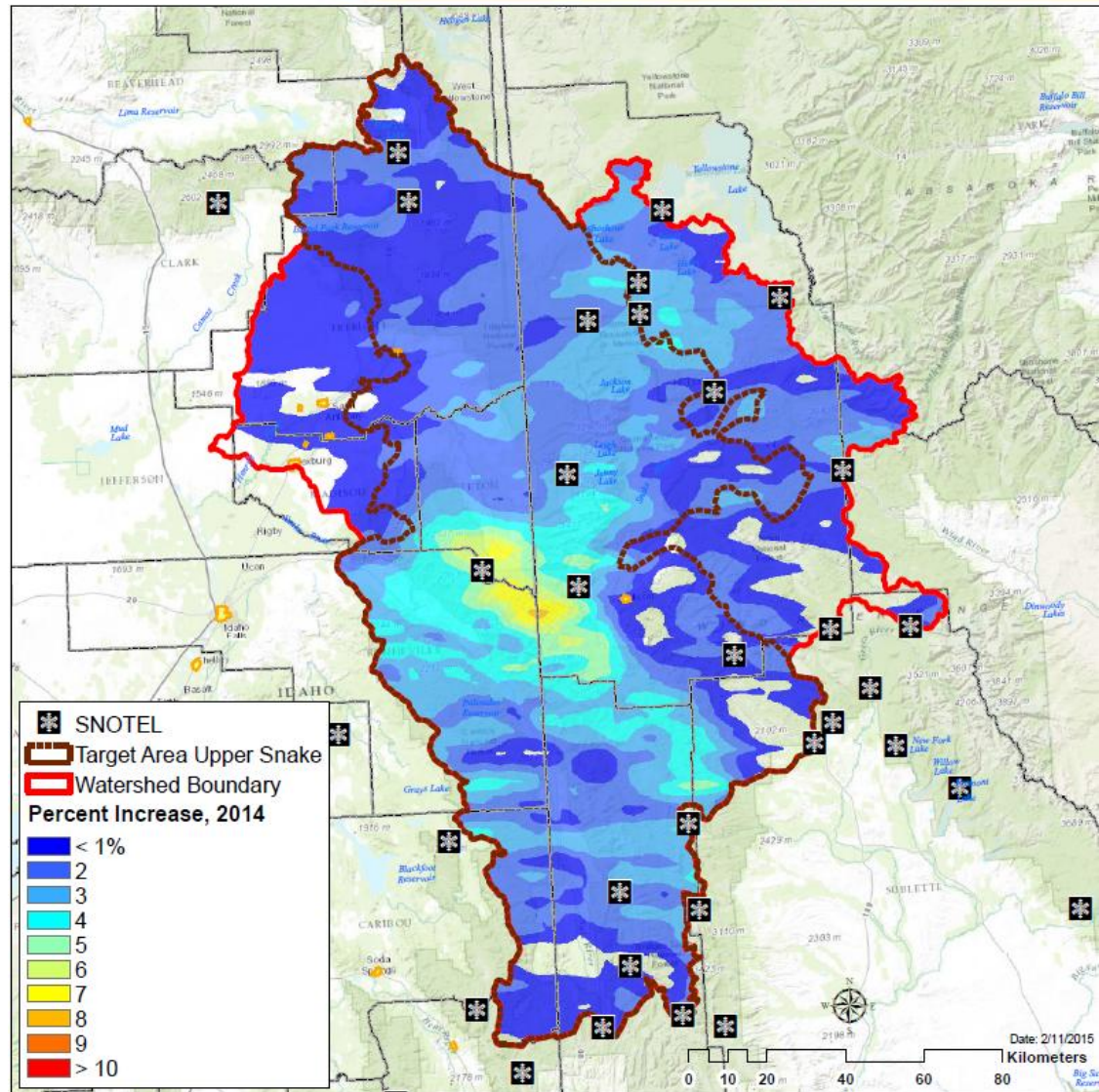




# Upper Snake Benefits – WRF CS Simulation

## WRF model simulation

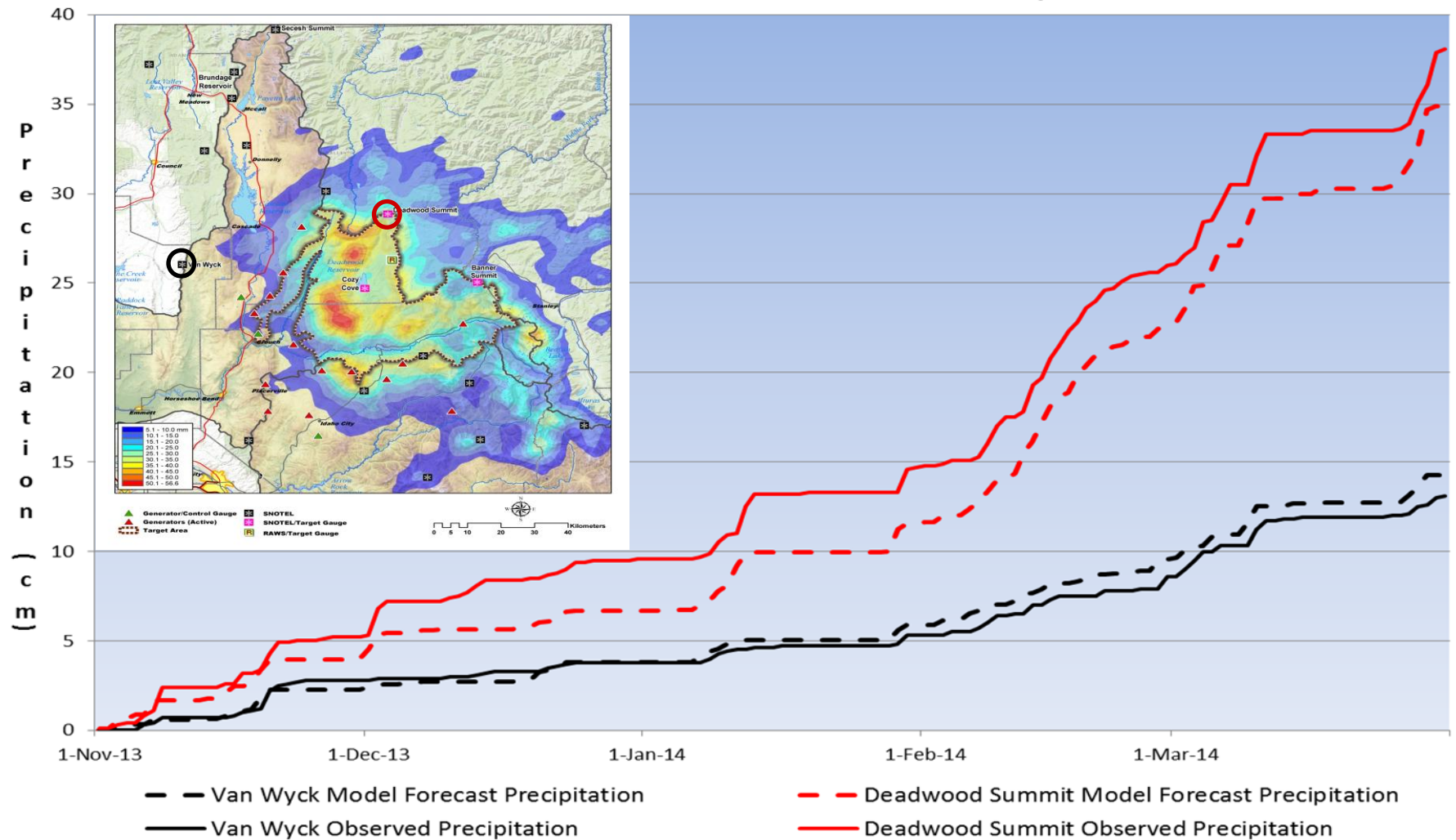
- With and Without cloud seeding
- Accumulate SWE
- 2014 SWE increase
  - 160 KAF
  - 19 generators, no aircraft



# WRF CS Simulation

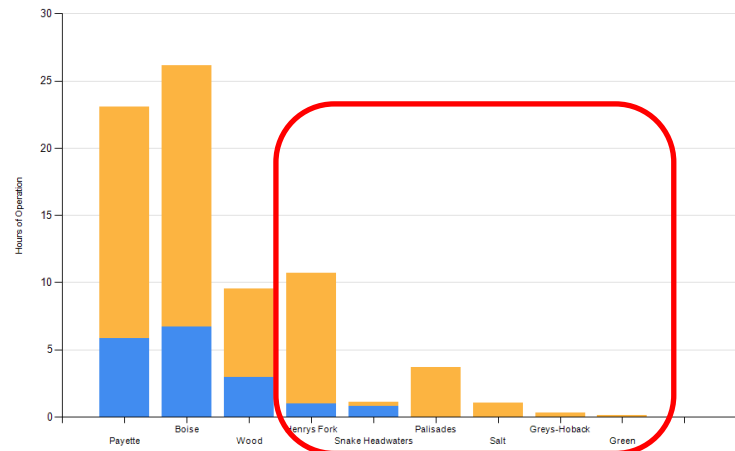
## Payette

### WRF Model Forecast Versus Observed Precipitation



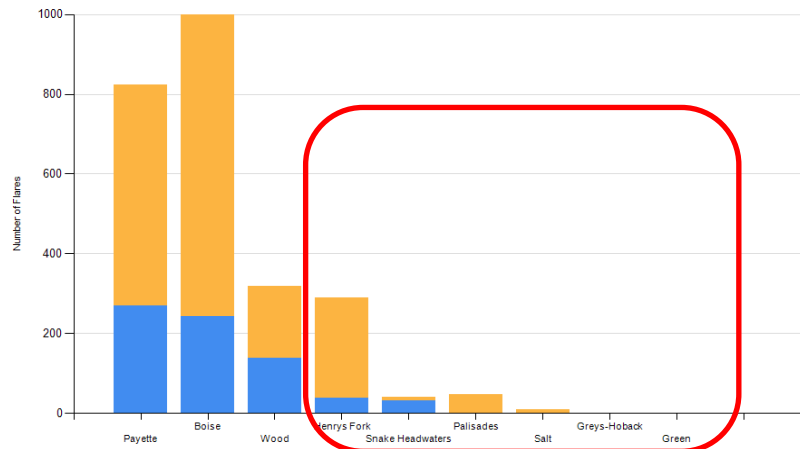
# 2016 Aircraft Operations to Date

*Flight Hours by Basin*



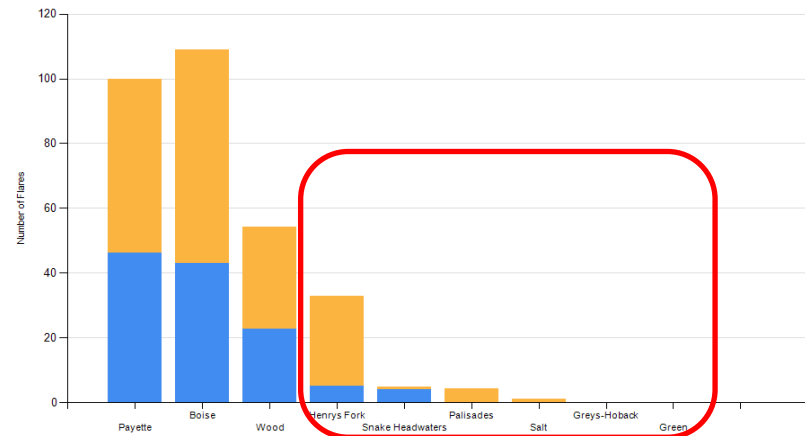
*Aircraft Ejectable Flares by Basin*

(20 grams AgI)



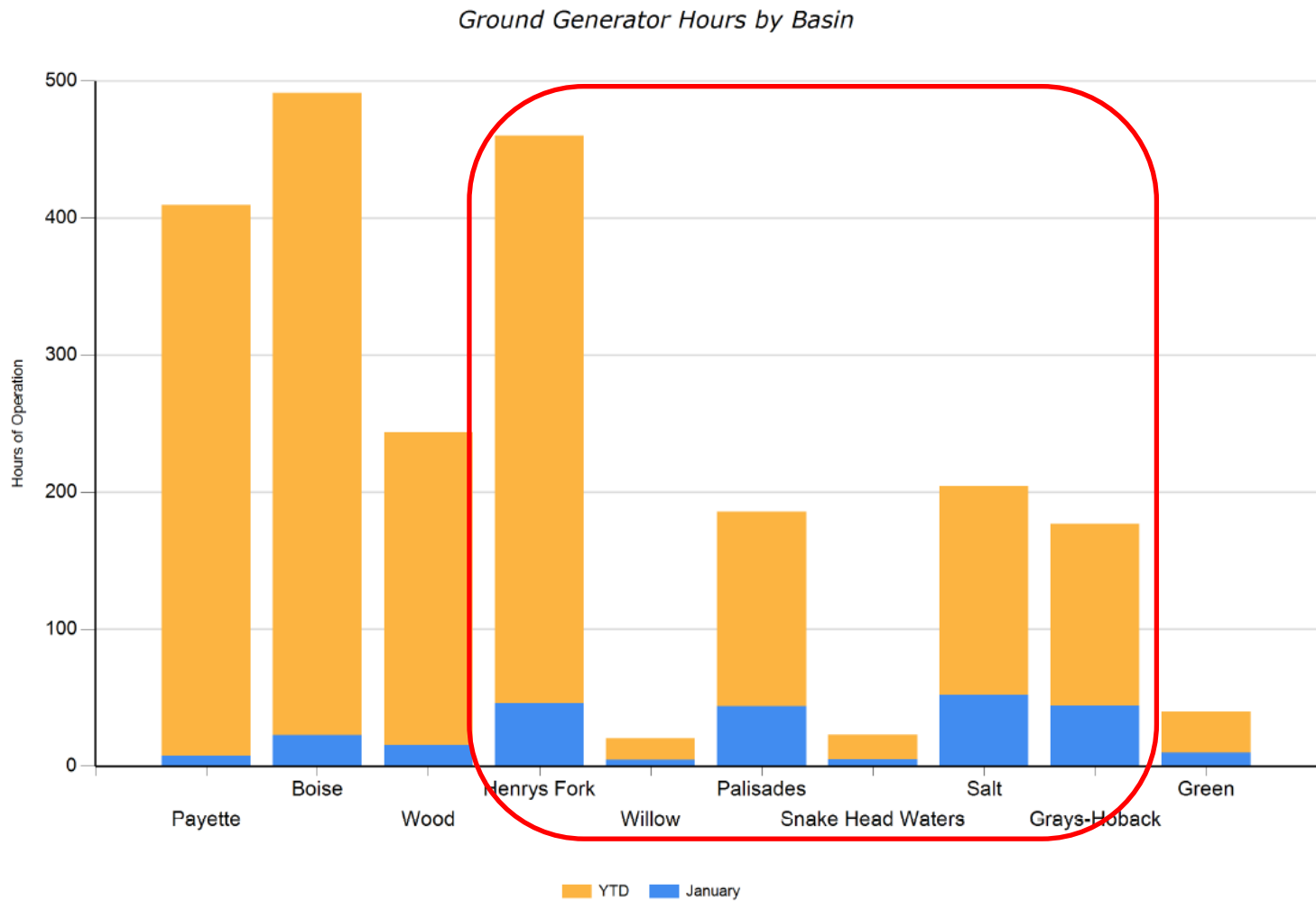
*Aircraft Burn in Place Flares by Basin*

(150 grams AgI)





# 2016 Ground Generator Operations to Date

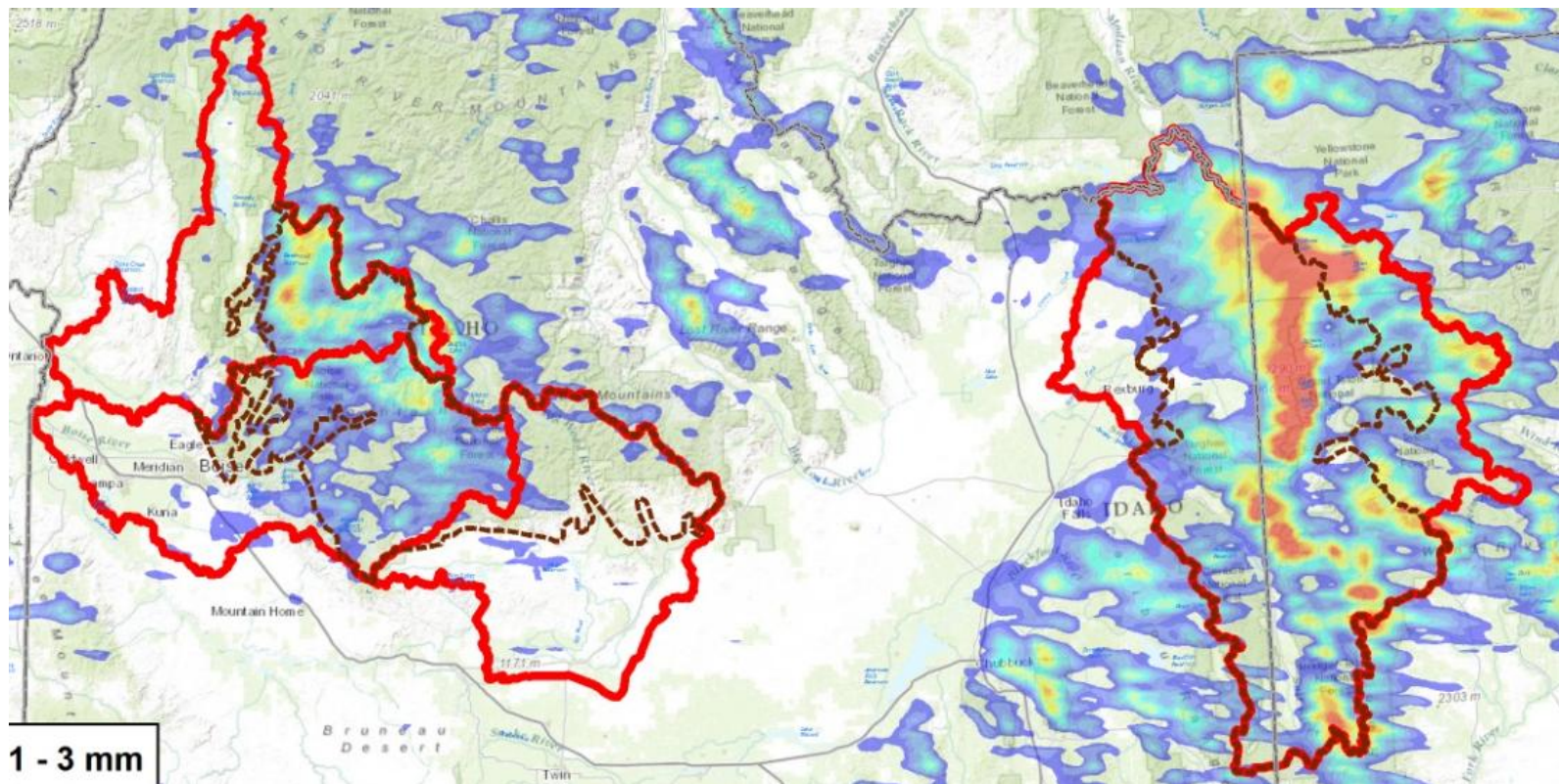




## Benefits to Date – ‘16

- Target Control (through December 2015)
  - Payette 15%
  - Boise 25%
  - Wood 7%

# Benefits to Date – '16





# Potential Future Program

## Payette, Boise, Wood & Upper Snake

### • Payette

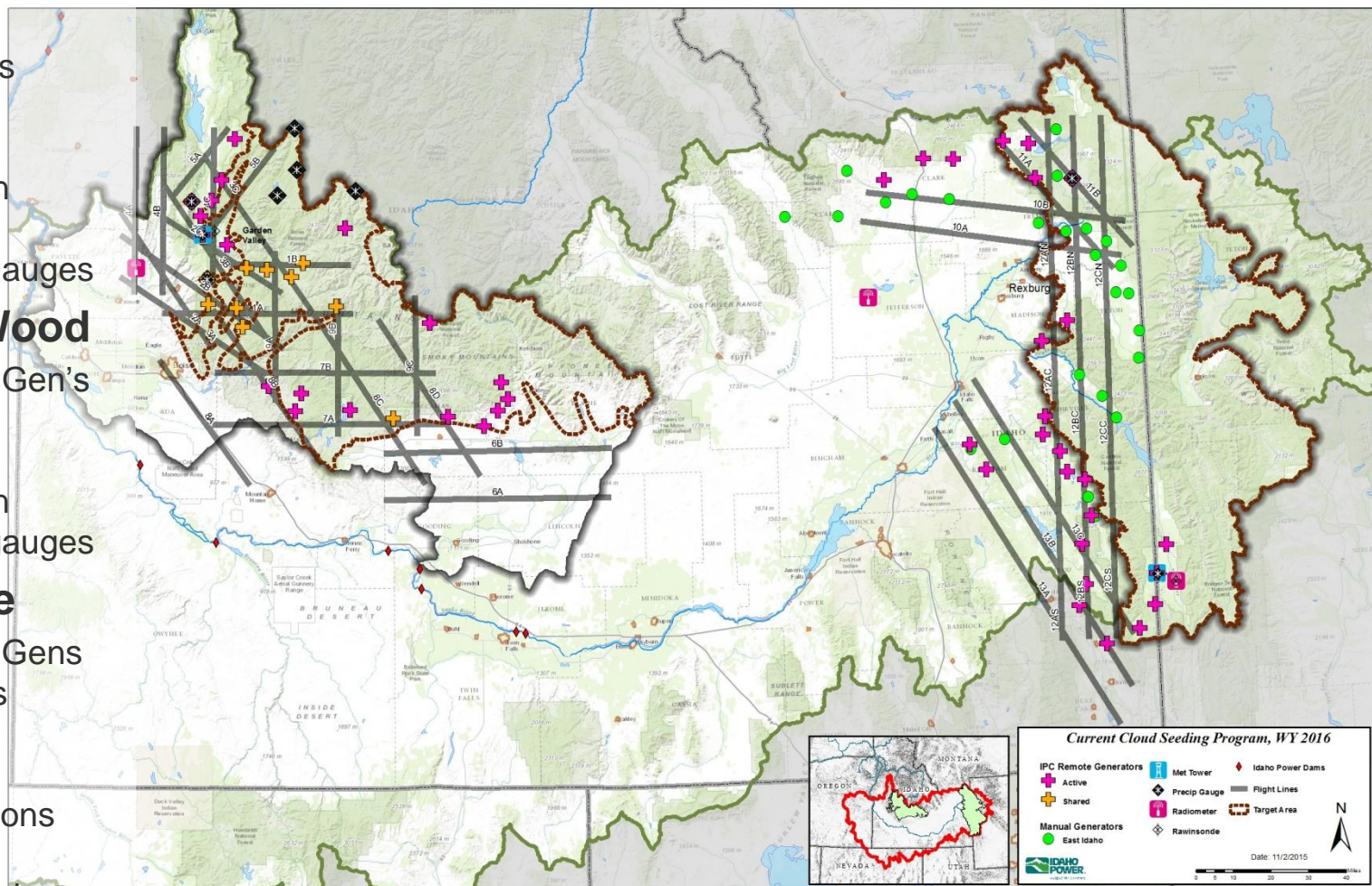
- 17 Remote Gens
- Aircraft
- Radiometer
- Weather Balloon
- Weather Tower
- 7 hi-res precip gauges

### • Boise and Wood

- 20 - 26 Remote Gen's
- Aircraft
- Radiometer
- Weather Balloon
- 4 hi-res precip gauges

### • Upper Snake

- 30 - 40 Remote Gens
- 25 Manual Gens
- Aircraft
- 2 Radiometers
- 2 Weather Balloons
- Weather Tower
- 2 to 5 hi-res precip gauges





# Project Costs

## Upper Snake at Build-Out

- Capital - \$510,000 (to get there)
- O&M - \$914,000 / year (1 aircraft)
- *O&M - \$1.4M / year (2 aircraft)*

## Boise and Wood at Build-Out

- Capital - \$720,000 (to get there)
- O&M - \$685,000 / year



**Questions?**