



Snow Survey Centennial Celebration 1906-2006

How Snow Survey Data and Products are Used

Maybe the title for this short story should be called **“Who Doesn’t Use Snow Survey Information?”**; one way or another, the work that NRCS Snow Survey and Water Supply Forecast Staff does, affects everyone in the West, other parts of the nation and even other countries. This article discusses some of the obvious, but also unusual uses of snow survey data and water supply products. First, let’s discuss the importance of snow in the West, how it accumulates and melts to provide our water supply, and then discuss the decisions made each year to manage and plan accordingly, based on the winter snowfall.



**Idaho's frozen Liquid Gold somewhere
in eastern Idaho, March 31, 2006**

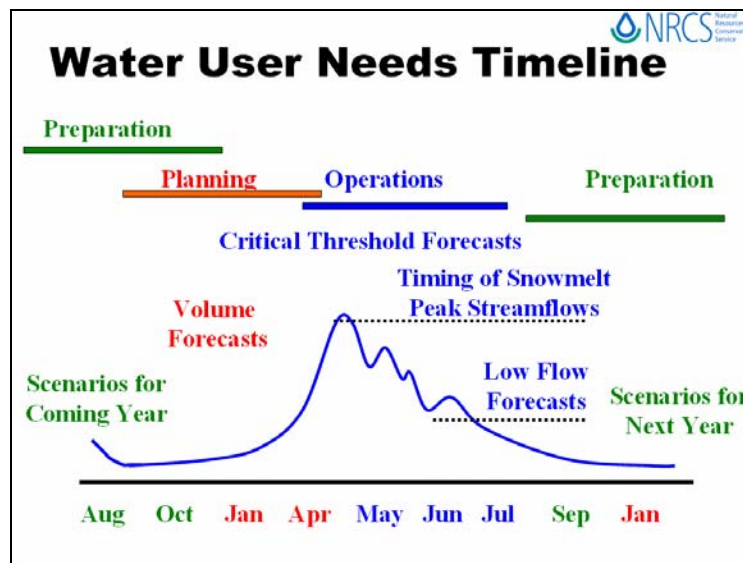
Here in Idaho, we refer to the mountainous snow pack as Idaho’s frozen, liquid gold. When it melts, it becomes the lifeblood of the state. The snow pack is like a giant reservoir in the mountains, storing and accumulating the moisture that falls in what we refer to as the mountainous snow pack. Each and every winter, storms roll in from the Pacific Ocean, crossing the western US, and depositing their moisture in the form of snow. In the spring, the snow gradually melts at an average rate of 1-2 inches a day. That would be the same as receiving 1-2 inches of precipitation for one to three months, or until the snow was all gone. The spring thaw and melt produces a predictable rise in stream flow across the western US. Over 75 percent of the annual stream flow originates from the melting mountain snow pack and could be over 95 percent if stream base flows from snow were also included.

The key factor in the West is how much snow and where for water users to speculate and plan accordingly. This is where NRCS comes into the picture, by inventorying

and monitoring the mountain snow pack throughout the West to predict the coming year's stream flow. If only Mother Nature delivered the same amount of snow each and every winter, this would be nice, consistent and may even eliminate my job. It would make it easy for water managers to manage and deliver constant supplies for irrigation, fish, and hydropower. Nature does not work this way and often goes through wet and dry cycles. In addition, studies have indicated that the weather is more volatile, when compared to the 1940s thru the 1970s. The increasing and competing demands for a limited water resource is making it tough for water managers to manage a water supply that is highly dependent upon the snowfall that falls, accumulates and melts each year in the West.

Keep in mind that the West is different from the eastern and mid-west US, as 70-80 percent of our annual precipitation falls from November to March and less than 10 percent of the annual precipitation falls during the July to August growing season. Summer monthly precipitation amounts are 1-2 inches in the mountains and typically less than an inch in populated valleys and agricultural areas, thus creating the need for steady and constant irrigation supplies. In the East and Midwest, nature delivers 3-4 inches a month, or an average of an inch a week... enough to sustain dryland farming. Irrigation is critical to agriculture in the US as nearly half of the value of all crops sold comes from the 16 percent of harvested cropland that is irrigated.

Lets get started and look at how our internal and external users use our data and products in their numerous decisions, whether for financial purposes or management of natural resources. The chart below illustrates the typical timeline when water users need and use Snow Survey products.



Lets start by talking about **Preparation – Scenarios for Next Year**. Each summer and sometimes even before the previous season's snow melts, the news media, farmers and weather watchers call and ask "What's the outlook for next year?" Farmers harvesting their crops are already thinking about the future, especially if it was a bad water year. We use El Nino/ La Nina, also referenced as Southern Oscillation Index (SOI), to advise customers about what may happen next year. From July-November, SOI correlates with next winter's precipitation in parts of the Pacific Northwest and Desert Southwest. This information allows us to provide scientific advice about next year's water supply. Other sources for next year's forecast are long-range weather forecasts, along with the Farmers Almanac. Those

interested include: farmers, stock brokers, power producers, recreationists, natural gas suppliers, etc. If the Pacific Northwest has a good or bad snow year, a possible increase or decrease in coal and natural gas production could occur. Bonneville Power Administration provides 40 percent of their region's power, with 90 percent coming from hydropower dams on the Columbia and Snake rivers. In an average runoff year, Idaho Power can produce 60 percent of its electricity needs from hydropower. Washington Water Power, now called Avista, generates 40 percent of its hydropower from the Clark Fork plant alone. Each spring, Idaho Power requests power cost adjustments for their consumers through the Public Utilities Commission, based on the April 1 water supply forecasts, contracts, and 'true up', which is based on our forecast accuracy for the previous year.

El Nino often makes the news in the fall, but don't put all your eggs in one basket, as we have learned -- past indicators do not always represent future conditions, especially with the stock market and other events that may have human influence. Upon learning about El Nino and sea surface temperatures at a presentation, a local District Conservationist inquired about where to get this information in order to plan his next scuba diving vacation. He learned the ocean water where they went scuba diving was colder than normal and not as warm as they expected. However, you usually see more ocean life in cooler water. During another El Nino year, a soil conservationist called to see if there was any correlation between El Nino and spring precipitation in southern Idaho, so that they could "accurately" schedule the appropriate number of rain make-up games for the local softball league several months in advance. No such luck, there is very little correlation between El Nino and spring precipitation throughout the West. How can you use El Nino/SOI in your planning process? For more information see El Nino/SOI correlations versus western states water supplies: <http://www.id.nrcs.usda.gov/snow/links/soiwsf3.html>

As we move from summer to fall, the days are getting shorter, nights are getting colder. We know our reservoir carryover storage for next year and have a feeling about how wet or dry the soils are. The fall rains help to get moisture back into the dry soils. If they don't happen, soil moisture can be the "wild card" in accurately forecasting stream flows next spring. Good antecedent moisture from fall rains means that less snowmelt goes into the ground next spring and more drains into rivers and reservoirs for use above ground. Summer maintenance at SNOTEL sites is complete and we are all waiting for the first snowfall of the season, which could be September, October, November or even December in a bad year. Snow survey folks and our customers get excited when the first flakes arrive. It is the dawn of a new season, and the news media starts calling to find how much and where the snow is falling. If last year's water supply was bad for you, then it is time to stop worrying about last year and start speculating and worrying about next year. Each year the Idaho Snow Survey staff provides about 100 news media interviews. Multiply this by 10 and you have a good ballpark figure for interviews throughout the west each year by NRCS Snow Survey offices. We have learned the news media is interested in what we do, likes to go snowshoeing, sometimes get lost with snow experts, and most importantly, can get the 'word out' about current and ever changing water supply conditions better than we can.



NRCS provides numerous news media interviews each year

Occasionally, in the fall, some states compile a Fall Outlook summarizing the accuracy of last year's stream flow forecasts, El Nino/SOI outlook for coming year, stream flow forecasts based on SOI, reservoir carryover for next year, and the amount of snow needed to provide adequate irrigation supplies. Perhaps one of our greatest challenges is to provide a snow level threshold for irrigators to watch during the long, cold winter to help monitor whether they will have an adequate water supply or not. Recently, we just started taking full advantage of having 20 plus years of daily SNOTEL data available. We are now able to produce DAILY volumetric stream flow forecasts starting on October 1 of each year, using this valuable data. Click here to learn how accurate these forecasts are and how they are produced:

<http://www.id.nrcs.usda.gov/snow/watersupply/>

It is now January... the snow is falling and starting to accumulate, but we are only 40 percent of the way through winter. In January, NRCS starts providing monthly or bi-monthly volume forecasts for water users to start planning and thinking ahead about their resource management decisions. Before 1990, we did not start forecasting until February because we were not even half-way through winter. Now, because of daily SNOTEL data and more accurate statistical forecast procedures, we are able to meet user requests for stream flow forecasts, with reasonable error bounds in January. These **Planning - Volume Forecasts** allow users to start thinking ahead, planning and making decisions based on the water supply forecasts for the coming season. If our volume forecasts are not available in a timely manner, customers start calling and asking 'When will they will be available?' NRCS and NWS coordinate stream flow forecasts and provide the 'official' public forecasts. Other agencies may forecast for their internal operations. However, many users call NRCS for their forecast numbers and even request the 'uncoordinated (or preliminary) values' to compare to their predictions, so they can independently decide which forecasts to favor for their decision and planning purposes. Most private irrigation districts and reservoir operators do not forecast and rely on NRCS forecasts. The volume forecasts are used by hydropower producers to help answer the critical question: how much hydropower can be produced, and if they need to start securing power from other sources at a reasonable price.

We are only in mid-January and with half the winter still to come, farmers start making decisions and signing contracts for growing crops and use our volume forecasts to guide their actions. It may be too early for some producers to tell if they will have a full water supply or not; and if they need to factor in additional costs for groundwater pumping or use a secondary irrigation source. From January-March,

water managers use our forecasts for planning and to shape their reservoir storage and releases by passing more or less water depending upon our SNOTEL site readings and associated volumetric stream flow forecasts. Some producers are lucky, and can put their decisions off until May to decide to plant higher money producing crops, rather than grains in a low water year. In consecutive drought years, some farmers decided to (or had to) get a secondary job since they knew they would be out of irrigation water by mid-summer. Department of Labor also uses our water supply outlook reports to gauge migrant worker employment needs. You can bet that if a farmer is looking for a second job, then they wont need as many hired hands.

Let's change snow hats and discuss the use of our snow data while it is still frozen in the mountains. Winter recreation use of SNOTEL data has grown over the years, especially with the invention of the automated snow depth sensor. We are now able to collect snow depth along with new snowfall and monitor snow density on a daily basis to help determine when the snow pack is ripe to melt. To view reports that we have created for our customers and learn about more of these uses, including a new snowboard with a depth sensor, click here:

<http://www.id.nrcs.usda.gov/snow/recreation/>

Snow depth is as important to some as the amount of snow water in the snow pack is for hydrologists and engineers to manage water as a natural resource. Snow depth and snowfall is used for determining big animal migration, when Sandhill Cranes return, avalanche forecasting, snow loads, and more. Everyone likes to hear the optimistic snow reports about the big dumps... snowfall in the hundreds of inches. Some snow stories are like the 'big fish' that got away and we have learned that a good snow pack means more tourist and travel dollars for the local economy. Lets talk about some of these other uses in more detail...



Resort & backcountry skiing



Snowmobiling



Digging out!

Have you ever tried sampling snow on groomed ski trails? We did to help determine if there was enough snow on the race course to host a ski race or if the ski area had to move the race to another resort. Moving the race means loss of revenue for the ski club, ski area, and local economy. We have also assisted the Forest Service to determine if plowed snow would end up in a river and affect salmon habitat, and helped an elderly lady determine how much snow was at scenic Redfish Lake in Idaho in the middle of winter so she could spread her husband's ashes who had recently passed away. Our advice was to wait until spring. We have even loaned snow tubes to determine how much snow and water may have to be removed because of a high elevation petroleum leak, and assisted law enforcement officials about how much snow was at the scene of the crime and if the road was passable where a body was found. CSI (Crime Scene Investigation) would be impressed.

Building managers and city personnel use SNOTEL data to determine snow loads and to be proactive in sending crews to shovel roofs that are under-designed for heavy mountain snows. Numerous calls about snow loads were received by the Idaho Snow

Survey staff in the winter of 2005-2006, because folks had not seen an above average snow pack in over six years. See this link for snow load calculations: <http://www.id.nrcs.usda.gov/snow/data/geninfo/snowload.html>

Roof snow loads and what could happen...



Studying snow loads



A properly designed roof



Snow load and gravity win

Other users of NRCS snow data, seasonal volume forecasts and Surface Water Supply Index (SWSI) products include: USDA Risk Management officials review our forecasts to help determine crop insurance needs for their customers in low snow years, and bank loan officers, the Federal Reserve Board and Natural Gas Companies gauge the economy and population growth potential in Idaho and other areas of the West where water availability may influence or limit future residential growth. Anheuser-Busch headquarters in St Louis uses our information to help determine their barley and hops outlook in many western states and Canada. Below is an example of how Anheuser-Busch is using water supply information to help guide their operations.

Brewery Water Supply Update

April 28, 2006

CURRENT WATER SUPPLY

Brewery	Status*	Brewery	Status*
Baldwinsville	●	Jacksonville	●
Cartersville	●	Los Angeles	●
Columbus	●	Merrimack	●
Fairfield	●	Newark	●
Ft. Collins	●	St. Louis	●
Houston	●	Williamsburg	●
		Stag	●

● > 90 % of normal
 ● 50 – 90 % of normal
 ● < 50 % of normal

**Status is based on current precipitation, reservoir level and stream flow compared to 30-yr average.*

Discussion of yellow and red status

- Precipitation is below normal in Houston, Jacksonville, Newark, St. Louis and Williamsburg. No impact to the brewery water supply is expected.

DROUGHT FORECAST

U.S. Seasonal Drought Outlook
Through July 2006
Released April 20, 2006

Agricultural Water Supply Update

April 28, 2006

CURRENT WATER SUPPLY

Barley	Status*	Rice	Status*
Idaho	●	Arkansas	●
N. Montana	●	California	●
Wyoming/S. Montana	●	Hops	●
MonDak	●	Washington	●

● > 90 % of normal
 ● 50 – 90 % of normal
 ● < 50 % of normal

**Status is based on current precipitation, reservoir level and stream flow compared to 30-yr average.*

Discussion of yellow and red status

- All locations are in the green status.

DROUGHT FORECAST

U.S. Seasonal Drought Outlook
Through July 2006
Released April 20, 2006

KEY:

- Drought to persist or intensify
- Drought easing, some improvement
- Drought likely to improve, major issue
- Drought development likely

KEY NEWS HEADLINES

No key headlines to report.

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SNOTEL data and water supplies are not just a western issue. SNOTEL data are available 24/7, updated hourly on the Internet and available to people everywhere. Program officials have provided advice or helped install weather stations in Iraq, South Africa, China and Antarctica, and for develop SWSI's in Iran. As long as our data and products are available on the Internet in a timely manner, we don't usually hear from our customers, nor do we know all the details of how they are using them in their **Planning and operations** decisions. For numerous and sundry reasons, the SNOTEL system is the only aspect of the NRCS program that is listed as a 'mission critical' program for USDA.

In a low snow year, a mint contractor called to see who would be water-short and who would have water through August. He needed information to guide him as to where to sign contracts with farmers. Mint plants need water in late season to produce their valuable oil. In this case, the Idaho Surface Water Supply Index (SWSI) provided him the necessary information to determine where surface agricultural irrigation shortages may occur, and also illustrated where farmers may need crop insurance. This graph illustrates when shortages typically occur in the upper Snake River basin:

http://www.id.nrcs.usda.gov/snow/watersupply/swsi/snake_heise/apr.html. More detailed information on the index can be found here:

<http://www.id.nrcs.usda.gov/snow/watersupply/swsi-main.html>. Water managers also use the volume forecasts to set the price of rental water in water banks each year.

It is now early April; the snow pack is reaching its peak water content for the season throughout most of the West. The **Planning Volume Forecasts** have been useful, but now, let the fun begin, as we shift gears and enter the **Operations – Critical Threshold Forecasts** period. This period is when the snow starts melting, streams start rising and we'll soon see how accurate our forecasts are and their usefulness for our customers. We'll hear them thank us or hear their complaints about under-forecasting wet years and over-forecasting dry years, which is typical when utilizing regression forecasting tools. The extreme years are the critical years to get right. It is easy to forecast streams and be a water manager in normal runoff year when water management decisions are fairly standard. We have lots of excuses about what went wrong, and often say "spring precipitation can make or break our forecasts". In the 1960s and 1970s, weather was less volatile and the job as a water manager was easier with fewer demands placed on this limited resource. More recently, we have seen more volatile weather and are wondering how many curve balls Mother Nature can throw at us. Have we seen them all in the past 20 or 50 years of climatological data we base our projections on? The answer is a resounding NO! As a result, greater climatic variability is encouraging our users to ask more specific questions about **Timing of Snowmelt Peak and Low Flow Forecasts**. Now, we can accurately answer them because of 20 plus years of high elevation daily climatic data that Congress has invested in, known as the SNOTEL Network. The entire annual Snow Survey and Water Supply Forecasting Program budget was \$10.5 million dollars in 2006. What a bang for your tax dollar!

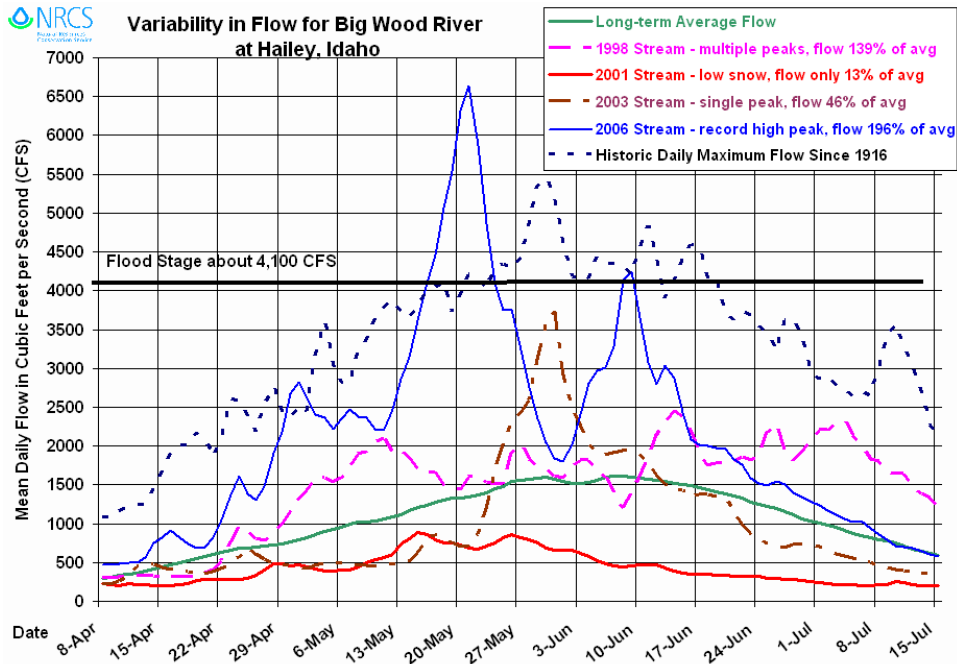
Let's get back on track and move on... Up until April, everyone wants to know how much snow is "up in them thar hills" and what the water supply outlook looks like. They'd like to hedge one way or another about their future decisions, which are dependent on this year's snow pack and resulting water supply. Water users monitor the accumulation and melting of the pack at their favorite SNOTEL site. Some even use SNOTEL graphs as screen savers on their home computers to remind them of

their water source which provides them with the water to grow crops, to put food on their table (and ours) and provide their family income.

How an individual uses water or wants to use the water, determines how they want the snow to melt. There are strong feelings on how the snow should melt, depending if you have a reservoir water right or surface water right; not to mention a groundwater right or a combination of them. Reservoir water right holders prefer a quick melt to flush the water out of the mountains to fill reservoirs and their water right, while natural stream flow water users would rather see a gradual melt to maintain their water supply through the dry summer months. In some small towns, neighbors gather at the local worship place and have their unofficial assigned seats. Groundwater users sit on the left and surface water users on the right, because you think the other guy is stealing your water. But after a series of drought years, it is amazing how a good snow pack can bring out smiles, change your attitude about life and bring joy to you and your neighbor. How do you put a dollar value on this? Even river runners have a preference on how the snow 'should' melt, depending if they like big whitewater in the spring or want a gradual melt to maintain adequate flows for family friendly whitewater rafting trips in the summer.

Now that May is here, things are heating up and the snowmelt is in full swing. The rivers have peaked once, and the questions that NRCS Water Supply Specialists get each spring are: "Is that all there is?", "Is there more runoff to come?", "Have the streams peaked?", "Is there enough snow up there to produce one more peak?", "Will the next peak be higher than the last?", "Can we close the gates on the reservoir and do final fill?", and "Is it safe for whitewater river runners to put their boats on the river?" The same questions are asked each and every year about snow dominated streams. Our answers assist users in the wise use and management of water as a finite natural resource.

The following examples illustrate the stream flow variability for the Big Wood River in central Idaho, which shows why users are asking the above questions. Hot weather in 2006 melted snow quickly and increased the flow above flood stage and to new record high levels since measurements started in 1916. Water year 2003 resulted in a single peak, but the locals that lived by the river got lucky, as the snow ran out just prior to reaching flood stage. However, irrigators downstream saw only one month of above average flows, as the April-September runoff volume was only 46% of average, and a water short irrigation season ensued. Mild temperatures during the snowmelt season of 1998 produced multiple stream flow peaks over a two month period. The snow pack was only fifty percent of average in 2001, producing stream flows that were only 36 percent of average. This prompted farmers to change the type of crops and the numbers of acres planted... irrigation water ran out in July!



Who is interested in the peak flow? Everyone from river runners, dam operators, hydro-power operators, fish management and more are interested in not only peak flows, but also magnitude and duration of the high stream flows. Farmers and irrigators may not be as interested in the peak flows as they are in their total water supply to fill their water right for irrigation. Lets discuss some of those interested that have used our services in the past.

Hard-core whitewater river runners travel the West looking for big water each spring and want to know if the river has peaked or if there is potential for higher flows which may be more dangerous. Boy Scout Troop leaders want to know if flows will be above their level of confidence before taking troops on a raft trip. This was an excellent learning example in providing advice to the trip leader, as he knew his 'comfort zone' for boating and only needed to know if the flow would exceed this level on a certain date. Everyone has their own 'comfort zone' on a river and it is difficult to explain the potential that rivers are capable of going 'big' if the optimum weather conditions occur in the Spring.



Filming Whitewater Rafting Conditions at Lochsa Falls Rapid on Lochsa River, Idaho for The Weather Channel June 8, 2006



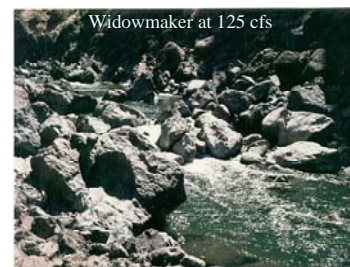
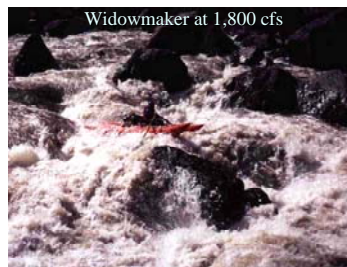
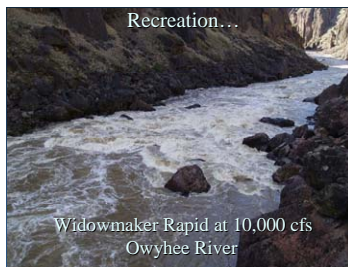
Family Boating on Main Salmon River in Idaho's Frank Church – River of No Return Wilderness Area, July 2005

On the other hand, if you are into sunny skies and family whitewater raft tips in July, you would like a gradual melt to maintain adequate boating levels in the summer. This allows many to enjoy whitewater rafting without encountering high dangerous flows or low late summer flows that often occur in non-reservoir controlled western streams.



Boat Launch at Heller Bar on Snake River, May 31, 2003. The river rose quickly from hot temperatures producing rapid snowmelt in the Salmon River basin.

Be careful where you park your vehicle, because streams can rise quickly, even in years with a below normal snow pack. In 2003, a delayed snowmelt in May gave way to record high temperatures, melting two inches of snow water per day. Stream levels increased rapidly to levels much higher than folks expected from the below average snowpack. River runners and land management agencies also monitor the melting snow at SNOTEL sites to determine when mountain forest roads will open to the river put-in locations. If roads are closed, river runners may have to cancel their 'once in a life time trip' or pay an additional expense to use over snow vehicles or fly gear to the river put-in. Likewise in the late summer, if rivers are too low to launch from the normal put-in. It pays to plan ahead. The SNOTEL Network can help with these decisions.



Dam operators and hydropower producers are interested and aware of consequences of maintaining a full reservoir to produce power verse not planning properly and flooding if Mother Nature throws curveballs in the winter or spring, producing inflows too big to manage.



**Lower Enterprise Dam southern Utah
January 12, 2005 after a heavy
precipitation event**



**Little Wood Reservoir spillway in
central Idaho May 18, 2005 after two
inches of rain fell in one day on top
of a ripe snow pack**

It is now July; streams have receded from the snowmelt. Monthly precipitation amounts are less than an inch in the valleys and an inch or two in the mountains. This is enough for dryland farming to squeeze by in some western states, but not enough for growing irrigated crops. The lack of summer precipitation is the reason why our winter snowfall is so crucial for meeting summer water supply needs.

Fish managers use peak and low flow forecasts to determine if, when and where they should plant hatchery fish in the spring or if the streams may dry-up and reduce fish habitat. Later in the summer months, low flow forecasts are used to determine if the fishing season should be curtailed due to low flows and warm water temperatures that stress the fish. Low volume and flow forecasts are also used to let the public know streams may open for salvage fishing as some streams dry-up in low snow years. Water supply information is also used as guidance for passing salmon flow water from the upstream reservoirs in Idaho and Wyoming through the Snake River dams to the Columbia River.



It is now late summer and fall is coming, reservoir operators have learned it is financially better to rent excess water during the summer season, then flush it in the fall, or gradually release water to produce hydropower in the summer when the price of electricity is higher.

Let's see, who did we miss?

- **Hunters** – keep their eye on the sky watching snow data in the fall to see if weather and snow are driving big game down from the higher elevations.
- **Tire sales** – did you know that Mother Nature is the best sales ad for getting people to buy or put their winter tires on? A good, old-fashion snow storm in November or December increases sales, while a winter snow drought hurts at the till. Likewise, windshield repair businesses are busy and hire more employees in good snow years.
- **School bus drivers and highway departments** – use SNOTEL data to monitor new snowfall before sending vehicles out and maybe even use it to call a "Snow Day"!
- **Teachers and school children** – access data for the Adopt-a-SNOTEL Program, see this link for more details:
<ftp://ftp.wcc.nrcs.usda.gov/downloads/centennial/article2120060522.pdf>
- **Ski rental stores** - thanked us for provided the encouraging information when El Nino conditions were threatening but had not happened yet in November and December 2006. They have learned once the public had the mind set of a bad snow year, their income decreases.
- **Power boat sales** – after hearing how a local ski area related their financial income to winter snowfall, a power boat dealer did the same thing and now advertises by mentioning snow and water supply in their ads.
- **Enron spin-off companies** - to buy or sell hydropower based on the flashy side of the market, demands and streamflow peaks.
- **Homeowners** - use the snow and soil moisture data to help determine how long they need to run their sump pumps to keep water away from their house foundations.
- **Fire weather forecasters** - for monitoring, predicting and determining forest fire potential, crew deployment, and ideal time for controlled burns to reduce forest fuels.
- **Range managers** - use snow data and soil moisture data to determine range readiness and when to turn the cattle loose in the high county.
- **Pizza sales** - a take-n-bake pizza chain requested temperature data because they noticed a decrease in pie sales as temperatures rose. Nobody wants to turn their stove on when temperatures are 90 or 100 degrees. Our suggestion was 'If temperatures were above 85 degrees, give 5 percent off, above 90 degrees, give 10 percent off, above 95 degrees, give 15 percent off, and if it sets a new record high, give free pizzas to the first 10 customers that come in the next day.' See this link for more information: <http://www.id.nrcs.usda.gov/snow/watersupply/usdanews.htm>

Who else? – navigation on the Columbia and Missouri, global change research, glacier recession, lake water quality studies, leaky sewer lines, sizing evaporation ponds, weekly updates for the US Drought Monitor, and weekly reports summarizing snow water around Mount St. Helens (in case it blows). Who else? I'm sure there are more stories to tell about how folks use our data and products for their personnel or financial decisions. If you have a good one, let your local snow surveyor know.

The NRCS Snow Survey and Water Supply Forecasting Program provides a wealth of data and products to help the public with their decision making processes. High quality data is important and critical in our analyses. Each year, the snow falls, accumulates, and melts differently. It's amazing how weather affects all of us in one way or another.

The following is a breakdown of the Recipients of Idaho's Water Supply Outlook Report in November 2002:

Total Count	Customer Group
132	Federal Government
120	Private Total – Business / Industry / Consultant
	43 Private – recreation
	33 Private - industry
	28 Private - hydropower
	9 Private – bank
	7 Private – consultant
94	Agriculture Group – irrigation district
86	Other – unknown, individual or landowner
61	State Government
34	News Media
28	Educator
21	Local Government
14	Agricultural Rural Group
9	Tribal Government
5	Congress Staff – federal
4	Community non-profit Organization
608	Total

Thirty-nine Idaho, NRCS Field Offices also receive the report but are not included in the above list. Twenty percent of recipients (123) were from outside the state of Idaho.

Note: this list does not include users accessing Water Supply Outlook reports from the Internet. In 2006, there were over 16 million web hits or accesses for data and information from the NRCS National Water and Climatic Center web pages. This count does not include web hits at the state level, or users that access SNOTEL data from other major web pages, such as National Weather Service, Western Region Climatic Center, Mesonet Network, or Weather Underground.

Ron Abramovich
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