IDWR State Water Supply Meeting
Mar 13, 2015

Photo taken by Ray Gadd March 11, 2015 looking east and south over Big Wood River valley illustrating lack of snow on south facing slopes.
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 12, 2015

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median

- unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- ≥ 150%

* Data unavailable at time of posting or measurement is not representative of this time of year

Provisional data subject to revision

USDANRCS NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by: USDA NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

SNOTEL Current Snow Water Equivalent (SWE) Records

Mar 12, 2015

NOTE: Until further notice, record calculations are based on period from 15th through water year 2012; water years 2013 and 2014 are not analyzed.

Preparatory Data Subject to Revision

Analysis includes sites with more than 26 years of historical data.

*Near* record in years that one other year of the period of records is more extreme.
February Precipitation: One Atmospheric River event brought 125% of average to the Panhandle, the 2 SNOTEL sites closest to the Canadian border received 200% of normal.

Rest of Idaho received 50-90% of average

Water year to date precipitation lowest total in Mud Lake area (Medicine Lodge, Beaver, Camas basins) was 56% of average on March 1 now 53%
Northern Panhandle Region 2015 Precipitation with Non-Exceedence Projections (8 sites)

Based on Provisional SNOTEL data as of Mar 09, 2015

Salmon Basin 2015 Precipitation with Non-Exceedence Projections (2 sites)

Based on Provisional SNOTEL data as of Mar 09, 2015
March 1 – 12
SNOTEL Precipitation as % of Mar Monthly Total
5-10% across most of Idaho
15% Upper Snake
20% in Bear River
Daily Mean Temperature Anomaly: 01 March 2015 - 11 March 2015
Period ending 7 AM EST 11 Mar 2015
Base period: 1981-2010
(Map created 12 Mar 2015)
Mar 12, 2015

NOTE: Until further notice, record calculations are based on period of record through water year 2012; water years 2013 and 2014 are not analyzed.

Yesterday’s Maximum Temperature Records

- New High
- Near High
- Non Record
- New Low
- Near Low

Analysis includes sites with at least 15 years of historical data. “Near” record means that one other year of the period of record is more extreme. Temperature is measured from midnight to midnight.

Prepared by USDA-ARS National Water and Climate Center
Portland, Oregon
http://wwwvcc.nrcs.usda.gov

Provisional Data Subject to Revision
<table>
<thead>
<tr>
<th>BASIN or REGION</th>
<th>SWSI Value</th>
<th>Most Recent Year With Similar SWSI Value</th>
<th>Agricultural Water Supply Shortage May Occur When SWSI is Less Than</th>
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<tbody>
<tr>
<td>Northern Panhandle</td>
<td>Not Available</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Spokane</td>
<td>-3.3</td>
<td>2005</td>
<td>NA</td>
</tr>
<tr>
<td>Clearwater</td>
<td>1.0</td>
<td>2006</td>
<td>NA</td>
</tr>
<tr>
<td>Salmon</td>
<td>-0.3</td>
<td>2002</td>
<td>NA</td>
</tr>
<tr>
<td>Weiser</td>
<td>-1.9</td>
<td>2004</td>
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<td>Payette</td>
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<td>2014</td>
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<tr>
<td>Boise</td>
<td>1.0</td>
<td>2009</td>
<td>-1.5</td>
</tr>
<tr>
<td>Big Wood</td>
<td>-0.2</td>
<td>2010</td>
<td>0.1</td>
</tr>
<tr>
<td>Little Wood</td>
<td>-0.6</td>
<td>2008</td>
<td>-1.3</td>
</tr>
<tr>
<td>Big Lost</td>
<td>-0.2</td>
<td>2008</td>
<td>0.6</td>
</tr>
<tr>
<td>Little Lost</td>
<td>-1.7</td>
<td>2014</td>
<td>1.3</td>
</tr>
<tr>
<td>Teton</td>
<td>-0.5</td>
<td>2005</td>
<td>-3.9</td>
</tr>
<tr>
<td>Henrys Fork</td>
<td>-0.1</td>
<td>2010</td>
<td>-3.4</td>
</tr>
<tr>
<td>Snake (Heise)</td>
<td>1.1</td>
<td>2014</td>
<td>-1.5</td>
</tr>
<tr>
<td>Oakley</td>
<td>-0.9</td>
<td>2013</td>
<td>0.4</td>
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<tr>
<td>Salmon Falls</td>
<td>-1.8</td>
<td>2004</td>
<td>-0.8</td>
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<tr>
<td>Bruneau</td>
<td>-0.7</td>
<td>2013</td>
<td>NA</td>
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<tr>
<td>Owyhee</td>
<td>-3.3</td>
<td>2003</td>
<td>-3.2</td>
</tr>
<tr>
<td>Bear River</td>
<td>-0.5</td>
<td>2014</td>
<td>-3.7</td>
</tr>
</tbody>
</table>
Boundary Creek

Year    Runoff
1959    109%
2014    104%
2015    82%
Forecast
North Fork Clearwater Basin 2015 Snow Water with Non-Exceedance Projections (8 sites)

Based on Provisional SNOTEL data as of Mar 09, 2015

2015 & 2013 Twin Lakes SNOTEL and Selway River near Lowell

Updated March 12, 2015

2015 & 1992 Lolo Pass SNOTEL and Lochsa River near Lowell

Updated March 12, 2015
From NOAA NWS  Crater Meadows, ID SNOTEL site

Max air temp

Other warm years
2015
2003
1992
Owyhee Basin 2015 Snowpack Comparison Graph (7 sites)
Based on Provisional SNOTEL data as of Mar 09, 2015

Current as Pct of Normal: 29%
Current as Pct of 2014: 64%
Current as Pct of Peak: 28%
Normal as Pct of Peak: 100%
Pct of Normal Needed to Reach Peak: 44706%
Normal Peak Date: Mar 12

2015 is a mild El Nino. 2010 and 2003 were El Nino, while 2014 was neutral.
Salmon Basin 2015 Snowpack Comparison Graph (22 sites)
Based on Provisional SNOTEL data as of Mar 09, 2015

Current as Pct of Normal: 82%
Current as Pct of 2014: 75%
Current as Pct of Peak: 72%
Normal as Pct of Peak: 88%
Pct of Normal Needed to Reach Peak: 230%
Normal Peak Date: Apr 09

2015 is a mild El Nino.
2010 and 2003 were El Nino, while 2014 was neutral.

2015 & 2013 Banner Summit SNOTEL and MF Salmon River at MF Lodge

On average MF Salmon River experiences a snowmelt streamflow peak, or increase in flow, when Banner Summit SNOTEL is half-melted.
Following are Boise River Snow to Flow Analysis by BSU to help predict the peak snowmelt streamflow

Caution – it maybe challenging this year due to early melting that is occurring
As of 3/12/2015, Graham Guard Station SNOTEL remains at 30% melt-out.
We are currently at 30% melt-out (70% of SWE remaining) at the Graham Guard SNOTEL site. The 30% melt-out probability curve is indicated by the RED line.

The x-axis shows the number of days from each melt-out percent to peak streamflow.

On average (50% probability), peak streamflow will occur within the next 39 days.
• We often use the highest elevation SNOTEL sites for predictive purposes since these sites still have snow remaining at the time of peak streamflow.

• As of 3/12, Atlanta Summit, the highest elevation SNOTEL site, is at 99% of max accumulation (~1% melt-out).

• The probability graph for Atlanta Summit shows that on average (50% probability), peak streamflow occurs:
  • 3 days after reaching 30% melt-out (or 1 day after 40% melt-out)
• We can use melt-out timing from the Graham Guard, the lower elevation SNOTEL site, to predict melt-out timing at Atlanta Summit.

• Graham Guard reached 30% melt-out on 3/10, we estimate Atlanta Summit will reach 30% melt-out on 4/15 (± 4 days).

• We can use this information in combination with the 30% melt-out probability curve for Atlanta Summit to estimate that there is a 50% probability that peak streamflow for the Boise River nr Twin Springs ID, will occur on or before 4/18 (± 4 days).
Photo taken by Ray Gadd
March 11, 2015 looking east over Ketchum in Big Wood River valley illustrating lack of snow on south facing slopes.
Big Wood River at Hailey

<table>
<thead>
<tr>
<th>Year</th>
<th>Runoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>44%</td>
</tr>
<tr>
<td>1959</td>
<td>57%</td>
</tr>
<tr>
<td>1977</td>
<td>30%</td>
</tr>
<tr>
<td>2014</td>
<td>59%</td>
</tr>
<tr>
<td>2015</td>
<td>77%</td>
</tr>
</tbody>
</table>
Big Lost River below Mackay Reservoir

Year    Runoff
2007    55%
1959    59%
1977    51%
2014    40%
2015    69% Forecast

On average, Big Lost R at Howell Ranch increases in flow or has its snowmelt peak 4 days after Lost-Wood Divide melts out.
118%

Current as Pct of Normal: 94%
Current as Pct of 2014: 67%
Current as Pct of Peak: 82%
Normal as Pct of Peak: 88%
Pct of Normal Needed to Reach Peak: 146%
Normal Peak Date: Apr 10

2015 is a mild El Nino.
2010 and 2008 were El Nino, while 2014 was neutral.

2015 Snake River near Heise: Apr - Jul Volume
NRCS Monthly Forecasts are Yellow Squares

Updated March 11, 2015

2014 Apr - Jul Runoff of Normal 3,660 KAF

118%

SNOTELs used: Base Camp, Blind Bull, Cottonwood Ck, Lewis Lake, Snake River Station, Slug Ck, Thumb Divide, Willow Ck
March 1 Surface Water Supply Index (SWSI)
Snake River near Heise & Jackson and Palisades Reservoirs

Estimated Threshold for Surplus of Water ~6,800 KAF
Adequate Irrigation Water Supply Above 4,400 KAF
Bear Basin 2015 Snowpack Comparison Graph (15 sites)

Based on Provisional SNOTEL data as of Mar 2, 2015

Current as Pct of Normal: 75%
Current as Pct of 2014: 66%
Current as Pct of Peak: 64%
Normal as Pct of Peak: 86%

Pct of Normal Needed to Reach Peak: 25%
Normal Peak Date: Apr 03

2015 is a mild El Nino. 2010 and 2003 were El Nino, while 2014 was neutral.
Goose Creek Basin 2015 Snowpack Comparison Graph (2 sites)
Based on Provisional SNOTEL data as of Mar 09, 2015

Current as Pct of Normal: 85%
Current as Pct of 2014: 95%
Current as Pct of Peak: 81%
Normal as Pct of Peak: 95%
Pct of Normal Needed to Reach Peak: 269%
Normal Peak Date: Mar 31

2015 is a mild El Nino.
2010 and 2003 were El Nino, while 2014 was neutral.

2015 Oakley Reservoir inflow: Mar - Jul Volume, NRCS Monthly / mid-Month Forecasts are Squares
Updated March 11, 2015

2015 -- based on irrigation demand of 50 KAF and Feb 28 reservoir storage of 20 KAF
30 KAF for Mar-Sep runoff or 97% of average runoff is needed for marginally adequate surface irrigation supply

2014 & 2013 Mar - Jul Runoff
57-60% of Normal 16-17 KAF

SNOTEL Sites used: Bostetter RS, Howell Canyon and Magic Mountain.
Salmon Falls Creek

Year Runoff
2007 ~54%
1959 39%
1977 39%
2014 46%
2015 65%

Forecast

2015 -- based on irrigation demand of 110 KAF and Feb 28 reservoir storage of 28 KAF,
96% of average runoff or 85 KAF for Mar-Sep is needed for marginally adequate surface irrigation supply

2014 & 2013 Mar - Jul Runoff
46% of Normal 37 KAF
Photo taken by Ray Gadd
March 11, 2015 looking east over Big Wood River valley illustrating lack of snow on south facing slopes.