

# **Snowpack Monitoring for Streamflow Forecasting and Drought Planning Workshop**

## **Central Utah Water Conservancy District**

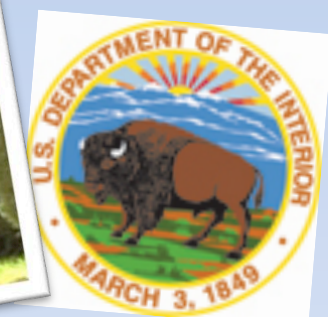
**August 11, 2015**





# Partners

- Natural Resources Conservation Service
- National Weather Service
- United States Geological Survey
- U.S. Army Corps of Engineers
- Salt Lake County Council
- Sandy City, Heber City, ...
- Utah County Cities: Provo ...
- Spanish Fork River Canal ...
- Utah County, Utah County ...
- JVCWD, MWDSL&S, PRWD ...
- Salt Lake City Department ...
- Interagency Biological Assn ...
- June Sucker Recovery Impl ...
- United States Bureau of Re ...
- United States Department o ...
- Duchesne County Commissio ...
- Duchesne County Emergency ...
- MLWUA, DCWCD, UWCD
- Wasatch County Council
- Wasatch County Emergency M ...
- North American Weather Con ...
- WCWEP Canal Companies
- Duchesne/Strawberry Water Users Association
- State Engineer
- River Commissioners
- Utah State Parks



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### Snow Survey

- ▣ Snow Survey Products
- ▣ Water Supply Products

### I Want To...

- Find Water Supply Documents

## Snow Survey

### Utah Snow Survey Program



The NRCS Snow Survey Program provides mountain snowpack data and streamflow forecasts for the western United States. Common applications of snow survey products include water supply management, flood control, climate modeling, recreation, and conservation planning.

[...More About Snow Surveys](#)

## Snow Survey Data, Products, and Reports

View real-time daily Snow and Precipitation data in [Google Maps](#)  
[Google Earth SNOTEL Data Layers](#)  
[Snow and Precipitation Update Reports](#)



### Snow Survey Data - [clickable map](#)

[Current Water Year](#) | [Historic Data](#)

#### Individual SNOTEL Site Pages

Agua Canyon (907) ▾

[Go to SNOTEL site page](#)



### Soil Climate Analysis Network

Data, figures, and maps...

#### Individual SCAN Site Pages

Alkali Mesa (2138) ▾

[Go to SCAN site page](#)



### Water Supply

Streamflow forecasts, reservoir storage, surface water supply index, etc...



### Site Information

Data site locations, descriptions, etc...



### Climate

Soil moisture/temperature data, climate information, climate summaries, and wetlands analysis



### Recreation

Weekly snow depth reports

## Additional Snow Survey Information

- [Related Links](#)
- [Contact Utah Snow Survey](#)
- [SnowNews Newsletter](#) - **NEW!**



# Utah Water Supply Outlook Report

February, 2015

Duplicate in Records Department  
Date: February 5, 2015 Initial: Conille  
DESTROY AFTER USE



**Monroe Mountain, Squaw Springs Snow Course. January, 29, 2015**

Photo by Kent Sutcliffe, NRCS



# Utah Climate and Water Report

February 2015

Duplicate in Records Department  
Date: February 9, 2015 Initial: Conille  
DESTROY AFTER USE



**Wasatch Range near Brighton, mid-January, 2015**

Photo by Jordan Clayton

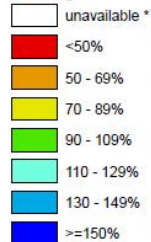
Scale in cm



# Utah SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal

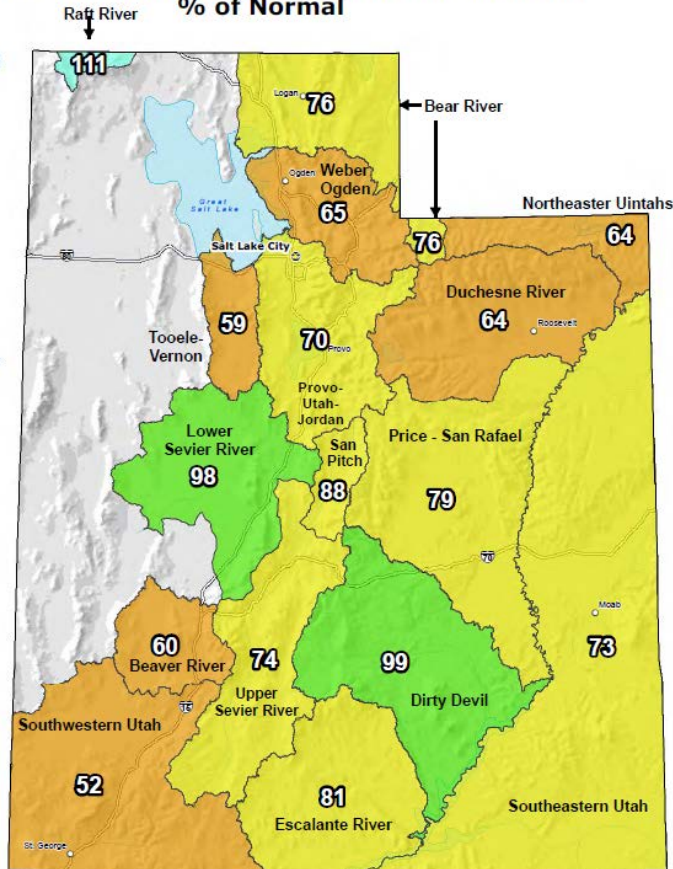
Feb 01, 2015

Water Year  
(Oct 1) to Date  
Precipitation  
Basin-wide  
Percent of  
1981-2010  
Average



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

Provisional Data  
Subject to Revision



The water year to date precipitation percent of normal represents the accumulated precipitation 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>

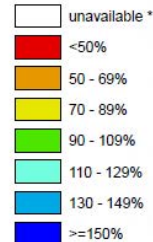
ndf-records-105.300.400.401.402.403.405.420.440.430.460.480.600

3.Y.01.228 Utah Water Supply Outlook 2-15

# Utah SNOTEL Current Snow Water Equivalent (SWE) % of Normal

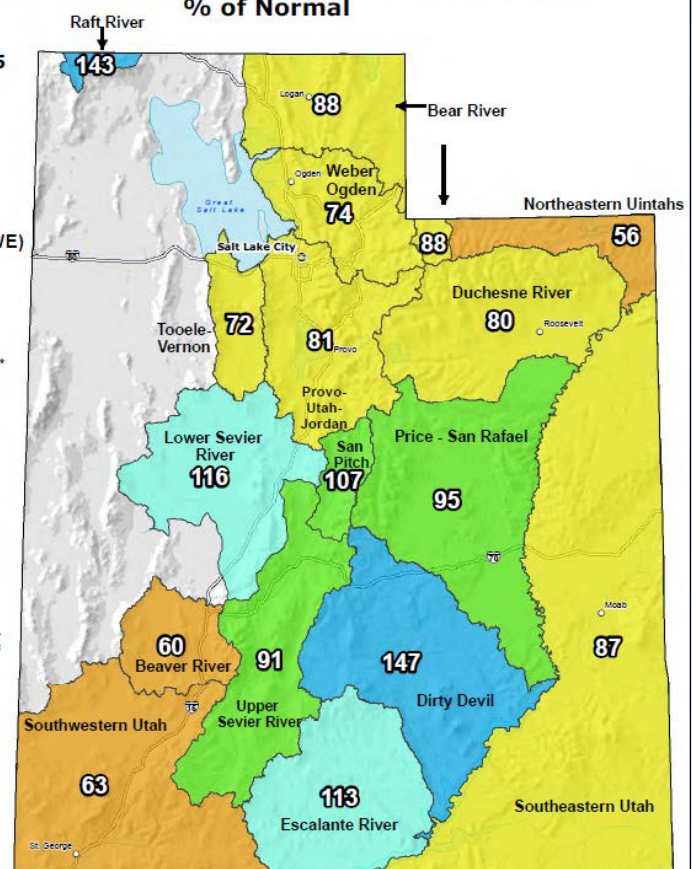
Feb 01, 2015

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



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

Provisional Data  
Subject to Revision



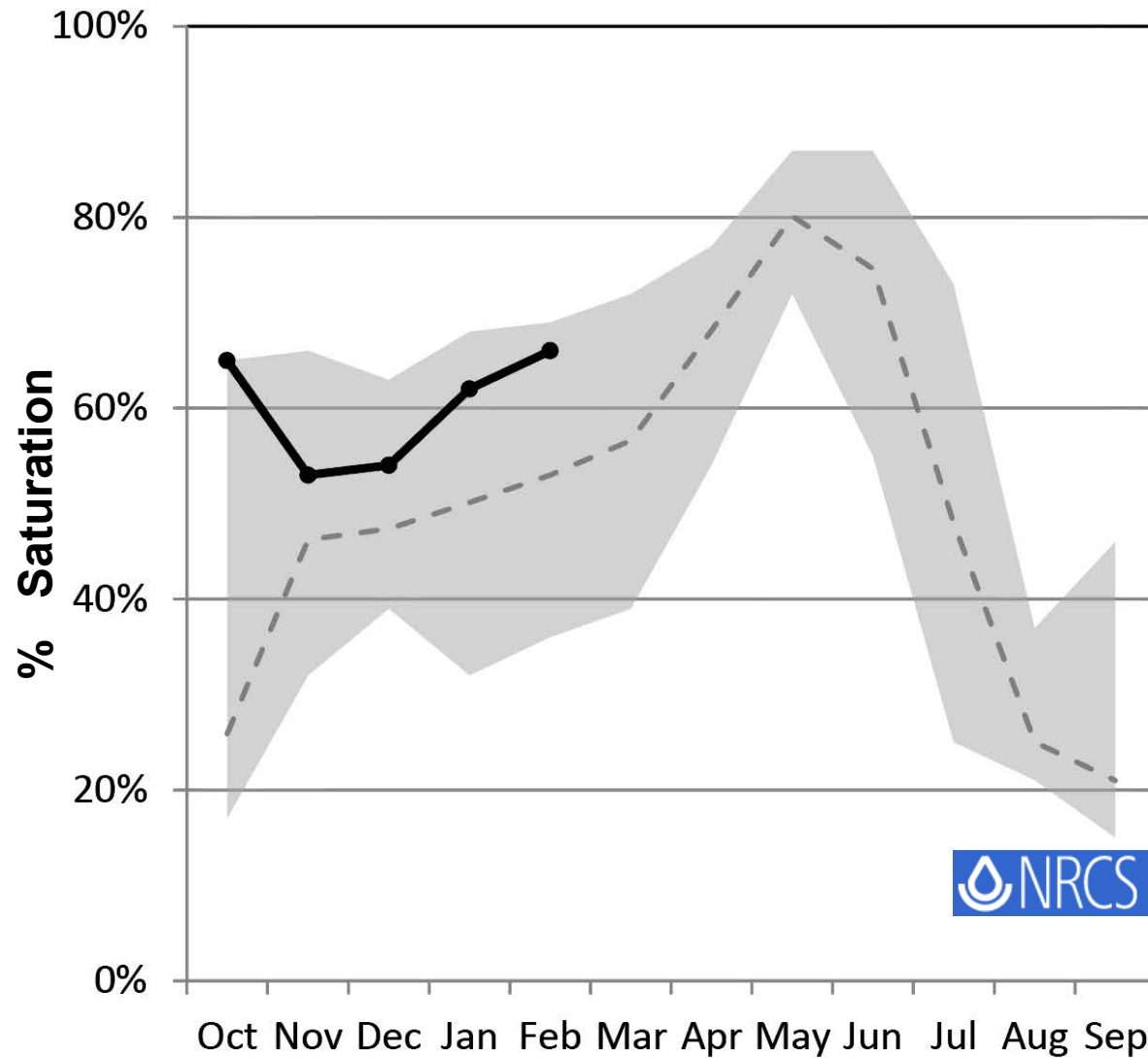
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

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

# Provo & Jordan River Basins

## Soil Moisture

2-1-2015





## Utah SNOTEL Snowpack Update Report

Based on Mountain Data from NRCS SNOTEL Sites

**\*\*Provisional data, subject to revision\*\***

Data based on the first reading of the day (typically 00:00) for Friday, July 31, 2015

| Basin<br>Site Name           | Elev<br>(ft) | Snow Water Equivalent |                           |                        |                        | Percent of        |                |    |
|------------------------------|--------------|-----------------------|---------------------------|------------------------|------------------------|-------------------|----------------|----|
|                              |              | Current<br>(in)       | Today's<br>Median<br>(in) | Median<br>Peak<br>(in) | Median<br>Peak<br>Date | Today's<br>Median | Median<br>Peak |    |
| PROVO R.-UTAH LAKE-JORDAN R. |              |                       |                           |                        |                        |                   |                |    |
| Trial Lake                   | 9992         | 0.0                   | 0.0                       | 23.0                   | Apr 29                 | *                 | 0*             |    |
| Snowbird                     | 9640         | 0.0                   | 0.0                       | 42.8                   | Apr 29                 | *                 | 0*             |    |
| Mill-D North                 | 8967         | 0.0                   | 0.0                       | 26.1                   | Apr 01                 | *                 | 0*             |    |
| Clear Creek #1               | 8908         | 0.2                   | 0.0                       | 18.8                   | Apr 01                 | *                 | 1*             |    |
| Brighton                     | 8750         | 0.0                   | 0.0                       | 23.6                   | Apr 10                 | *                 | 0*             |    |
| Redden Mine Lwr              | 8500         | ~M                    | N/A                       | N/A                    | N/A                    | *                 | *              |    |
| Beaver Divide                | 8280         | 0.1                   | 0.0                       | 9.8                    | Mar 14                 | *                 | 1*             |    |
| Lookout Peak                 | 8200         | 0.0                   | 0.0                       | 26.4                   | Apr 03                 | *                 | 0*             |    |
| Timpanogos Divide            | 8140         | ~M                    | 0.0                       | 20.9                   | Mar 17                 | *                 | *              |    |
| Payson R.S.                  | 8066         | 0.0                   | 0.0                       | 17.9                   | Apr 03                 | *                 | 0*             |    |
| Daniels-Strawberry           | 8037         | 0.0                   | 0.0                       | 15.2                   | Mar 16                 | *                 | 0*             |    |
| Cascade Mountain             | 7774         | 0.0                   | 0.0 <sub>R</sub>          | 20.6                   | Apr 11                 | *                 | 0*             |    |
| Clear Creek #2               | 7659         | 0.2                   | 0.0                       | 14.3                   | Apr 02                 | *                 | 1*             |    |
| Parley's Summit              | 7500         | 0.0                   | 0.0                       | 15.0                   | Apr 01                 | *                 | 0*             |    |
| Hobble Creek                 | 7399         | 0.2                   | N/A                       | N/A                    | N/A                    | *                 | *              |    |
| Dry Fork                     | 7093         | 0.0                   | 0.0 <sub>C</sub>          | 13.9                   | Mar 29                 | *                 | 0*             |    |
| Louis Meadow                 | 6700         | 0.0                   | 0.0 <sub>C</sub>          | 20.0                   | Mar 16                 | *                 | 0*             |    |
| Basin Index (%)              |              |                       |                           |                        |                        |                   | *              | 0* |

Data Current as of: 2/4/2015 2:17:06 PM

# Provo R Utah Lake Jordan R Streamflow Forecasts - February 1, 2015

Forecast Exceedance Probabilities for Risk Assessment  
Chance that actual volume will exceed forecast

| Provo R Utah Lake Jordan R      | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---------------------------------|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Salt Ck at Nephi                | APR-JUL         | 0.19      | 4         | 8.1       | 85%   | 12.2      | 18.3      | 9.5            |
| Spanish Fk at Castilla          | APR-JUL         | 2.1       | 24        | 60        | 87%   | 96        | 148       | 69             |
| Provo R at Woodland             | APR-JUL         | 38        | 57        | 72        | 72%   | 89        | 117       | 100            |
| Provo R at Hailstone            | APR-JUL         | 39        | 58        | 74        | 69%   | 92        | 121       | 108            |
| Provo R bl Deer Ck Dam          | APR-JUL         | 31        | 57        | 75        | 65%   | 93        | 119       | 116            |
| American Fk ab Upper Powerplant | APR-JUL         | 7.2       | 16.6      | 23        | 72%   | 29        | 39        | 32             |
| Utah Lake Inflow                | APR-JUL         | 5.3       | 53        | 200       | 75%   | 347       | 501       | 265            |
| W Canyon Ck nr Cedar Fort       | APR-JUL         | 0.035     | 0.57      | 1.1       | 63%   | 1.63      | 2.4       | 1.76           |
| Little Cottonwood Ck nr SLC     | APR-JUL         | 21        | 27        | 32        | 84%   | 37        | 44        | 38             |
| Big Cottonwood Ck nr SLC        | APR-JUL         | 10.3      | 18        | 23        | 64%   | 29        | 36        | 36             |
| Mill Ck nr SLC                  | APR-JUL         | 0.128     | 2.3       | 3.8       | 59%   | 5.3       | 7.6       | 6.4            |
| Parleys Ck nr SLC               | APR-JUL         | 0.28      | 4.3       | 8.1       | 57%   | 11.9      | 17.6      | 14.2           |
| Dell Fk nr SLC                  | APR-JUL         | 0.11      | 0.76      | 3.3       | 60%   | 5.8       | 9.6       | 5.5            |
| Emigration Ck nr SLC            | APR-JUL         | 0.08      | 1.9       | 2.2       | 55%   | 2.5       | 4.7       | 4              |
| City Ck nr SLC                  | APR-JUL         | 0.16      | 2.9       | 4.8       | 62%   | 6.7       | 9.5       | 7.7            |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

| Reservoir Storage<br>End of January, 2015 | Current<br>(KAF) | Last Year<br>(KAF) | Average<br>(KAF) | Capacity<br>(KAF) |
|-------------------------------------------|------------------|--------------------|------------------|-------------------|
| Deer Creek Reservoir                      | 130.8            | 109.9              | 107.7            | 149.7             |
| Strawberry Reservoir                      | 837.4            | 830.3              | 658.4            | 1105.9            |
| Utah Lake                                 | 548.3            | 619.6              | 752.5            | 870.9             |
| Jordanelle Reservoir                      | 199.5            | 155.4              | 242.0            | 320.0             |
| Basin-wide Total<br># of reservoirs       | 1716.1<br>4      | 1715.3<br>4        | 1760.6<br>4      | 2446.5<br>4       |

| Watershed Snowpack Analysis<br>February 1, 2015 | # of Sites | % Median | Last Year<br>% Median |
|-------------------------------------------------|------------|----------|-----------------------|
| Upper Provo                                     | 6          | 77%      | 66%                   |
| Jordan                                          | 16         | 78%      | 67%                   |
| Utah Lake                                       | 13         | 81%      | 64%                   |
| Spanish Fork                                    | 5          | 83%      | 64%                   |
| Six Creeks                                      | 15         | 77%      | 67%                   |
| Cottonwoods                                     | 7          | 77%      | 61%                   |



## North American Weather Consultants, Inc.

Air Quality, Applied Meteorology, Meteorological Research, Weather Modification

8180 South Highland Drive, Suite B-2  
Sandy, Utah 84093  
Telephone 801-942-9005  
Facsimile 801-942-9007  
Email: [nawc@nawcinc.com](mailto:nawc@nawcinc.com)

March 5, 2015

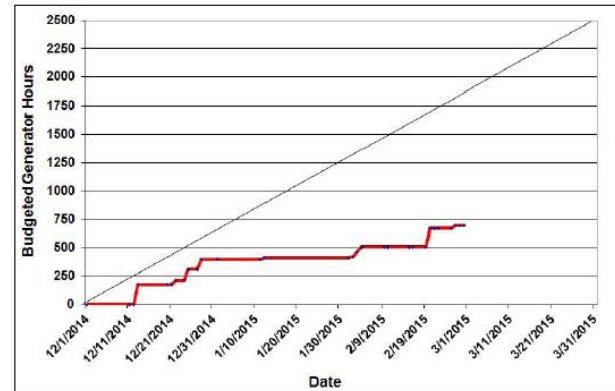
Tom Bruton  
Central Utah Water Conservancy District  
355 W. University Parkway  
Orem, UT 84058

Dear Tom:

This is a report of cloud seeding activities conducted for the Western Uintas program during the month of February, 2015. February had quite a few days of unseasonably warm temperatures during the first half of the month, with more February-like weather during the second half of the month. There were five seeded storm events in February. Table 1 summarizes the seeding for February and the season to date, while Figure 1 shows the cumulative seeding generator hours so far this season, in comparison to a linear usage of budgeted hours during the entire season.

**Table 1**  
Summary of February 2015 Seeding Operations

| Storm Number   | Date           | No. of Generators | No. of Hours |
|----------------|----------------|-------------------|--------------|
| 6              | February 2     | 3                 | 9.0          |
| 7              | February 2-3   | 4                 | 43.5         |
| 8              | February 3-4   | 3                 | 42.25        |
| 9              | February 20-21 | 5                 | 166.0        |
| 10             | February 26    | 5                 | 25.5         |
| February Total |                |                   | 286.25       |
| Season to Date | ---            | ---               | 699          |

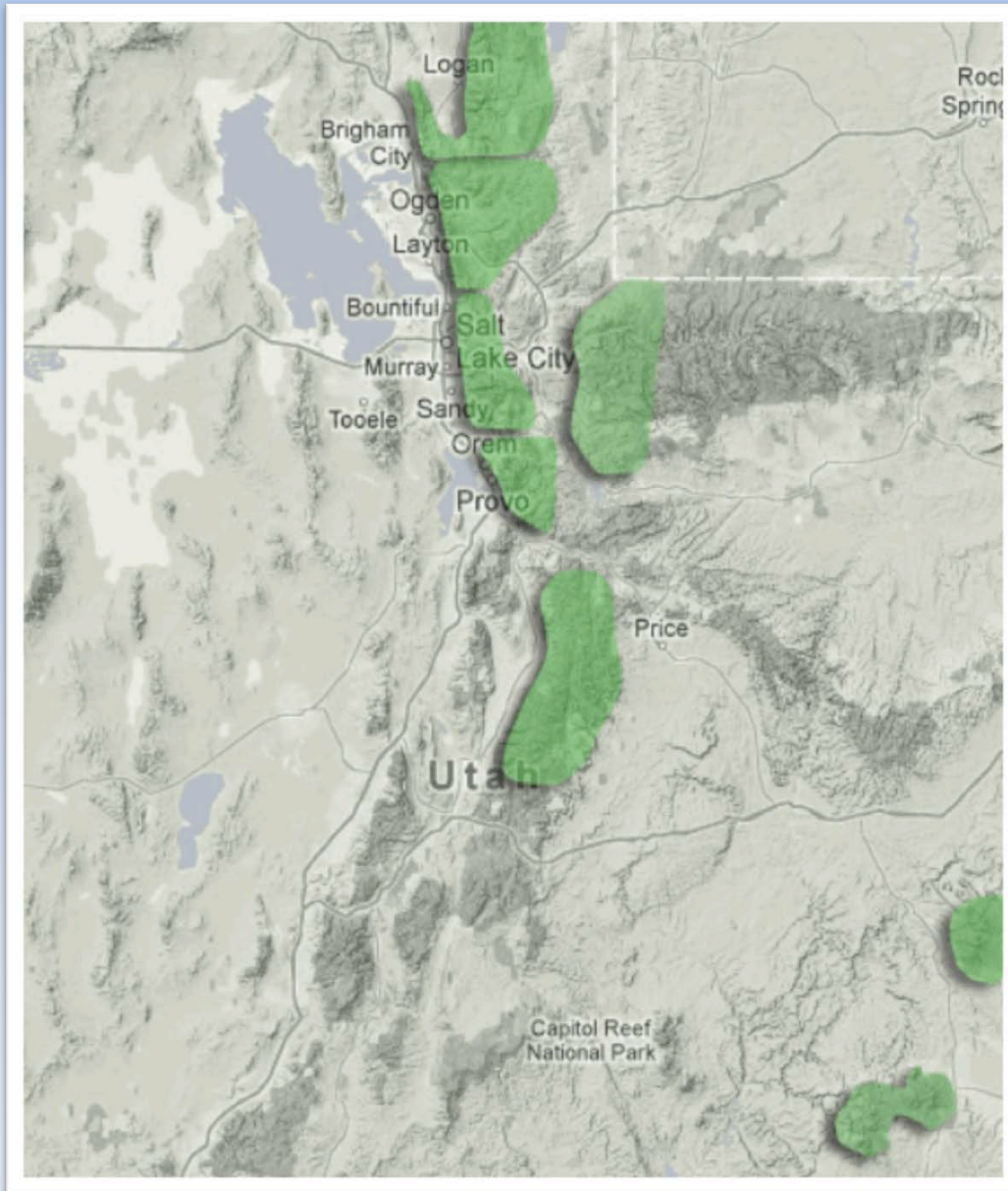


**Figure 1.** Seeding through February, 2015 (red), in comparison to a linear usage of budgeted hours through the season (diagonal line)

As of March 1, 2015, SNOTEL observations from the Natural Resource Conservation Service showed snowpack and water year precipitation percentages averaging 63% and 61%, respectively, for the overall Weber/Ogden watershed area. Corresponding percentages of 64% and 62% were reported for the overall Provo River and Utah Lake watershed areas. Table 2 summarizes the March 1 data at SNOTEL sites in and around the target area.

# Current Avalanche Danger

February 19, 2015

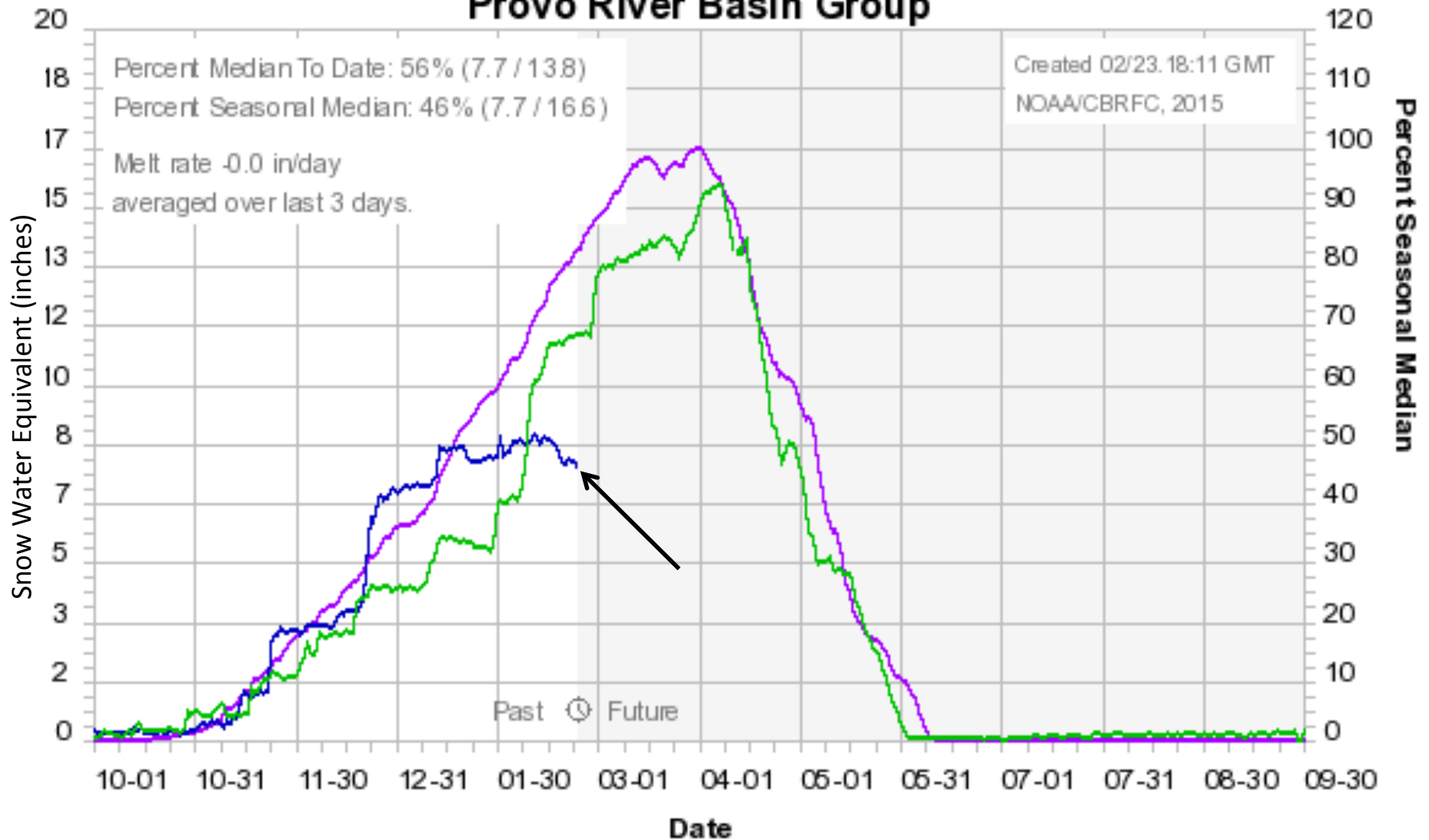


|                       |  |
|-----------------------|--|
| <b>5 EXTREME</b>      |  |
| <b>4 HIGH</b>         |  |
| <b>3 CONSIDERABLE</b> |  |
| <b>2 MODERATE</b>     |  |
| <b>1 LOW</b>          |  |

# Provo River Basin Snowpack

Based on Provisional SNOTEL data as of February 23, 2015

## Colorado Basin River Forecast Center Provo River Basin Group



Median 1981-2010 — 2015 — 2014 —



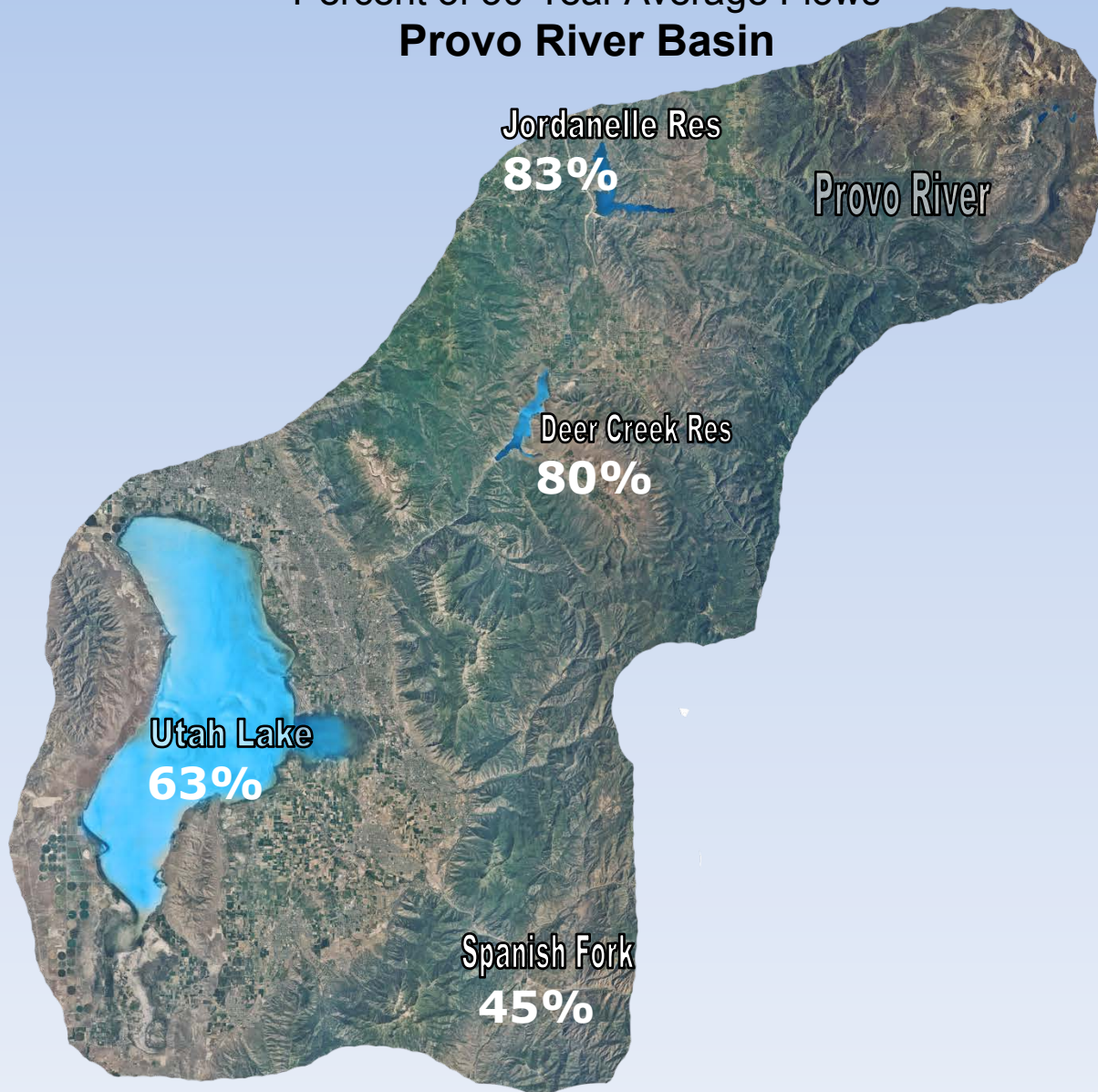
# Forecasted Utah Spring Snowmelt Runoff Volume

February 1, 2015

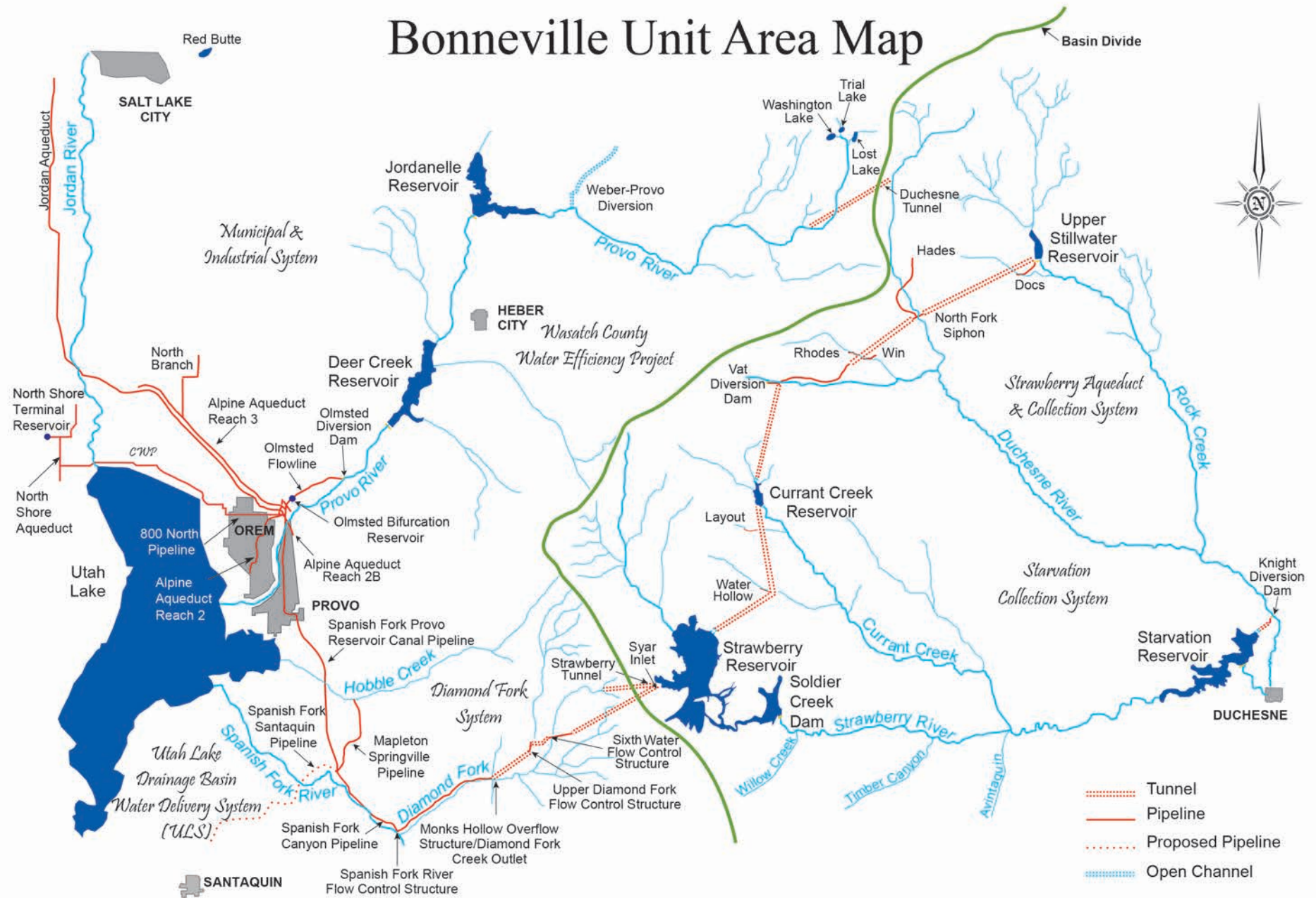
April-Through-July Volume Forecast

Percent of 30-Year Average Flows

## Provo River Basin



# Bonneville Unit Area Map



| <b>RESERVOIR</b>        | <b>% Full<br/>as of<br/>2-24-15</b> | <b>Projected<br/>Fill %</b>    |
|-------------------------|-------------------------------------|--------------------------------|
| <b>Jordanelle</b>       | <b>65%</b>                          | <b>77%</b>                     |
| <b>Utah Lake</b>        | <b>-3.57 ft<br/>below comp</b>      | <b>-3.00 ft<br/>below comp</b> |
| <b>Deer Creek</b>       | <b>91%</b>                          | <b>Fill</b>                    |
| <b>Upper Stillwater</b> | <b>46%</b>                          | <b>Fill</b>                    |
| <b>Strawberry</b>       | <b>75%</b>                          | <b>78%</b>                     |
| <b>Starvation</b>       | <b>94%</b>                          | <b>Fill</b>                    |
| <b>Moon Lake</b>        | <b>83%</b>                          | <b>85%</b>                     |
| <b>Big Sandwash</b>     | <b>99%</b>                          | <b>Fill</b>                    |
| <b>Red Fleet</b>        | <b>46%</b>                          | <b>50%</b>                     |
| <b>Steinaker</b>        | <b>53%</b>                          | <b>60%*</b>                    |
| <b>Trial Lake</b>       | <b>83%</b>                          | <b>Fill</b>                    |
| <b>Washington Lake</b>  | <b>78%</b>                          | <b>Fill</b>                    |
| <b>Lost Lake</b>        | <b>65%</b>                          | <b>Fill</b>                    |

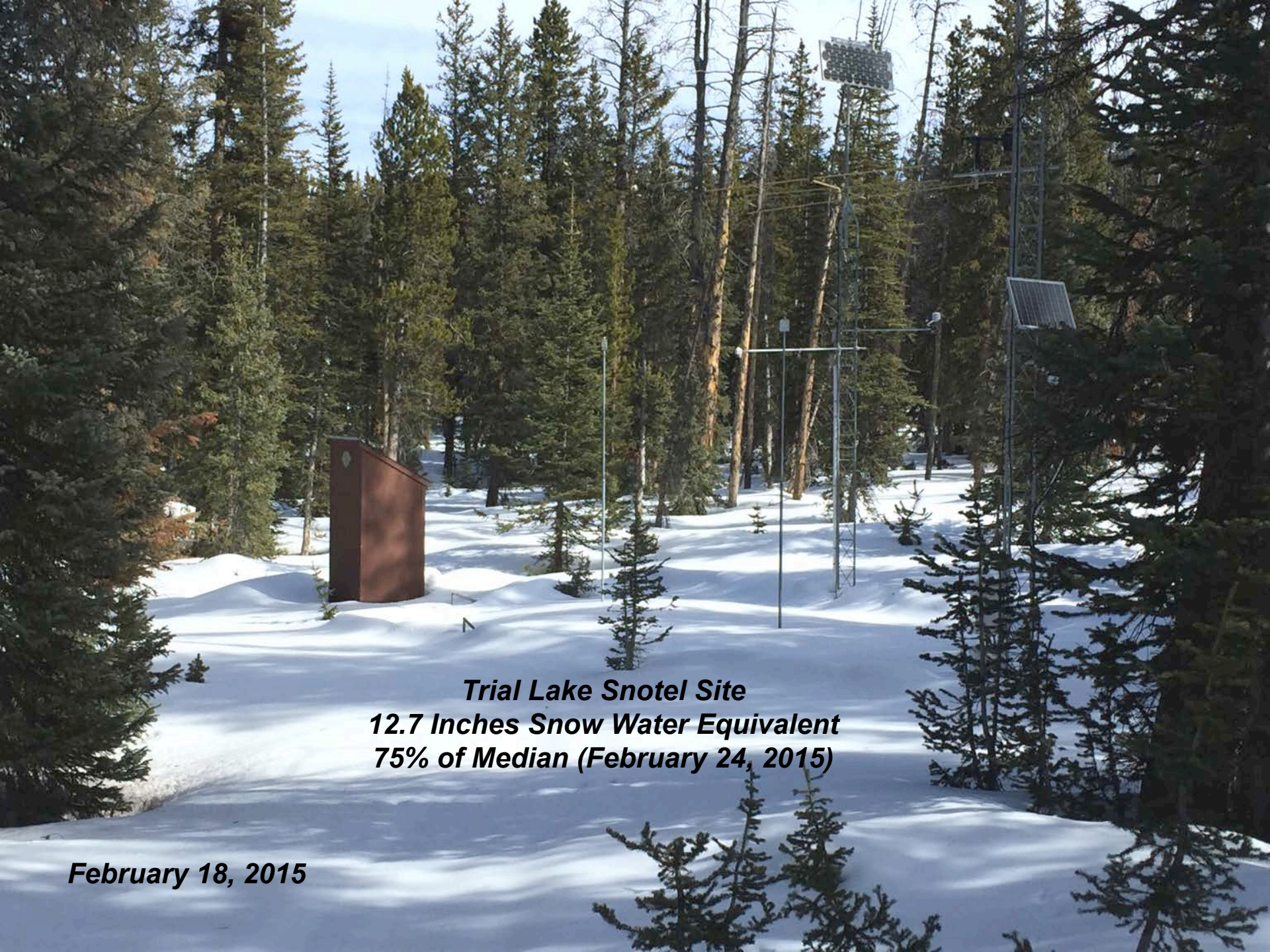
\* Under filling restrictions



- September-October:
  - CUWCD staff meet to discuss fall/winter operations.
  - Complete cooperative agreements with USGS and NAWC.
- November-February:
  - Monthly meetings as necessary, particularly in preparation for high-runoff years.
- March-April:
  - CUWCD staff meet to discuss runoff operations.
- May-September:
  - Main runoff season operations and deliveries

NAME THAT  
SNOTEL SITE!





***Trial Lake Snotel Site  
12.7 Inches Snow Water Equivalent  
75% of Median (February 24, 2015)***

***February 18, 2015***





***February 19, 2015***

***Rock Creek Snotel Site  
4.0 Inches Snow Water Equivalent  
59% of Median (February 24, 2015)***





***February 23, 2015***

***Currant Creek Snotel Site  
3.6 Inches Snow Water Equivalent  
44% of Median (February 25, 2015)***

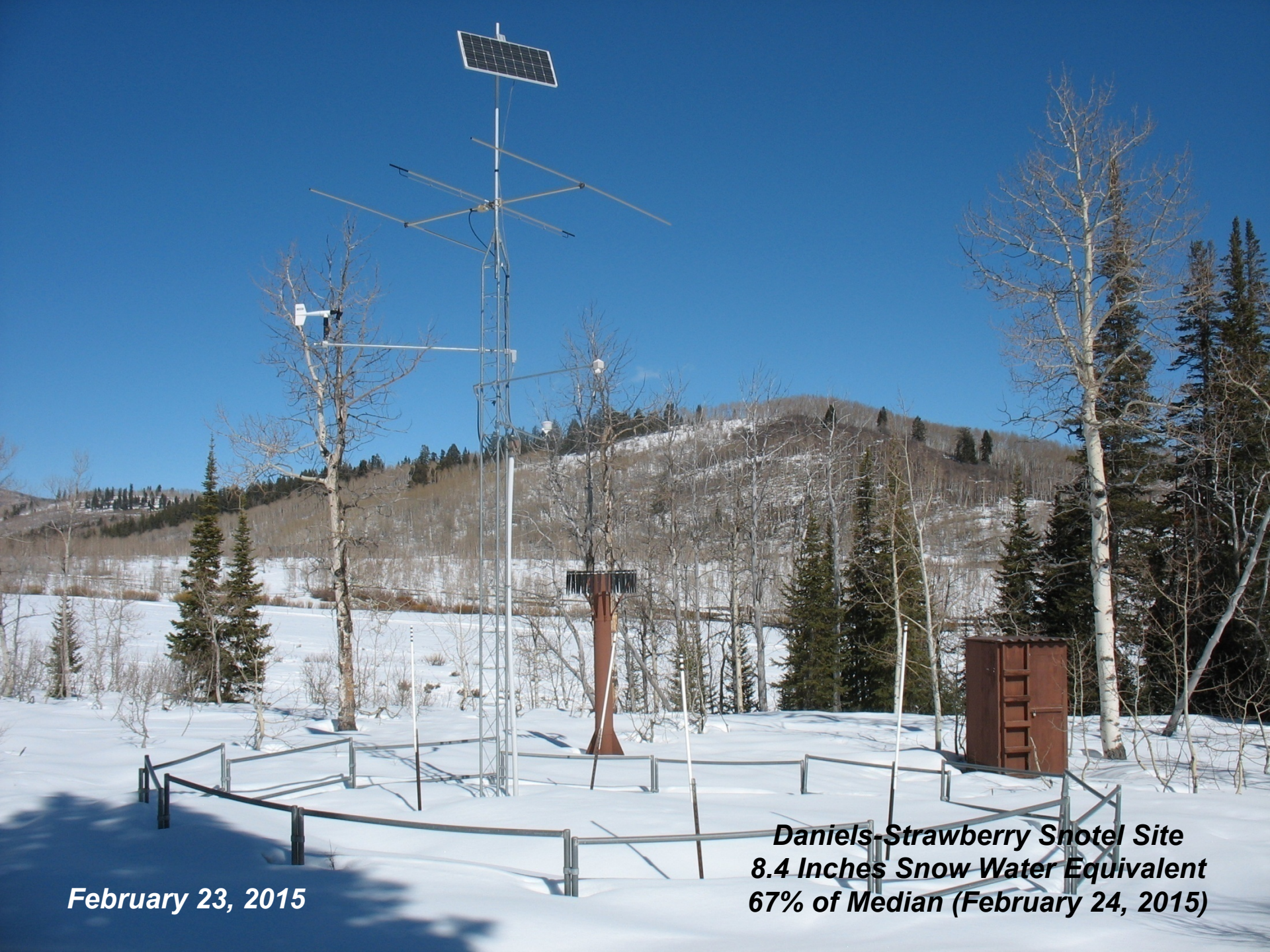




**February 23, 2015**

**Strawberry Divide Snotel Site  
8.0 Inches Snow Water Equivalent  
59% of Median (February 24, 2015)**





**February 23, 2015**

**Daniels-Strawberry Snotel Site  
8.4 Inches Snow Water Equivalent  
67% of Median (February 24, 2015)**



# Questions?

