Basin Outlook Reports
And
Federal - State - Private Cooperative Snow Surveys

**For more Wyoming water supply information, contact:**

Jim Fahey - Hydrologist
100 East "B" Street, Casper, WY 82601
(307) 233-6787  james.fahey@usda.gov

**How forecasts are made**

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño/Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers. If you believe you experienced discrimination when obtaining services from USDA, participating in a USDA program, or participating in a program that receives financial assistance from USDA, you may file a complaint with USDA. Information about how to file a discrimination complaint is available from the Office of the Assistant Secretary for Civil Rights. USDA prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual’s income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) To file a complaint of discrimination, complete, sign, and mail a program discrimination complaint form, available at any USDA office location or online at www.ascr.usda.gov, or write to: USDA Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW, Washington, DC 20250-9410 Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of hearing, or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer, and lender. Persons with disabilities who require alternative means for communication of program information (e.g., Braille, large print, audiotape, etc.) should contact USDA’s TARGET Center at (202) 720-2600 (voice and TDD).
Hydrologic Discussion

Snowpack below the 9,000 foot elevation melted out by late May over a majority of basins in Wyoming. Snow water equivalents (SWEs) at the 9,000 to 10,500 foot elevation were near 70% percent of average for early June. Well above average mountain temperatures expected though the first 7 days of June will quickly melt out any remaining snowpack at the 9,000 to 10,500 foot elevation.

Except for the Snake, Wind, and Upper Green Basins--most basins in Wyoming had below average precipitation totals during May. Notably, the Little Snake and Lower North Platte Watersheds only recorded 50 to 65 percent of average precipitation during the month. Additionally, current water year precipitation totals are still below average for majority of basins in Wyoming—especially along basins in western and southern Wyoming.

Reservoirs across Wyoming continue to average near 78% of capacity. Last year at this time Wyoming reservoirs were around 82% of capacity. Reservoir storages have remained around 105% of average by late May.

Severe to extreme hydrologic drought conditions have decreased in areal coverage across central through eastern Wyoming during the past three months; however, severe hydrologic drought conditions have increased in areal coverage in far western Wyoming during the past two months. The outlook for the summer is for current drought conditions to persist as a result of expected warmer than average as well as drier than average basin conditions.

April and May streamflows across basins in southern Wyoming were below to much below normal; while basins in central through northwestern Wyoming had near normal streamflows. Peak flows have already occurred along several streams in southwestern to southern Wyoming. Peak flows for all other main stem rivers are expected by the end of the first week of June. Runoff volumes through the end of July are expected to be below to well below average for many drainages west of the continental divide. The Powder and Tongue Basins are forecasted to have near average flow volumes through the rest of the main runoff period.

Snowpack trends and basin hydrological conditions for many basins in Wyoming continue to be very similar to what occurred Water Years 2012 and 2013. Runoff volumes during those water years were the lowest in the past decade.
Summary

- Snow Water Equivalents (SWEs) above 9,000 feet were below average (near 70%) by late May.
- Precipitation totals across Wyoming for May were below (about 85%) average. Water year precipitation continues to be below (near 85%) average.
- Reservoirs across Wyoming were averaging near 78% of capacity with 82% of capacity reported last year. Overall reservoir storages for late May continue to be above average.
- State-wide stream flow snowmelt volumes for June - July are forecasted to be generally below average at around 70%.

Snowpack/SWEs

Majority of snowpack below 9,000 feet has melted out. Snow water equivalents (SWEs) at elevations of 9,000 feet and above by June 1st were near 70% of average. Last year, SWEs across the state at 9,000 feet and above feet were near 85% of average. (For complete tabular data, see Appendix)
Precipitation

Basin precipitation across Wyoming was near 85% of average during May. The Snake and Madison Headwater River Basins had the highest precipitation totals for the month at 120 to 125% of average. The Little Snake River Basin had the lowest precipitation amount at near 55% of average. Water year precipitation (October – May) is currently about 85% of average.

(See Appendix for complete tabular data.)

Map 2. Current monthly precipitation by basin.

Map 3. Water year to date precipitation by basin.
Reservoirs

Reservoirs across Wyoming were averaging near 78% of capacity—down from 82% of capacity last year. Overall reservoir storages for late May continued to be above average at 106% (112% last year). The highest average reservoir storage was across the Tongue River Basin at near 148%. The Upper Bear River Basin had the lowest average reservoir storage at near 35%.

(See Appendix for complete tabular data.)
Stream Flows

Snowmelt runoff stream flow volumes for across the state are expected to be below average at around 70%. The highest forecasted stream flows due to snowmelt are across the Powder and Tongue Basins at near 100% of normal. The lowest snowmelt runoff volumes are expected across the Little Snake and Upper Bear Drainages at near 30 to 35% of average.

(See Appendix for complete tabular listing of stream flow forecasts.)
Snake River Basin

- SWEs at 9,000 feet and above are near 75% of average.
- Last month’s precipitation for the Snake River Basin was near 120% of average. Water-year-to-date precipitation is near 85% of average.
- Current reservoir storage is near 125% of average for the three main reservoirs in the basin.
- The streamflow forecasts for June through July are below average (65%) for this basin.
Madison Headwaters Basin

- SWEs at 9,000 feet and above are 39% of average.
- Last month’s precipitation for the Madison Headwaters River Basin was near 125% of average. Water-year-to-date precipitation is around 85% of average.
- Current reservoir storage is near 100% of average for one main reservoir in the basin.
- Hebgen Reservoir inflows (June-July) are forecasted to be below average at 80%.
Madison Headwaters Streamflow Forecast -- June 1, 2021

Hegben Lake Inflow

Exceedance
- 10%
- 30%
- 50%
- 70%
- 90%

K ac-ft

JUN-JUL

= 30yr Avg

0 20 40 60 80 100 120 140 160 180 200

Wyoming Water Supply Outlook Report
Yellowstone River Basin

- SWEs at 9,000 feet and above are near 70% of average.
- Last month’s precipitation for the Yellowstone River Basin was near 90% of average. Water-year-to-date precipitation is near 95% of average.
- The 50% exceedance forecasts for June through July are below average (85%) for this basin.

No reservoir data for the basin.
Wind River Basin

- SWEs at 9,000 feet and above are near 40% of average.
- Last month’s precipitation for the Wind River Basin was near 110% of average. Water-year-to-date precipitation is around 90% of average.
- Current reservoir storage is near 115% of average for the three main reservoirs in the basin.
- The streamflow forecasts for June through July are below average (90%) for this basin.

![Wind River Basin Snow Water Equivalent](chart1)

![Wind River Basin Precipitation](chart2)

![Wind River Water Supply (Reservoir Storage + Streamflow)](chart3)
• SWEs at 9,000 feet and above are close to 50% of average.
• Last month’s precipitation for the Bighorn River Basin was near 80% of average. Water-year-to-date precipitation is close to 90% of average.
• Current reservoir storage is near 100% of average for the two main reservoirs in the basin.
• The 50% exceedance forecasts for June through July are near average (95%) for this basin. Greybull River at Meeteetse is forecasted to have flows at 102% of average.
Shoshone River Basin

- SWEs at 9,000 feet and above are near 55% of average.
- Last month’s precipitation for the Shoshone River Basin was near 105% of average. Water-year-to-date precipitation is around 95% of average.
- Current reservoir storage is near 120% of average for one main reservoir in the basin.
- Streamflow forecasts for June through July are below average (90%) for this basin.
Powder River Basin

- SWEs at 9,000 feet and above are near 55% of average.
- Last month’s precipitation for the Powder River Basin was near 65% of average. Water-year-to-date precipitation is near 90% of average.
- The 50% exceedance forecasts for June through July are near average (95%) for this basin. Piney Creek at Kearney is expected to have flows at 115% of average.

No reservoir data for the basin.
Tongue River Basin

- SWEs at 9,000 feet and above are around 40% of average.
- Last month’s precipitation for the Tongue River Basin was near 65% of average. Water-year-to-date precipitation is near 100% of average.
- Current reservoir storage is near 150% of average for one main reservoir in the basin.
- The 50% exceedance forecasts for June through July are near average (98%) for this basin.
Belle Fourche River Basin

- The Belle Fourche River Basin snowpack has melted out.
- Last month’s precipitation for the Belle Fourche River Basin was near 65% of average. Water-year-to-date precipitation is around 70% of average.
- Current reservoir storage is near 110% of average for three main reservoirs in the basin.

There are no streamflow forecast points for the basin.
The Cheyenne River Basin snowpack has melted out.

Last month’s precipitation for the Cheyenne River Basin was near 80% of average. Water-year-to-date precipitation is around 80% of average.

Current reservoir storage is near 105% of average for three main reservoirs in the basin.

The 50% exceedance forecasts for June through July are below average (70%) for this basin. Deerfield Reservoir inflows are forecasted to be 77% of average.
- SWEs at 9,000 feet and above are near 40% of average.
- Last month’s precipitation for the Upper North Platte River Basin was near 65% of average. Water-year-to-date precipitation is around 80% of average.
- Current reservoir storage is near 85% of average for one main reservoir in the basin.
- Streamflow forecasts for June through July are well below average (55%) for this basin.
Upper North Platte River Basin Streamflow Forecasts -- June 1, 2021

- Seminoe Reservoir Inflow
- Sweetwater R nr Alcova
- Rock Ck nr Arlington
- Encampment R nr Encampment
- North Platte R nr Northgate

K ac-ft

Exceedance:
- 10%
- 30%
- 50%
- 70%
- 90%
- 30yr Avg

JUN-JUL
Lower North Platte River Basin

- The Lower North Platte River Basin snowpack has melted out.
- Last month’s precipitation for the Lower North Platte River Basin was near 65% of average. Water-year-to-date precipitation is around 90% of average.
- Current reservoir storage is near 110% of average for four main reservoirs in the basin.
- The 50% exceedance forecasts for June through July are well below average (55%) for this basin.

<table>
<thead>
<tr>
<th>LOWER NORTH PLATTE RIVER BASIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESERVOIR STORAGE</td>
</tr>
<tr>
<td>Current (KAF)</td>
</tr>
<tr>
<td>Alcova</td>
</tr>
<tr>
<td>Glendo</td>
</tr>
<tr>
<td>Guernsey</td>
</tr>
<tr>
<td>Pathfinder</td>
</tr>
<tr>
<td>Basin-wide Total</td>
</tr>
<tr>
<td># of reservoirs</td>
</tr>
</tbody>
</table>
Laramie River Basin

- SWEs at 9,000 feet and above are near 60% of average.
- Last month’s precipitation for the Laramie River Basin was around 80% of average. Water-year-to-date precipitation is near 95% of average.
- Current reservoir storage is around 145% of average for one main reservoir in the basin.
- Streamflow forecasts for June through July are below average (85%) for this basin.
Sweetwater River Basin

- SWEs at 9,000 feet and above are near 25% of average.
- Last month’s precipitation for the Sweetwater River Basin was near 95% of average. Water-year-to-date precipitation is near 80% of average.
- Current reservoir storage is near 125% of average for one main reservoir in the basin.
- Streamflow forecast for Sweetwater River near Alcova (June-July) is well below average at 45%.
The South Platte River Basin snowpack has melted out.

Last month’s precipitation for the South Platte River Basin was near 105% of average. Water-year-to-date precipitation is close to 105% of average.

No reservoir data for the basin.

There are no streamflow forecast points for the basin.
Little Snake River Basin

- SWEs at 9,000 feet and above are near 20% of average.
- Last month’s precipitation for the Little Snake River Basin was near 55% of average. Water-year-to-date precipitation is near 75% of average.
- Current reservoir storage is close to 65% of average for one main reservoir in the basin.
- The 50% exceedance forecasts for June through July are well below average (35%) for this basin.
Upper Green River Basin

- SWEs at 9,000 feet and above are near 50% of average.
- Last month’s precipitation for the Upper Green River Basin was near 115% of average. Water-year-to-date precipitation is around 85% of average.
- Current reservoir storage is near 90% of average for two main reservoirs in the basin.
- Streamflow forecasts for June through July are well below average (55%) for this basin.
Lower Green River Basin

- Much of the Lower Green Basin’s snowpack below 10,000 feet has melted out.
- Last month’s precipitation for the Lower Green River Basin was near 85% of average. Water-year-to-date precipitation is around 85% of average.
- Current reservoir storage is close to 100% of average for three main reservoirs in the basin.
- Streamflow forecasts for June through July are well below average (50%) for this basin.
• Much of the Upper Bear Basin’s snowpack below 10,000 feet has melted out.
• Last month’s precipitation for the Upper Bear River Basin was near 80% of average. Water-year-to-date precipitation is around 75% of average.
• Current reservoir storage is near 35% of average for one main reservoir in the basin.
• The 50% exceedance forecasts for June through July are well below average (30%) for this basin.
Upper Bear River Basin Streamflow Forecasts -- June 1, 2021

- Bear R ab Resv nr Woodruff
- Bear R nr UT-WY State Line
- Smiths Fk nr Border

Exceedance:
- 10%
- 30%
- 50%
- 70%
- 90%

K ac-ft

= 30yr Avg

JUN-JUL

Wyoming Water Supply Outlook Report

June 1, 2021
Appendix

DROUGHT

CURRENT CONDITIONS

CONDITIONS 3 Months Ago

OUTLOOK through August 31st
TEMPERATURE/PRECIPITATION OUTLOOKS

**TEMPERATURE**

Above Average 40 - 50%

Above Average

50 - 60%

50 - 60%

Below Average

40 - 50%

**PRECIPITATION**

Below Average

30 - 40%

30 - 40%

JUNE

JUN - AUG

JUL - SEP
SWE ANALYSIS FROM NOHRSC

JUNE 1, 2021

JUNE 1, 2020
Record **High** Runoff Water Year

JUNE 1, 2011

---

Record **Low** Runoff Water Year

JUNE 1, 2013
MONTHLY STREAMFLOWS

APRIL

MAY

Explanation - Percentile classes

<table>
<thead>
<tr>
<th>Low</th>
<th>&lt;10</th>
<th>10-24</th>
<th>25-75</th>
<th>75-90</th>
<th>&gt;90</th>
<th>High</th>
<th>No Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wyoming Water Supply Outlook Report 50 June 1, 2021
TABULAR DATA

**Snowpack (SNOTEL/Snow Course) Data**

In Word double click the object below to view entire document

SWE_data_0601202
1.pdf

**Precipitation Data**

In Word double click the object below to view entire document

Precip_data_060120
21.pdf

**Reservoir Data**

In Word double click the object below to view entire document

Reservoir_data_060
12021.pdf

**Stream Flow Forecasts**

In Word double click the object below to view entire document

Forecasts_06012021
.pdf
LINKS (for more information/graphics)

**National Water Climate Center (NWCC)**
- Interactive maps featuring current conditions of snow, precipitation, reservoir storages:
  

**Water Resources Data System and State Climate Office (WRDS)**
- Clearinghouse of hydrological and climatological data for the State of Wyoming:
  
  [http://www.wrds.uwyo.edu/](http://www.wrds.uwyo.edu/)

**USGS WaterWatch**
- Tools and products to monitor streamflow, runoff, drought, and floods:
  
Wyoming Basin Outlook Report
National Resources Conservation Service
Casper, Wyoming

Issued by:
Terry Crosby (Chief)
U.S.D.A.
Natural Resources Conservation Service
Washington D.C.

Released by:
Astrid Martinez
State Con.
N R C S
Casper, Wyoming

The Following Agencies and Organizations Cooperate with the Natural Resources Conservation Service with Snow Surveys and/or with Data:

FEDERAL:
United States Department of the Interior (National Park Service)
United States Department of the Interior (Bureau of Reclamation)
United States Department of Agriculture (Forest Service)
United States Department of Commerce NOAA (National Weather Service)

STATE:
The Wyoming State Engineer's Office
The University of Wyoming

LOCAL:
The City of Cheyenne