Drought information
and
Utah drought research
Streamflow, water supply forecast, climate data

CBRFC: https://www.cbrfc.noaa.gov/
Snotel data: SWE, snow depth, precipitation, soil moisture

U.S. Drought Monitor: https://www.drought.gov/drought/
Intermountain West Drought Early Warning System

Conditions for the week of November 1-7
This week the Intermountain West has experienced subnormal basin average precipitation and snow water content, including no snow at some Utah, Arizona, and New Mexico basins. But the majority of the cold season precipitation normally occurs later in the winter here, so there is still plenty of time left. However, due to a weak summer monsoon and early withdraw, 90-day deficits existed in northwestern and southeastern Arizona, southwestern Utah, and extreme western New Mexico, thus D0 and some D1 was added to these areas. While in Wyoming, some improvements made in the southeast where short-term surpluses existed and most indices were normal or wet, even out to 1-2 years. Accordingly, D0 was removed in southeastern Wyoming.

Read more about the Intermountain West DEWS
U.S. Drought Monitor - Intermountain West DEWS

As of November 7, 2017

<table>
<thead>
<tr>
<th>Week</th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
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<tbody>
<tr>
<td>Current 11/07/2017</td>
<td>49.64</td>
<td>50.36</td>
<td>15.07</td>
<td>0.51</td>
<td>0.00</td>
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<tr>
<td>Last Week 10/31/2017</td>
<td>54.24</td>
<td>45.76</td>
<td>13.81</td>
<td>0.51</td>
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<tr>
<td>Three Months Ago 8/08/2017</td>
<td>75.49</td>
<td>24.51</td>
<td>4.25</td>
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<td>0.00</td>
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<td>Start of Calendar Year 1/03/2017</td>
<td>49.44</td>
<td>50.56</td>
<td>18.89</td>
<td>1.51</td>
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<tr>
<td>Start of Water Year 10/03/2017</td>
<td>60.66</td>
<td>39.34</td>
<td>6.23</td>
<td>0.00</td>
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<tr>
<td>One Year Ago 11/08/2016</td>
<td>30.31</td>
<td>69.69</td>
<td>20.83</td>
<td>1.63</td>
<td>0.00</td>
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</table>

IMW DEWS: https://www.drought.gov/drought/dews/intermountain-west
Summary: November 7, 2017

The Intermountain West started November warmer and drier than average under a subtropical high pressure ridge. Flow...

Recommendations

UCRB: Status quo is recommended. The Four Corners Region continues to be our area of focus as the area was slighted by 2017’s weak monsoon. The region did remain dry over the past week, but D0 and D1 currently appear to be in the right places based on current SPI blends.

Eastern Colorado: Status quo is recommended.

UCRB received less than 0.25”, Eastern Colorado was mostly dry, but the northern Urban Corridor woke up to several inches of snow this morning. Much of northern Wyoming received 0.25-1.00” of precipitation with the Bighorn Range seeing as much as 1.00-2.00”.

Evaporative demand, albeit tapering with the cooling temperatures, has been higher than average over the last two month stretch in the Four Corners Region, and further south in Arizona and western New Mexico, but in the normal range north of there. 28-day streamflow in the UCRB is also lowest in the Four Corners area. Flows are running below the 25th percentile mark, in some cases below the 10th. Reservoir storage is on the low side of average at Navajo Reservoir and the high side of average at McPhee Reservoir.

There are reports in San Juan and Grand County, Utah of not enough moisture to plant, brown and dry grasses and small ponds that would normally have water this time of year are empty. Recent precipitation in this area did little to help.

Weekly Drought Outlook: http://climate.colostate.edu/~drought/
Intermountain West Climate Dashboard

WWA IMW Climate Dashboard: [http://wwa.colorado.edu/climate/dashboard.html](http://wwa.colorado.edu/climate/dashboard.html)
New Products
EDDI: Evaporative Drought Demand Index

- Indicator for droughts
  - "flash" droughts
  - Long-term droughts
- Early warning for drought stress
- 2 weeks to 12 months
- Difference between potential evapotranspiration (ET) and actual ET
- Compares to 30 year average
NIDIS and Western Water Assessment

- NIDIS has interagency mandate
- WWA and other RISA’s partially funded by NIDIS
- WWA works in Utah, Colorado and Wyoming
- Drought research
- Outreach to drought stakeholders
Drought activities in Utah

- 2015 snow monitoring workshops
- IMW DEWS stakeholder outreach in Utah
  - Agricultural sector
- Drought contingency planning
- Outdoor water use and future climate
2015 WWA Snowpack Monitoring Workshops

- Three one day workshops
  - 180 participants
  - UT, CO, WY
- Presentations from WWA, NIDIS, CBRFC, NRCS Snow Survey, water managers
- Discussed how to improve snowpack monitoring
IMW DEWS stakeholder outreach

- 2016 IMW DEWS stakeholder meetings
  - Tucson and Denver
- First Utah IMW DEWS meeting
  - Key drought stakeholders
- Outreach to agricultural sector
- Future direction of DEWS in Utah
Weber Basin WCD Drought planning

- Grant from Bureau of Reclamation
- Develop a drought contingency plan
- Utah Div. of Water Resources, Utah State University, WWA, Langdon Group
- Information about past and future drought to inform planning

East Canyon Reservoir
Bekker et al. 2014

- Paleo-streamflow from tree rings
- 450 years
- Downscaled annual streamflow to monthly streamflow (Jim Stagge, USU)
- More severe and prolonged drought than in historical record
- Used as input for a Riverware model of the Weber River
- Projections of future Weber River flows
- Temperature and precipitation sensitivity analysis of Weber River flow
- Used CBRFC streamflow model
- Scenario planning approach
- Input for Weber River systems model

Bardsley, unpublished data
Weber River systems model

Information on drought
-water supply
-reservoir storage

Weber Basin WCD Drought Contingency Plan
Projections of outdoor water use along the Wasatch Front

- Project with Jordan Valley WCD – 2016
  - How will climate change impact water demand?
- Outdoor water use model based on potential evapotranspiration (PET)
- Used downscaled projections of PET to project outdoor water use in Draper
- Expand geographic scope
- Refine model
Outdoor water use model

- Outdoor water use data from Draper
- Observed potential evapotranspiration (PET)
- Data aggregated weekly
- Linear regression - $r^2 = 0.797$
PET projections for West Jordan

- **2060**
  - RCP 4.5: +6%
  - RCP 8.5: +8%

- **2085**
  - RCP 4.5: +7%
  - RCP 8.5: +13%
2060 Outdoor water use projections

- Scenario planning approach
  - Low PET (CanESM2)
  - High PET (IPSL CM5A MR)
- Low PET scenario
  - 1 – 2% water use increase
- High PET scenario
  - 10 – 17% water use increase
- Scale Draper water use up to entire JVWCD area

Low PET scenario: +1500 – 2400 AF
High PET scenario: +13,000 – 22,000 AF
Next steps
Outdoor water use and PET

- Expand geographic scope
  - Wasatch Front
  - St. George
- Daily to weekly water use data
- Secondary water users
- Goal to develop method that can be used around state