Navajo Unit Operations Coordination Meeting

January 18th, 2022 1:00 PM
Microsoft Teams Virtual Meeting
Lake Powell End of Month Elevations
Projections from the January 2022 24-Month Study Inflow Scenarios

Lake Powell’s operating condition for the upcoming year is based on the end of calendar year elevation (on December 31) as projected in the August 24-Month Study. For additional information, the draft 2022 Annual Operating Plan is available online at: www.usbr.gov/lc/region/g4000/AOP2022/2022AOP_2021-11-03_Post-Final-Consulation.pdf.

The Drought Response Operations Agreement (DROA) is available online at: https://www.usbr.gov/dcp/finaldocs.html.

See more about Glen Canyon Operations here: https://www.usbr.gov/uc/water/crsp/cs/gcd.html
Lake Mead End of Month Elevations

Projections from the January 2022 24-Month Study Inflow Scenarios

Lake Mead's operating condition for the upcoming year is based on the end of calendar year elevation (on December 31) as projected in the August 24-Month Study. For additional information, the draft 2022 Annual Operating Plan is available online at: www.usbr.gov/lc/region/g4000/AOP2022/2022AOP_2021-11-03 Post-Final-Consultation.pdf.

The Drought Response Operations Agreement (DROA) is available online at: https://www.usbr.gov/dcp/finaldocs.html.

See more about Lake Mead operations here https://www.usbr.gov/lc/riverops.html.
The Past
January 2022

Temperature
Departure from normal

Departure from Normal Temperature (F)
10/1/2020 - 9/30/2021

Precipitation
% of normal

Percent of Normal Precipitation (%)
10/1/2020 - 9/30/2021

Water Year 2021
The Past
January 2022

Temperature
Departure from normal

Precipitation
% of normal

Water Year 2022 through mid January
The Past
January 2022

Precipitation
November 2021

Precipitation
December 2021

Percent of Normal - Monthly QPE
The Past
January 2022

Temperature
Departure from normal

Precipitation
% of normal

December 2021
The Past
January 2022

Temperature
Departure from normal

Precipitation
% of normal

January 2022 so far
Snow
January 2022

San Miguel, Dolores, Animas & San Juan River Basins Time Series Snowpack Summary
Based on Provisional SNOTEL data as of Jan 19, 2022

Current as Pct of Normal: 124%
Current as Pct of Avg: 120%
Current as Pct of Last Year: 178%
Current as Pct of Peak: 59%
Normal as Pct of Peak: 48%
Pct of Normal Needed to Reach Peak: 78%
Normal Peak Date: Apr 06

SNOTEL Snow Water Equivalent – NRCS Southwestern Colorado
Drought
January 2022

Jan 2022

January 11, 2022

Jan 2021

January 12, 2021

Intensity:
- Yellow: D0 Abnormally Dry
- Orange: D1 Moderate Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

Drought – Monitor
### CPC/IRI Early-Month Consensus ENSO Forecast Probabilities
(uses NWS CPC classification system)

<table>
<thead>
<tr>
<th>Season</th>
<th>La Niña</th>
<th>Neutral</th>
<th>El Niño</th>
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<tbody>
<tr>
<td>DJF</td>
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<td>AMJ</td>
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<td>JJA</td>
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<td>56</td>
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<td>JAS</td>
<td>29</td>
<td>49</td>
<td>22</td>
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<tr>
<td>ASO</td>
<td>30</td>
<td>45</td>
<td>25</td>
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</tbody>
</table>

**ENSO – Outlook**

La Niña becoming Neutral this spring
Weather Outlook
January 2022

El Niño

North of Colorado - Dry and Warm
South of Colorado - Wet and Cool

La Nina

North of Colorado - Wet and Cool
South of Colorado - Dry and Warm
Weather Outlook
January 2022

WPC 7-Day Precipitation Outlook
Accumulation period from Jan 15-22
Weather Outlook
January 2022

Temperature

Precipitation

Feb/Mar/Apr – Outlook
Weather Outlook
January 2022

Temperature

Precipitation

Mar/Apr/May – Outlook
Weather Outlook
January 2022

Temperature
Precipitation

Seasonal Temperature Outlook
Valid: Apr-May-Jun 2022
Issued: December 16, 2021

Seasonal Precipitation Outlook
Valid: Apr-May-Jun 2022
Issued: December 16, 2021

Apr/May/Jun – Outlook
Weather Outlook
January 2022

Seasonal

U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period
Valid for January 1 - March 31, 2022
Released December 31, 2021

Consistency adjustment based on Monthly Drought Outlook for January 2022

Consistency adjustment based on Monthly Drought Outlook for January 2022

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short-lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

http://go.usa.gov/3eZ73

Drought – Outlook
The 2021 monsoon season was much wetter than recent years, especially across southern Arizona and central Utah. In the San Juan basin, the 2021 monsoon season was near to slightly below normal.
Two consecutive years of below normal spring runoff

Some improvement to conditions from July and October precipitation.

Streamflow conditions have improved from last year in most basins, with some exceptions, but are still below to much below normal.

An average 2021 monsoon can not make up for multiple years of near/record dry conditions.
Fall Modeled Soil Moisture Conditions: 2020 vs. 2021

- Soil moisture conditions have improved from record/near record dry levels last year but remain below normal across the majority of the San Juan River Basin.

- Soil moisture conditions can impact spring runoff efficiency
  - Degree of impact is uncertain in every year
  - Timing/magnitude of runoff is ultimately a result of spring weather (precipitation/temperature), snow and soil moisture conditions.

CBRFC Modeled Soil Moisture:
- Represents the deep soil layer
- Source of longer-term (weeks to years) streamflow
- Impacts water supply forecasts
  - Below average conditions = lower forecasts
  - Above average conditions = higher forecasts

Fall 2020

% Normal
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

Fall 2021

% Normal
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

% Change: 2021-2020

% Change
-20 -10
-10 10
10 20
20 30
30 40
40 50
> 50
January 17, 2022

Model snow includes areas above and below SNOTEL sites.
- SNOTEL locations range from ~8,500-11,500’
- Some modeled basins extend to over 13,000’

Snow accumulation had a slow start at all elevations
- Warm and dry November

SWE conditions above 11,000’ are below normal
- Eastern headwaters have near normal conditions above 11,000’

SWE conditions below 11,000’ are normal to above normal.

Still early in the snow accumulation season.
1981-2010 vs 1991-2020 Averages: San Juan River Basin

- Averages are updated every 10 years
- Conforms to World Meteorological Organization standards
- New averages represent most recent trends
- Averages in the San Juan River basin decreased by 10-20%
- Water supply forecasted/observed volumes will will be higher as a percent of average compared to the same volume last year.

<table>
<thead>
<tr>
<th></th>
<th>1981-2010</th>
<th>1991-2020</th>
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</thead>
<tbody>
<tr>
<td>10%</td>
<td>995</td>
<td>134%</td>
</tr>
<tr>
<td>50%</td>
<td>550</td>
<td>75%</td>
</tr>
<tr>
<td>90%</td>
<td>375</td>
<td>51%</td>
</tr>
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</table>
January 2021 Water Supply Forecasts: San Juan River Basin

April-July Forecasts
Volume in 1000’s acre-feet / Percent of 1991-2020 average

San Juan-Bluff
900 / 81%

Vallecito
155 / 88%

Animas-Durango
360 / 94%

Navajo
550 / 87%

San Juan-Pagosa Springs
183 / 94%

Forecast Range is 85-90% of average
The forecast has decreased since Jan 1 due to dry conditions. The forecast will likely continue to decrease through the end of the month.
January 1st Forecast:
What we know:
- ~40% of snowpack accumulation
- Fall soil moisture conditions

What we DON’T know:
- Jan-May weather (4 months)
- ~60% of snowpack accumulation

Average January Forecast Error: ~200 KAF

April 1st Forecast:
What we KNOW:
- ~98% of snowpack accumulation
- Dec-March weather

What we don’t know:
- April-May weather (2 months)
- Snowmelt pattern

Average April Forecast Error: ~100 KAF
Upcoming Weather

January 18-25 Precipitation Outlook

8-14 Day Outlooks (January 25-31)
Summary

- **Soil moisture**
  - Conditions have improved from last year but are still below normal.
  - Soil moisture deficits still exists
  - Impact on runoff uncertain and will depend on spring weather and snow conditions.

- **Snow**
  - Slow start to the snow season
  - Conditions are mixed above 11,000’
  - Above normal conditions below 11,000’
  - Early January is a little less than halfway (~40-50%) through the snow accumulation season

- **Averages**
  - Moved from 1981-2010 to 1991-2020
  - 1991-2020 are 10-20% lower in the San Juan River Basin

- **January Water Supply Forecasts**
  - Range from 85-90% of average
    - Impacted by below normal modeled soil moisture conditions
  - Forecast guidance has decreased since early January
  - Expect lower February 1st forecasts

- **Upcoming Weather**
  - No significant storms through the end of the month
**Basin Focal Points (Forecasters)**

- Brenda Alcorn - Green, Duchesne, White/Yampa  
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- Ashley Nielson - Gunnison, San Juan, Dolores, Lake Powell  
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- Cody Moser - Upper Colorado Mainstem  
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- Patrick Kormos - Great Basin/Sevier  
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- Tracy Cox - Hydrometeorologist  
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- Nanette Hosenfeld - Senior Hydrometeorologist  
  nanette.hosenfeld@noaa.gov
- Wolfgang Hanft - Hydrometeorologist  
  wolfgang.hanft@noaa.gov

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**CBRFC Webpage**  
https://www.cbrfc.noaa.gov/

**CBRFC Operations**  
cbrfc.operations@noaa.gov  
801-524-4004

**CBRFC Water Supply Presentations**  
https://www.cbrfc.noaa.gov/present/present.php
Official Water Supply Forecast (April-July)

Navajo: 550 kaf (87%* avg)
Vallecito: 155 kaf (88% avg)
Lemon: 42 kaf (88% avg)
Animas: 360 kaf (94% avg)
McPhee: 235 kaf (92% avg)
Powell: 6,300 kaf (99% avg)

*1991 – 2020
Projected Operations WY 2022

Based on current streamflow conditions, storage levels, and statistical outlooks based on 35 years of historical hydrology,

- Runoff projections range from 375 kaf (60% avg) – 995 kaf (158% avg) with a median projection of 550 kaf (88% avg).
- 8% chance of a SJRIP-prescribed Spring Peak Release
- 3% chance of falling below 5990 ft (min active storage)
- End of Water Year storage range 820 kaf (6015 ft, 50% full) – 1,326 kaf (6063 ft, 80% full) with a median projection of 1,034 kaf (6038 ft, 63% full)
Updates:

• **Statistical Averages**
  • The 30-year average used across agencies progresses every decade
  • The time period for statistics has been updated to 1991 - 2020
  • Navajo April – July Modified Unregulated Inflow averages:
    • 1981 – 2010: 737 kaf
    • 1991 – 2020: 628 kaf
  • What does this mean?
    • Averages for the same forecast will be higher than they have in previous years.
    • The forecasts will trend lower from the start, as the hydrology feeding the models is lower.

• **Navajo Area-Capacity Tables** were updated and implemented in October of 2021. Updated live storage is 1.65 maf (1.70 maf previously)
Reclamation Contacts:

Marc Miller – Water Management Group Chief
970-385-6541  mbmiller@usbr.gov

Susan Novak Behery – Hydrologic Engineer
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To be added to Navajo Dam notices email list, send an email to westcoloareaoffice@usbr.gov

Useful Links
Reclamation: www.usbr.gov/uc
USGS: water.usgs.gov/nwis
CBRFC: cbrfc.noaa.gov

Next Meeting: April 19, 2022