Definitions

Native/Natural Rio Grande water: Water that comes directly from the Rio Grande Basin

San Juan-Chama water: Water that is imported into the Rio Grande Basin from the San Juan Basin through the San Juan-Chama Project

Rio Grande Compact: Agreement between the states of Colorado, New Mexico, and Texas that apportions Rio Grande water between the three states.

Article VII: Section of the Rio Grande Compact that dictates storage in reservoirs. If Rio Grande Project storage is less than 400,000 ac-ft at Elephant Butte and Caballo, no storage of Rio Grande water can take place at El Vado except to satisfy Native American needs or as part of the Emergency Drought Water Agreement.
cfs- cubic feet per second (roughly 7.5 gallons/second)

Acre foot = approximately 326,000 gallons or 43,560 cubic feet

Hydrograph – graph of flow rate per unit time

MRGCD – Middle Rio Grande Conservancy District

The City/The Water Authority – Albuquerque Bernalillo County Water Utility Authority (ABCWUA)

NRCS – Natural Resources Conservation Service

Supplemental water – Water leased by Reclamation to augment flows in support of the Rio Grande Silvery Minnow as outlined in the 2016 Biological Opinion

P&P – Prior & Paramount
Definitions (cont.)

EBID - Elephant Butte Irrigation District

EP1 - El Paso County Water Improvement District No. 1

IBWC - International Boundary and Water Commission, US Section

1906 - Convention of 1906, US and MX

OA - 2008 Operating Agreement for the Rio Grande Project, NM and TX
What Drives the Process

Volume Forecast from the NRCS
Based on snowpack, soil moisture, climate forecast

Choose similar year based on similar volume
Actual hydrograph vs. average hydrograph
Can tweak timing of hydrograph to best match forecasted conditions (warm Spring vs. cool Spring)

Inflows/Outflows based on nature and policies

Article VII restrictions
Flood control and channel capacity
Timing of water deliveries
Demand curves from water users
Using NRCS/NWS Forecasting
In the Model(s)...

DEFAULT: CLOSEST HISTORIC YEAR
DAILY TIMESTEP
HYDROGRAPH SHAPE, SHIFTED TO
MATCH VOLUME

NRCS/NWS VOLUME

NRCS/NWS VOLUME

March July March July

Rest of year

BUILDING STRONG®
Similar Year Hydrographs

Rio Chama @ La Puente

2018

- 2018
- AVG
- 2002
- 1977
- 2013

2002: 17,481
1977: 31,218
2013: 65,937
(acre-feet)
<table>
<thead>
<tr>
<th>Operated By:</th>
<th>Reclamation Corps</th>
<th>Water Supply</th>
<th>Recreation</th>
<th>Flood Control</th>
<th>Sediment Control</th>
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<tbody>
<tr>
<td>Dams:</td>
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<td>ELEPHANT BUTTE</td>
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<tr>
<td>CABALLO</td>
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</tbody>
</table>
2017: The Year in Review
Elephant Butte Reservoir
April 2017 Forecast and Observed

Dashed lines – observed
Solid lines – forecast
Elephant Butte Reservoir
September 2017 Projections

Elephant Butte Sept 19 AOP and Observation Comparison: Storage and Pool Elevation

Elephant Butte Sept 19 AOP and Observation Comparison: Inflow and Outflow

Dashed lines – forecast
Solid lines – observed
Caballo Reservoir
September 2017 Projections

Caballo Sept 19 AOP and Observation Comparison: Storage and Pool Elevation

Caballo Sept 19 AOP and Observation Comparison: Inflow and Outflow

Dashed lines – forecast
Solid lines – observed
Current Snow Conditions
Rio Chama Snow Data

Cumbres SNOTEL Site 2017-18
Elev. 10,400'

Rio Chama Snow Comparison

Rio Chama Basin

Total Basin SWE (inches)

11/6 12/6 1/6 2/6 3/6 4/6 5/6

16-17 17-18 Average
Similar Snowpack Years

Chama Basin Total SWE
Current Year vs Average and Worse Years

- AVG
- 2018
- 2002
- 2013
- 2000
- 2006
- 1981
- 1996
- 2014
- 1990
Rio Grande Snow Data
Beartown SNOTEL 2017-18
Elev. 11,600'
Sangre de Cristo Snow Data

Gallegos Peak SNOTEL 2017-18
Elev. 9,800'

Snow Water Equivalent & Precip (in.)

Sangre de Cristo Snow Data

Wesner Springs SNOTEL 2017-18
Elev. 11,120'

Snow Water Equivalent & Precip (in.)

Spring and Summer Streamflow Forecasts as of April 1, 2018

Percent of 1981-2010 Average
- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25

NOTICE: This map will be discontinued after May 2018 due to staffing constraints.

Alternate maps: go.usa.gov/xnzxk

Prepared by: USDA Natural Resources Conservation Service National Water and Climate Center Portland, Oregon
https://www.nwcc.nrcs.usda.gov
Created: 8 Apr 2018 12:10
Monsoon Season Temperature Outlook
Monsoon Season Precipitation Outlook

THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
2.5 MONTH LEAD
VALID JJA 2018
MADE 15 MAR 2018

EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

Probability of Below
33% 40% 50% 60% 70% 80% 90% 100%
Probability of Near-Normal
33% 40% 50% 60% 70% 80% 90% 100%
Probability of Above
33% 40% 50% 60% 70% 80% 96% 100%
2018 Water Operations Modeling
MRG Project Assumptions

• April 1 70% most probable forecast
• Storage of water for Prior & Paramount lands

Results:
• Back into Article VII restrictions by May
• MRGCD uses all of its storage
• No supplemental water left by August (18,000 ac-ft used)
Rio Grande Project Input

- February 23 - Elephant Butte releases began
- March 16 - Caballo releases began
- March 19 - EPCWID diversions began
- March 20 - MX diversions began
- March Allocation – EPCWID (309,284 ac-ft), EBID (119,329 ac-ft), MX (36,879 ac-ft) (~59% of full)
- April 15 - EBID (Arrey) will come on-line
- June 1 - EBID (Mesilla) will come on-line
- End of July - EBID will end irrigation season
- Mid-September - EP1 will end irrigation season
April Forecast Data

<table>
<thead>
<tr>
<th>Location</th>
<th>Most Probable Percent of Average</th>
<th>April 1 70% Probability Volume, ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio Grande nr Del Norte</td>
<td>109%</td>
<td>215,000</td>
</tr>
<tr>
<td>El Vado Reservoir Inflow</td>
<td>160%</td>
<td>30,000</td>
</tr>
<tr>
<td>Rio Grande at Otowi</td>
<td>128%</td>
<td>106,000</td>
</tr>
<tr>
<td>Nambe Reservoir Inflow</td>
<td>89%</td>
<td>1,100</td>
</tr>
<tr>
<td>Jemez blw Jemez Dam</td>
<td>74%</td>
<td>1,100</td>
</tr>
<tr>
<td>Rio Blanco @ Diversion</td>
<td>117%</td>
<td>22,000</td>
</tr>
<tr>
<td>Navajo River @ Diversion</td>
<td>115%</td>
<td>25,000</td>
</tr>
</tbody>
</table>
Historic Mar-Jul Flow Volumes at Otowi

March-July Volumes at Otowi
(2018 - NRCS forecast volumes)

April Forecast - (Mar-Jul vol)
50% probability - 141,000 ac-ft
90% probability - 69,000 ac-ft
10% probability - 255,000 ac-ft
30-year average: 720,000 ac-ft
Heron Reservoir
Proposed 2018 Heron Operations

Storage Capacity = 401,000 ac-ft
El Vado Reservoir
Proposed 2018 Abiquiu Operations

2018 Abiquiu Operations

Flow [cfs]

Storage [ac-ft]

Inflow
Outflow
Storage
Proposed 2018 Cochiti Operations

2018 Cochiti Operations

Flow [cfs]

Storage [ac-ft]
Estimated Hydrograph at Central Ave.

2018 Flow at Central Ave Gage
Estimated Flow at San Acacia

2018 Flow at San Acacia Gage

Flow [cfs]

2018 Elephant Butte Water Surface Elevation

Elevation [ft]
Proposed Caballo Operations

2018 Caballo Operations

Flow [cfs] vs. Storage [ac-ft] for the years 2018, showing inflow, outflow, and storage trends over time.
WaterSMART Financial Assistance Programs

https://www.usbr.gov/watersmart

- **Water and Energy Efficiency Grants**
  - Awarded to projects that result in quantifiable water savings and support broader water reliability benefits
  - Proposals due by 4:00 p.m. MDT on May 10, 2018

- **Water Marketing Strategy Grants**
  - Awarded to entities exploring actions to develop or facilitate water marketing
  - Proposals due by 4:00 p.m. MDT on July 18, 2018
  - View Grant opportunity at [https://www.grants.gov/web/grants/view-opportunity.html?oppId=301914](https://www.grants.gov/web/grants/view-opportunity.html?oppId=301914)

- **Small-Scale Water Efficiency Projects**
  - Awarded to small-scale water management projects identified through previous planning efforts
  - Proposals due by 4:00 p.m. MDT on July 31, 2018

Opportunities posted at [www.grants.gov](http://www.grants.gov)