

RECLAMATION

Managing Water in the West

2017 CBRFC Stakeholder Forum

Partner Presentation
Reclamation Provo Area Office
Gary Henrie

October 31, 2017



U.S. Department of the Interior
Bureau of Reclamation





RECLAMATION

Bureau of Reclamation

Provo Area Office (PAO) Reservoir Operations

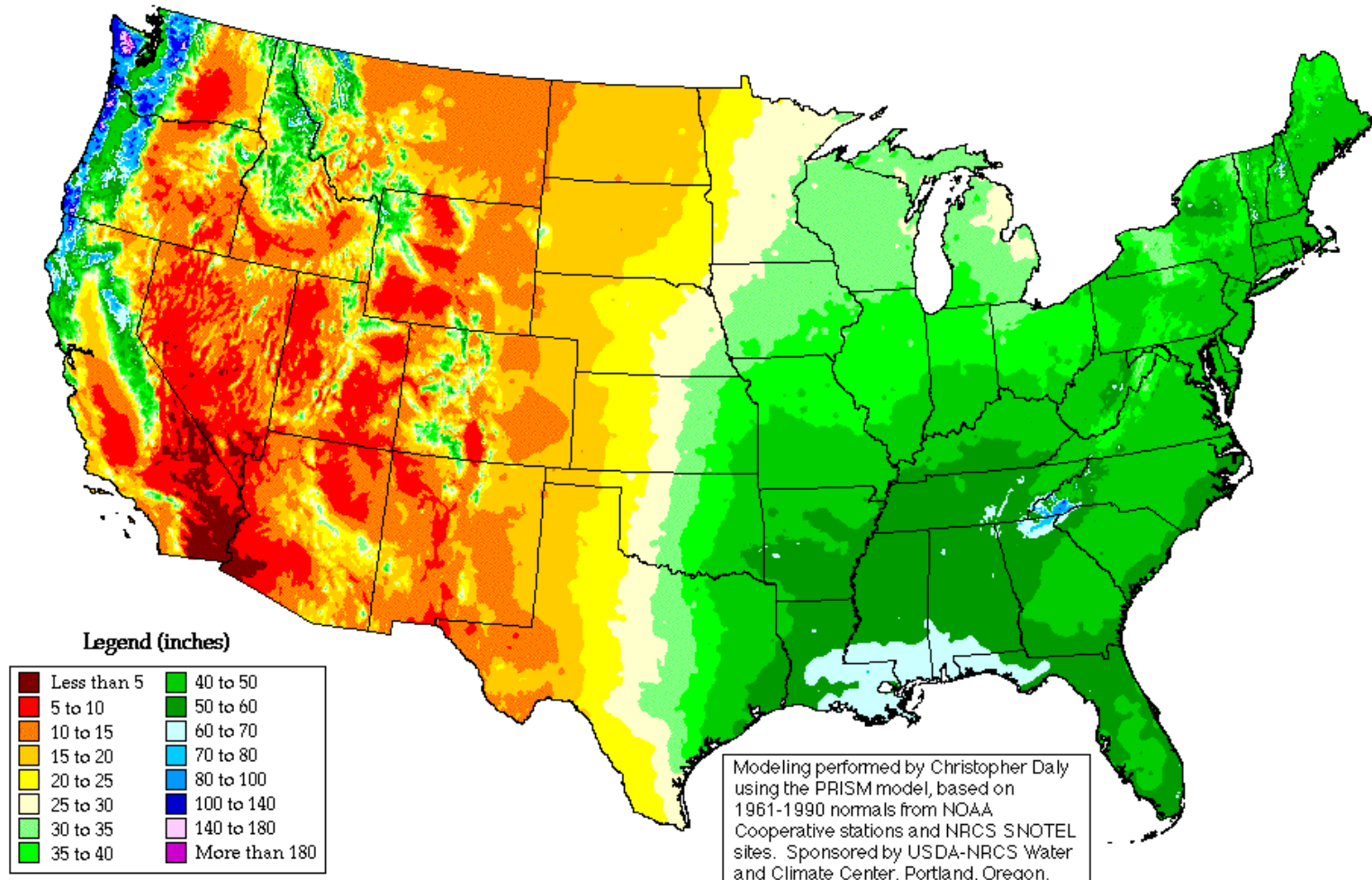
CBRFC & USBR-PAO Tools

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Annual Average Precipitation

United States of America



Hydrology of the Western U.S. => Water Development

Dam Design Expertise => Reclamation

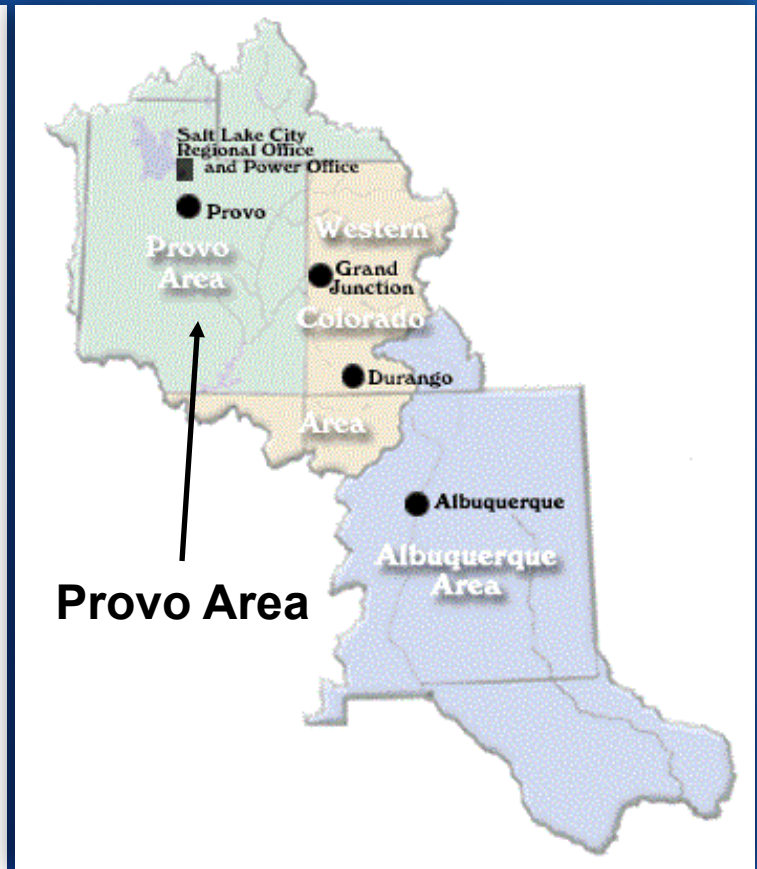
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Upper Colorado Region



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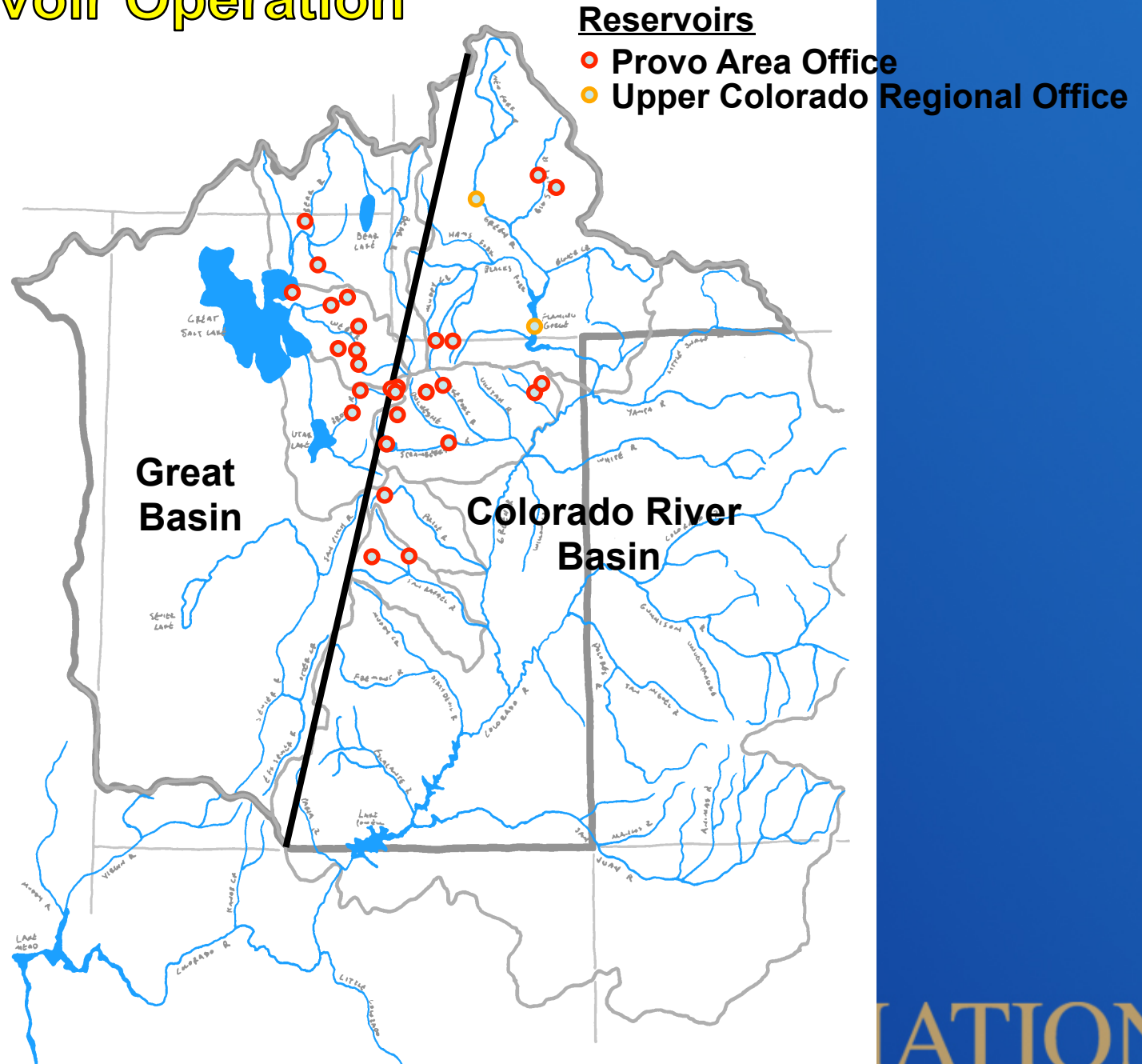
Bureau of Reclamation

Provo Area Office (PAO) Reservoir Operations

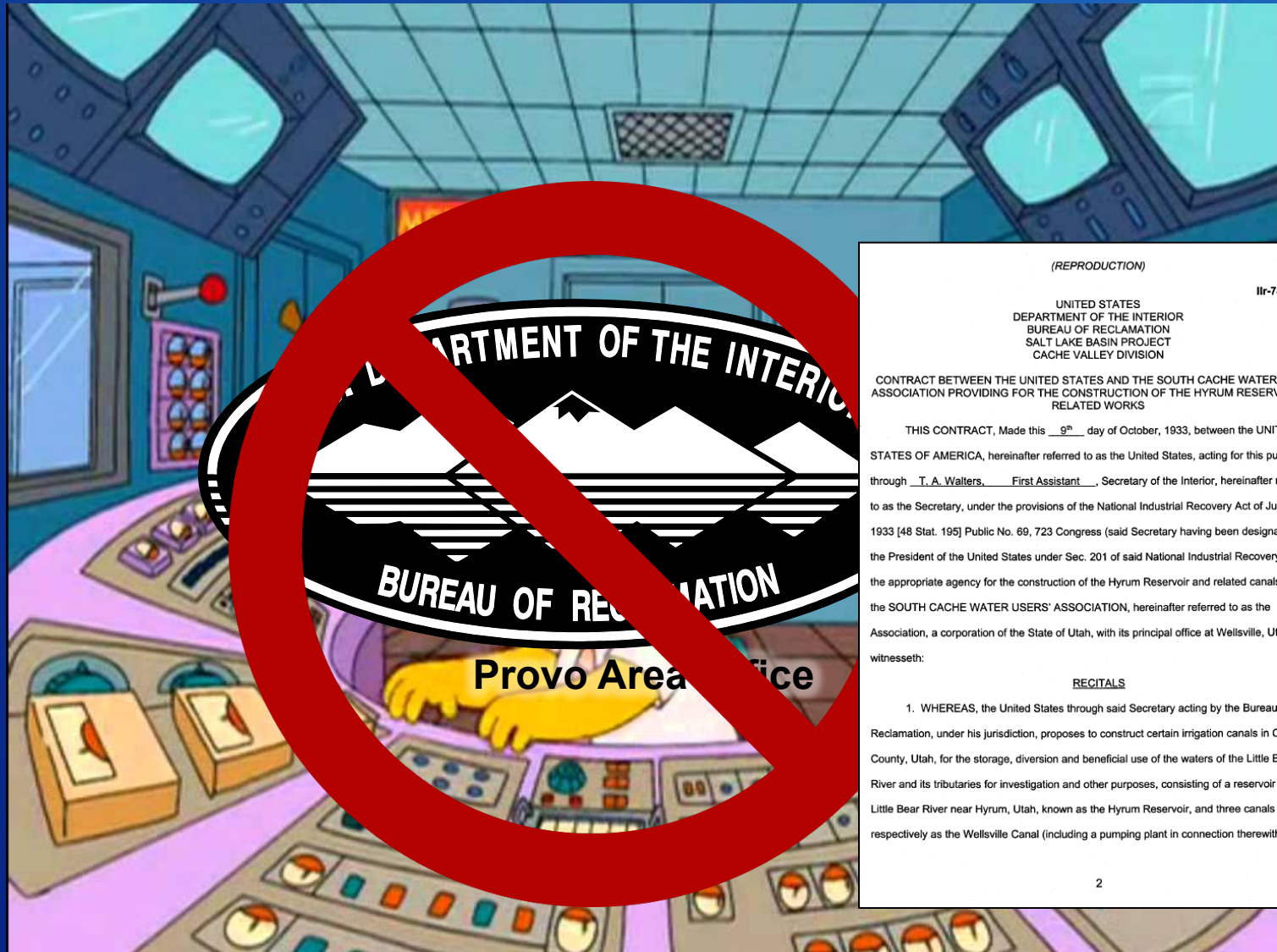
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Reservoir Operation



Reservoir Operation



(REPRODUCTION)

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
SALT LAKE BASIN PROJECT
CACHE VALLEY DIVISION

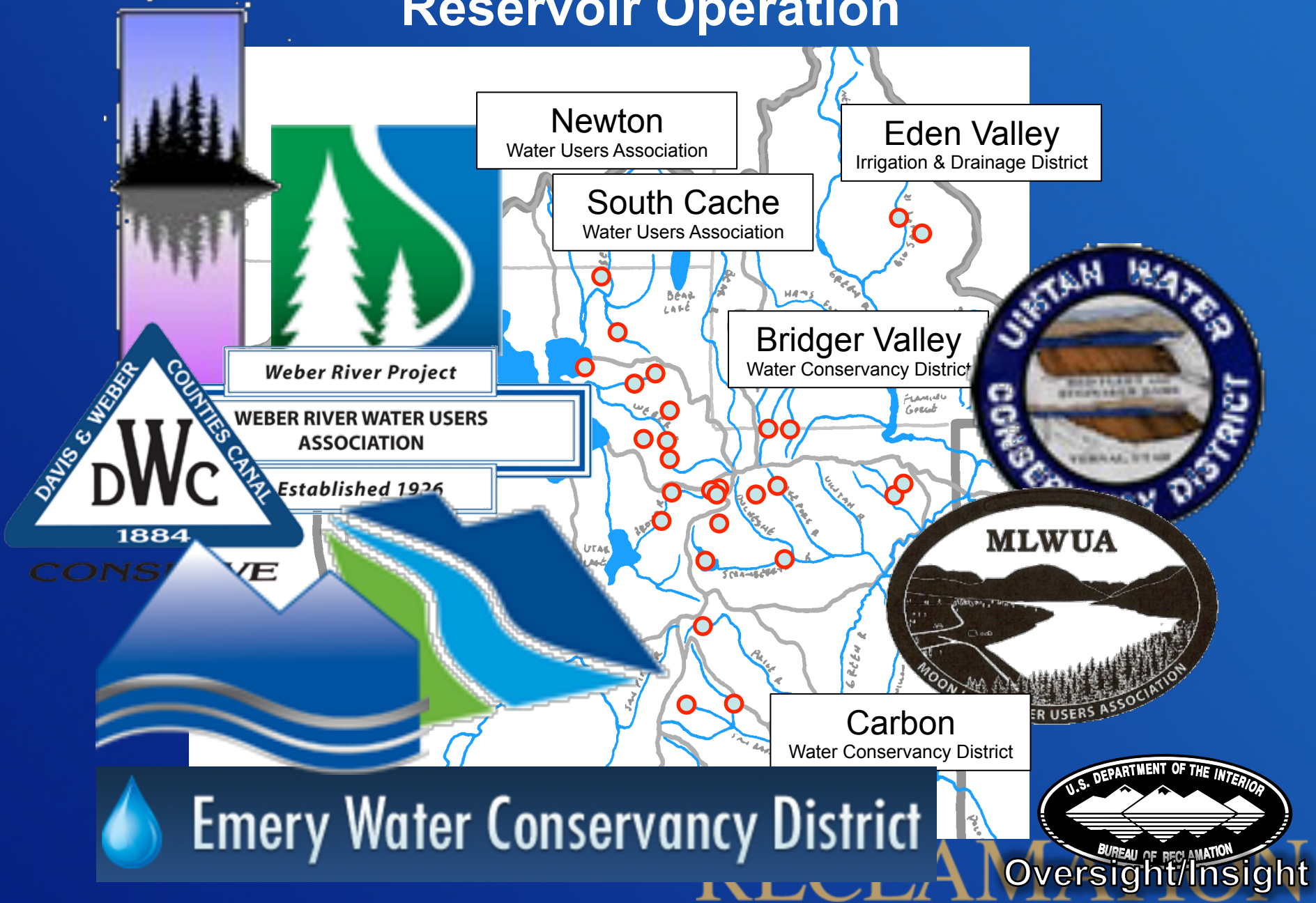
CONTRACT BETWEEN THE UNITED STATES AND THE SOUTH CACHE WATER USERS' ASSOCIATION PROVIDING FOR THE CONSTRUCTION OF THE HYRUM RESERVOIR AND RELATED WORKS

THIS CONTRACT, Made this 9th day of October, 1933, between the UNITED STATES OF AMERICA, hereinafter referred to as the United States, acting for this purpose through T. A. Walters, First Assistant, Secretary of the Interior, hereinafter referred to as the Secretary, under the provisions of the National Industrial Recovery Act of June 16 1933 [48 Stat. 195] Public No. 69, 723 Congress (said Secretary having been designated by the President of the United States under Sec. 201 of said National Industrial Recovery Act as the appropriate agency for the construction of the Hyrum Reservoir and related canals), and the SOUTH CACHE WATER USERS' ASSOCIATION, hereinafter referred to as the Association, a corporation of the State of Utah, with its principal office at Wellsville, Utah; witnesseth:

RECITALS

1. WHEREAS, the United States through said Secretary acting by the Bureau of Reclamation, under his jurisdiction, proposes to construct certain irrigation canals in Cache County, Utah, for the storage, diversion and beneficial use of the waters of the Little Bear River and its tributaries for investigation and other purposes, consisting of a reservoir on the Little Bear River near Hyrum, Utah, known as the Hyrum Reservoir, and three canals known respectively as the Wellsville Canal (including a pumping plant in connection therewith); the

Reservoir Operation



Reservoir Operation

Safe Operation

Reservoir Operation



Weather



Snowpack



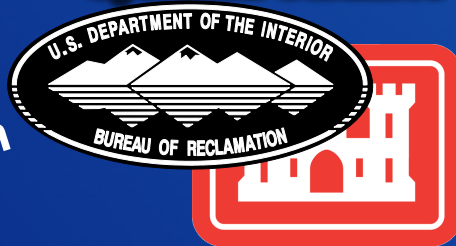
Rivers



Forecasts



Operation Guidance



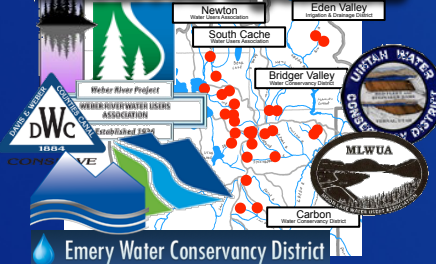
Operation Data



Operation Analysis



Reservoir Operation



Normal Operation

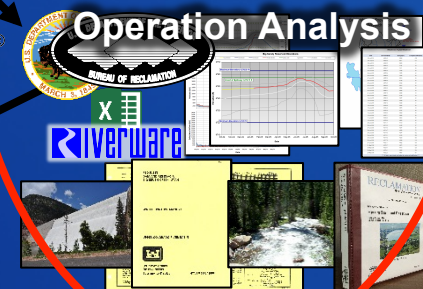
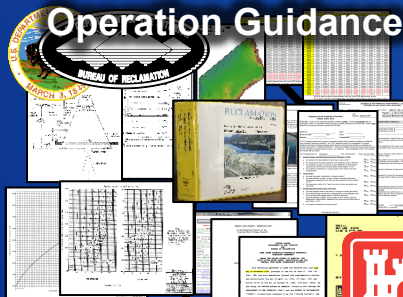
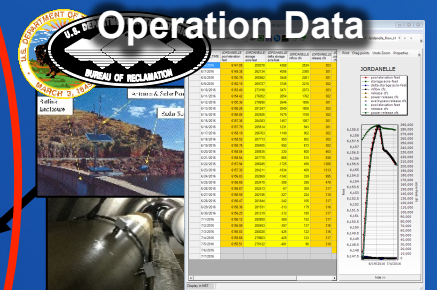
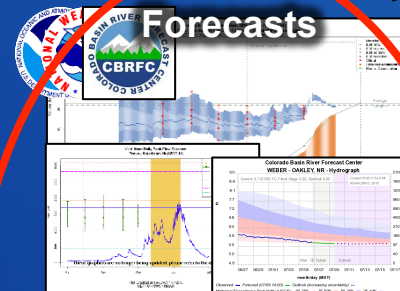
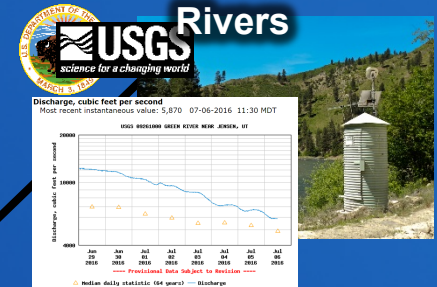
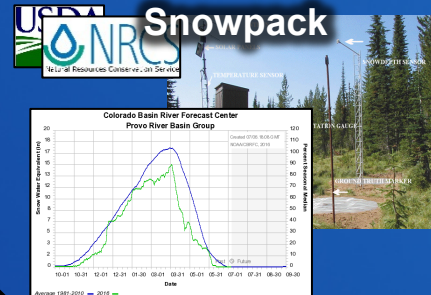
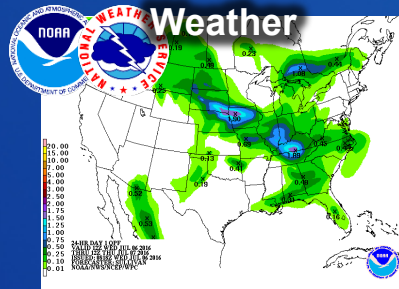


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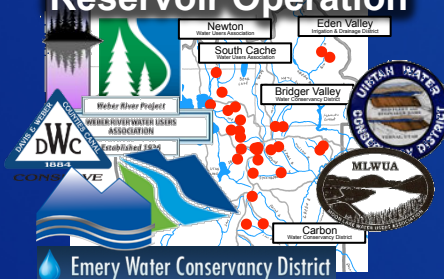
Reservoir Operation

Safe Operation

Reservoir Operation



Reservoir Operation



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Normal Operation



Bureau of Reclamation

Provo Area Office (PAO) Reservoir Operations

CBRFC & USBR-PAO Tools

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CBRFC & USBR PAO Tools

River, Snow, and Water Supply Monitoring

Daily ESP List

/usr/bin/Rscript /web

Water Supply Volum

▲ < 30% ▲ 30-

Options (on/

Area: CBRFC

Columns (o

Click column

Area

1 Green

2 Green

3 Green

4 Green

5 Green

6 Green

7 Green

8 Green

9 Green

10 Green

11 Green

12 Green

13 Green

14 Green

15 Green

16 Green

17 Green

18 Green

19 Green

20 Green

21 Green

22 Green

23 Green

24 Green

25 Green

26 Green

27 Green

Snow Groups



Raw SNOTEL data from NRCS.

Great Basin

Bear River Drainage (bulu1 fbn1 hfk1 kllw4 llku1 lbnu1 ltbu1 mcr1 tglu1 oxsi1 sepi1 dbpu1)

Bear River Headwaters (hfk1 llku1 chcu1)

Bear River below Woodruff (dbpu1 mcr1 bulu1 kllw4 givi1 fbn1)

Beaver Minersville (bgfu1 mvu1)

Chalk Ck Index (ccku1 chcu1)

Clear Creek Sevier (kmnu1)

Cottonwood Canyons (mldu1 briu1 sbdu1)

Logan BlacksFork Little Bear Basins (bulu1 tglu1 fbn1)

Ogden River Drainage (blpu1 bltu1 dbpu1 hru1 lbu1 mecu1)

Provo River Basin (tru1 dsu1 nwyu1 stdu1)

Sevier River Basin Blo Plute (mcd1 rpu1 se)

Sevier River Basin Headwaters (wflu1 mdvu1)

Sevier River Drainage (mdvu1 bxcu1 frlu1 pk)

Six Creeks Headwaters (lopu1 psuu1 mldu1)

Smith Fork Bear Basin (clw4 slw4 kllw4 incw)

Spanish Fork Drainage (clcu1 crku1 psu1 w)

Utah Lake Drainage (clcu1 crku1 cucu1 dsu)

Weber Basin Headwaters (smmu1 trlu1 ccku)

Weber River Drainage (blpu1 bltu1 ccku1 ch)

Lower Colorado

Central Mogollon Rim (proa3 bkba3)

Gila River (cnda3 frdn5 scdn5 lkt5 sgnn5 h)

LC Southern Headwaters (bbsa3 blda3 hbea3)

Little Colorado River (bkba3 blda3 mvfa3 mb)

Lower Colorado (whla3 frya3 mrma3 bkba3)

Salt (mvfa3 cnda3 wcta3 xbha3)

Salt River (blda3 cnda3 hnma3 mvfa3 wcta3)

San Francisco (frdn5 cnda3 xbha3)

Upper Gila (scdn5 lkt5 sgnn5)

Upper Salt (mvfa3 cnda3 wcta3 xbha3)

Verde (whla3 bkba3 frya3 mrma3)

Verde River (bkba3 frya3 mrma3 whla3)

virgin (cvyu1 hru1 lgu1 lgu1 mdvu1)

Green River

Duchesne River (icyu1 wrvu1 stdu1 dsu1 cu)

Flaming Gorge-North Slope (hewu1 hiru1 hps)

Green River Basin (kndw4 hmkw4 erdw4 sni)

cwhu1 bndu1 fplu1 lbnu1 btlw4 blsc2 burc2

Green abv Fontenelle (sniw4 scdw4 trpw4 bb)

Ham's Fork (kllw4 hmkw4 incw4)

Little Snake (btlw4 dwdw4 oldw4 srsw4 wpk)

Price-San Rafael (bubu1 mcd1 rpu1 seeu1)

Upper Green (sniw4 scdw4 trpw4 bbsw4 erdw4)

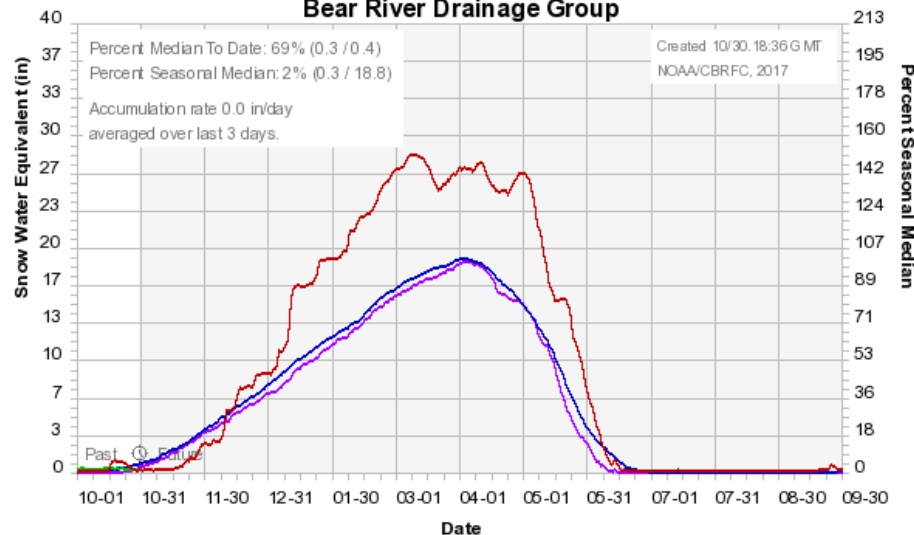
White (blsc2 burc2 rcp2 tisc2)

Wind Rivers (bgsw4 ekpw4 kndw4 nfw4)

Bear River Drainage Snotel Group

Colorado Basin River Forecast Center

Bear River Drainage Group



P 30 Max 10 Avg

Avg Med Pct Avg

245 220 176

168 150 170

98 94 151

76 73 162

355 315 189

255 230 180

725 650 230

475 380 210

52 47 156

34 32 162

730 630 234

480 365 219

26 23 142

17.8 15.9 110

89 93 120

59 63 110

54 47 209

26 20 162

74 63 210

31 29 162

980 830 220

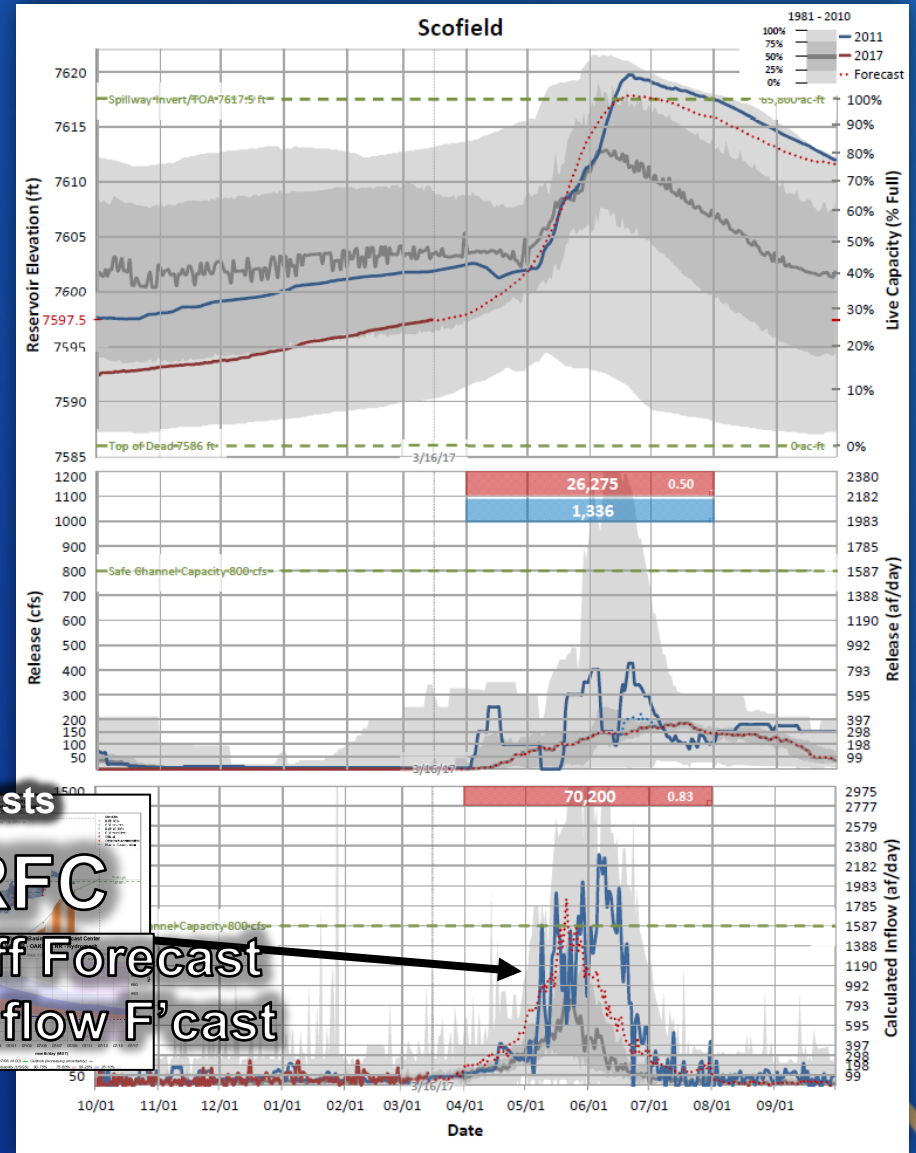
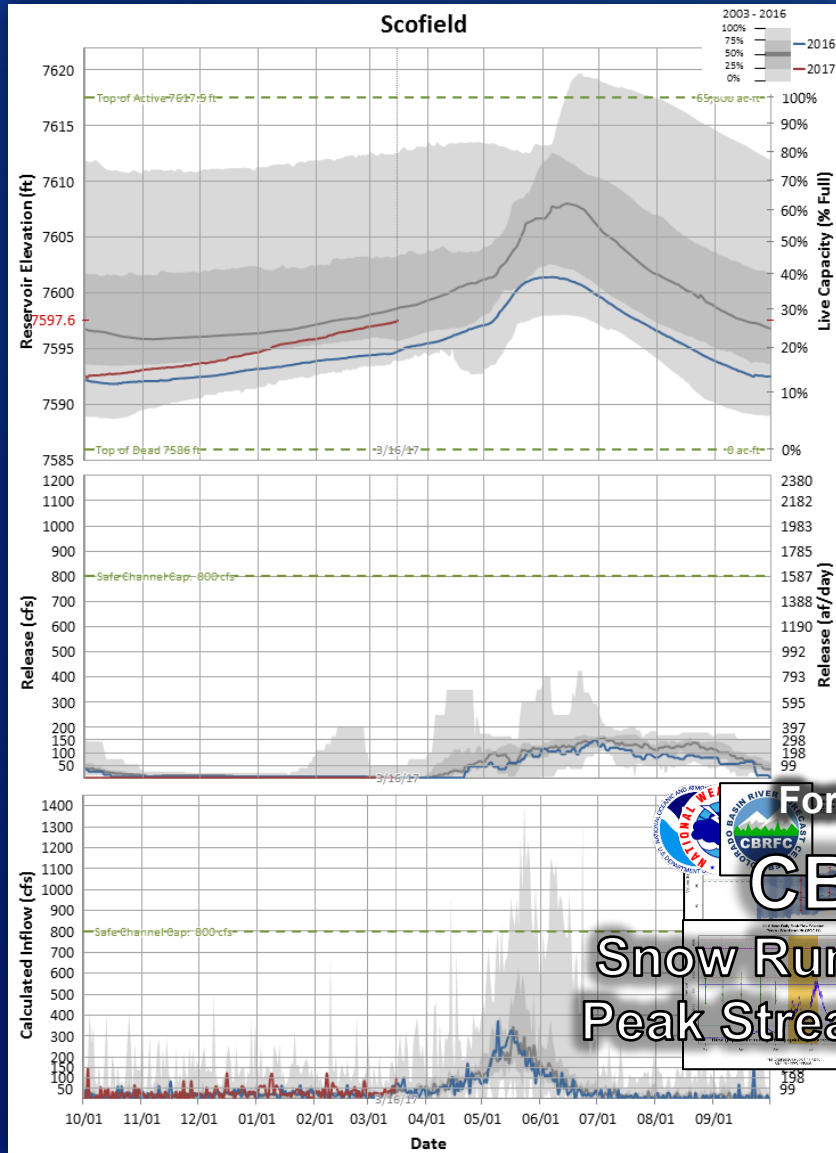
600 450 200

23 21 60

CBRFC & USBR PAO Tools

Reservoir Monitoring

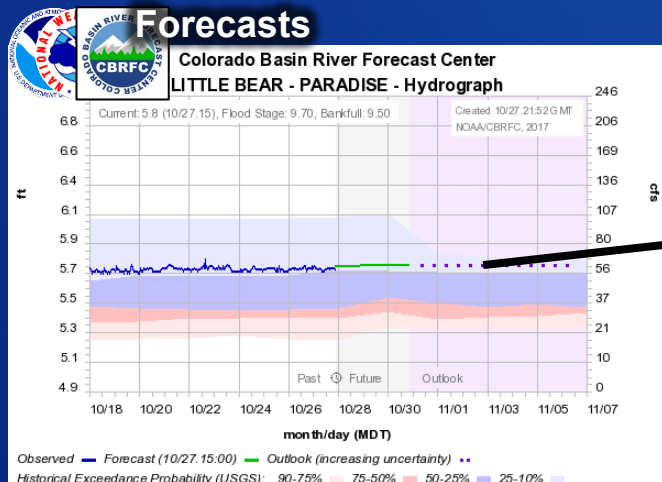
Will it Fill?



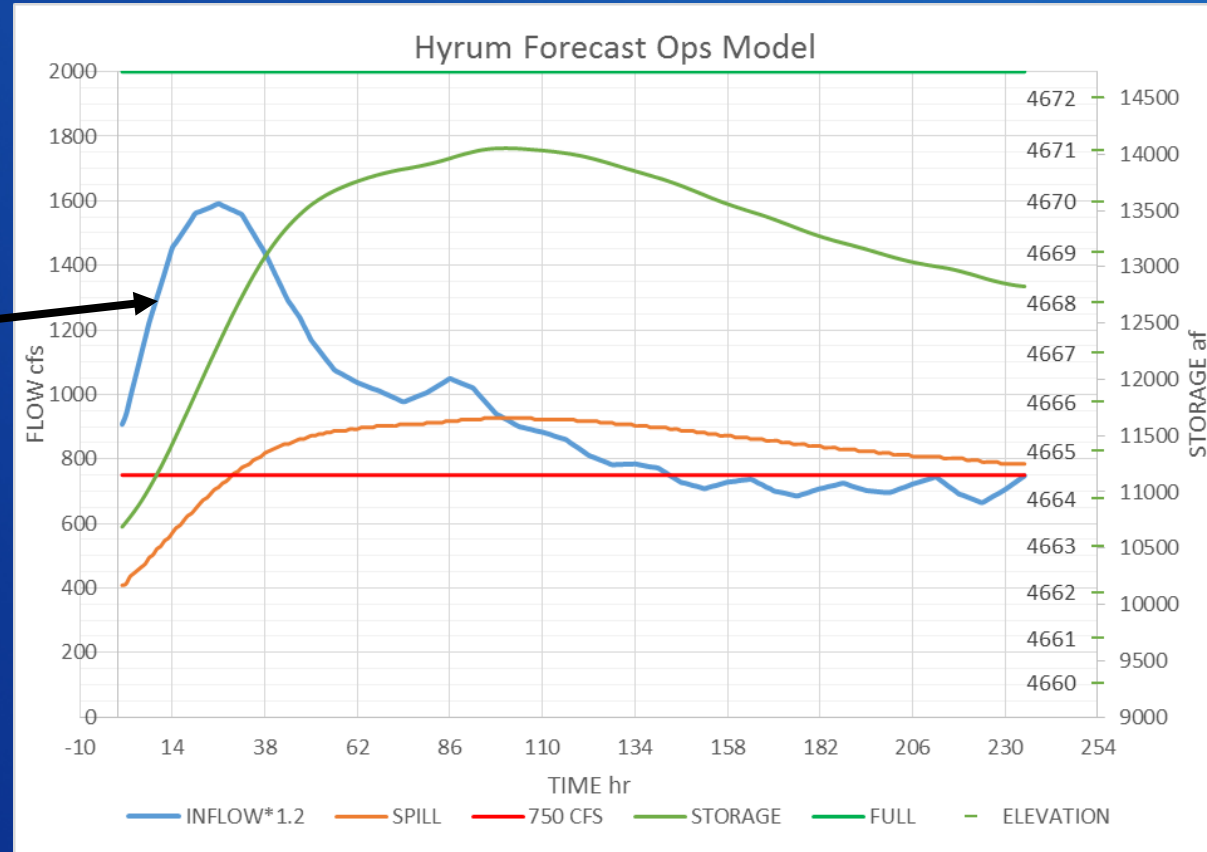
CBRFC & USBR PAO Tools

Reservoir Monitoring

Will it Get Ugly?



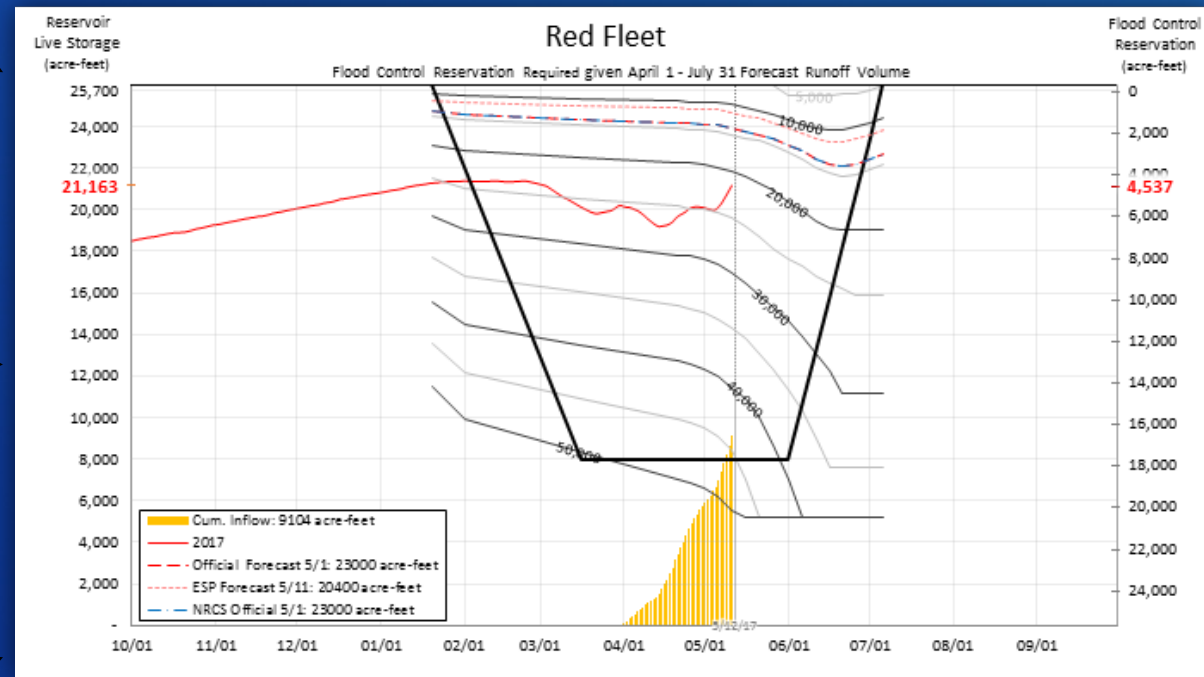
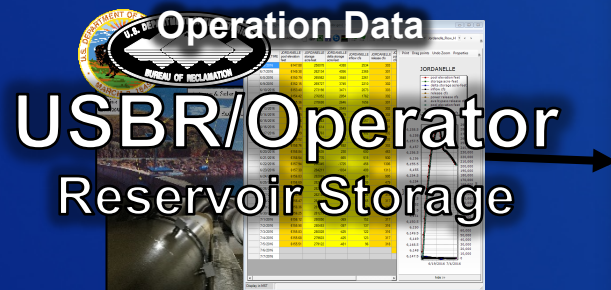
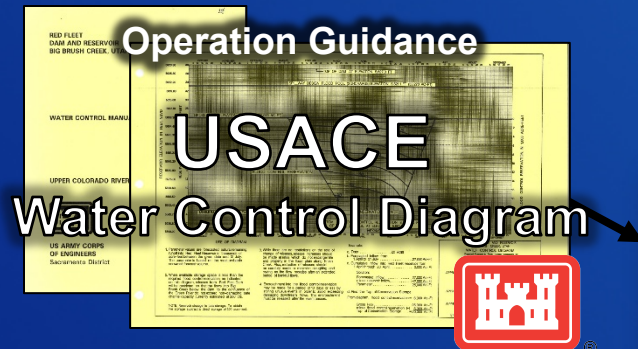
10-day Streamflow F'cast



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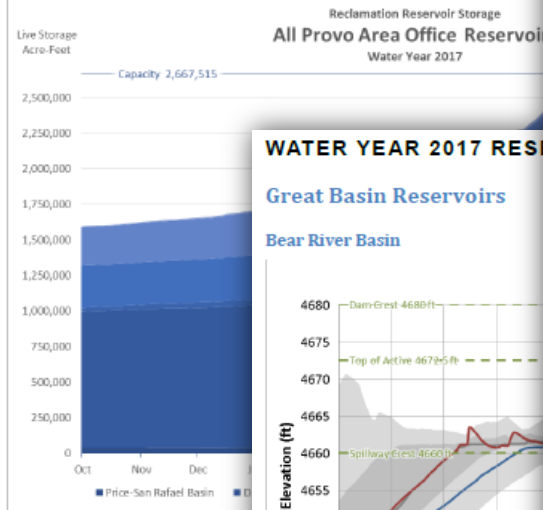
USACE Flood Control Compliance



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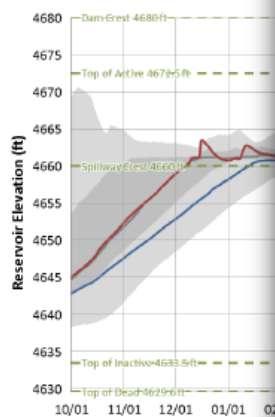
Reporting



WATER YEAR 2017 RES

Great Basin Reservoirs

Bear River Basin



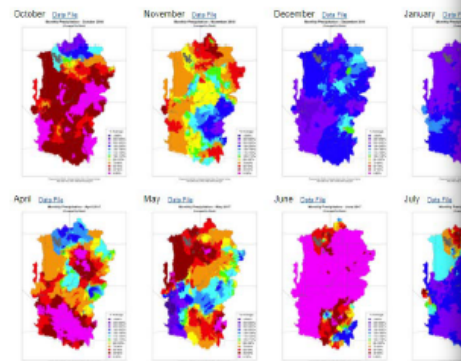
Hyrum Reservoir ended water year 2017 at 66% of live capacity. The reservoir frequently in February, March, April, variable inflows¹. A rain-on-snow event in March, inflows again exceeded 100 cfs, spillway was again monitored. In mid-September, With irrigation releases

¹ Inflows were highly variable due to changes in weather and releases from Fryingpan Reservoir upstream.

² Releases from Hyrum Reservoir are measured with USBR equipment and reported values are considered to be accurate. GOES parameter "BENCH 57" is stored in the hydrologic database. (r-b) as Bypass Release #1, and consists of flows to the Hyrum Feeder Canal (also known as Little Feeder Canal by UDWR) and flows to the Hyrum-Mendon Canal (also known as the Wells

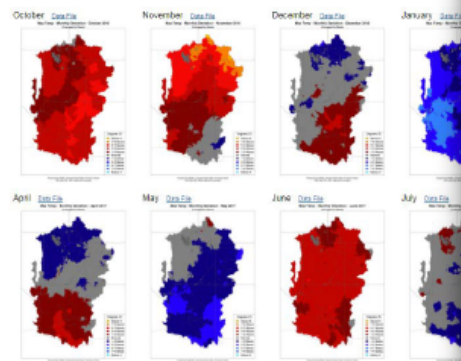
Precipitation & Temperature

Precipitation in the Colorado River drainage basin was variable throughout water year 2017. The most significant impacts to the 2017 snowpack and water resources were the wetter and warmer months of December and January, and for much of Utah.



Monthly Precipitation

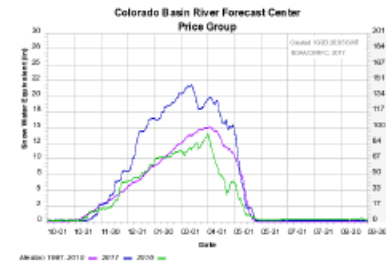
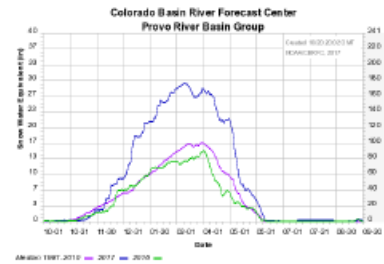
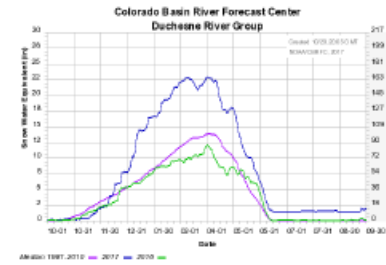
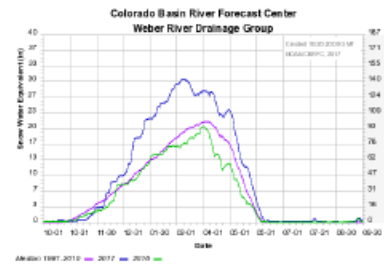
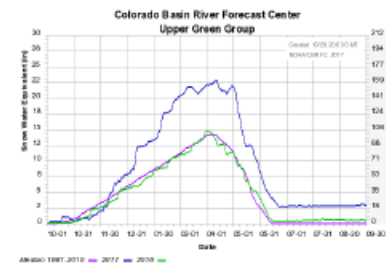
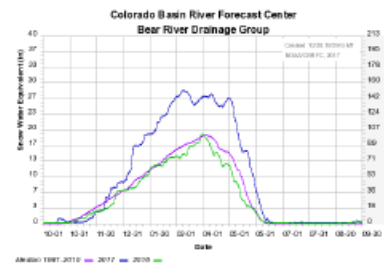
With the exception of an average December and cold January, temperatures were generally above average during the snow accumulation season (and very dry) June, temperatures were generally near normal during the water use season.



Maximum Temperature, Deviation from

Snowpack

Snowpack in the Provo Area Office river basins was near record levels for much of 2017. The peak water year 2017 snow water equivalent values were also, generally, near record levels and well above the median peak (Bear 151%, Weber-Ogden 143%, Provo 178%, Upper Green 161%, Duchesne 166%, and Price-San Rafael 146%). Conditions were significantly better than what was observed in water year 2016.



Median 1981-2010 2017 2016

Snow Water Equivalent, Compilations of NRCS SNOTEL data

Questions?

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