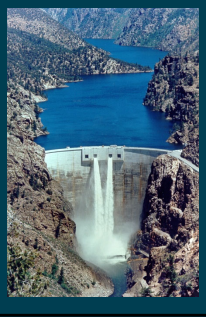
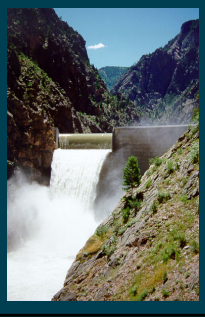
BUREAU OF RECLAMATION

Aspinall Operations Meeting

January 20, 2022



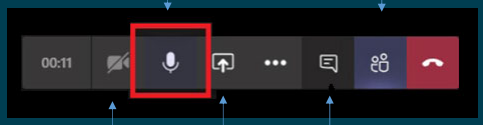


1

Microsoft Teams Video Conferencing

Mute/Unmute Yourself

View Participant List



Turn on/off your camera

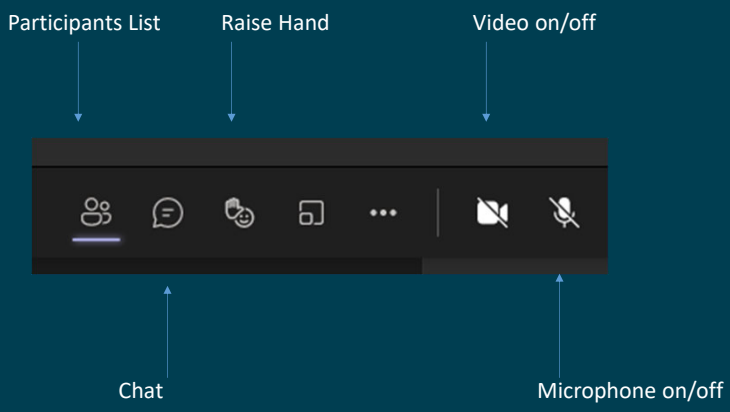
Share your screen:
Should be disabled

Chat: Ask questions,
make comments
(everyone can see this)

Depending on your device/browser, these buttons may be in a different location

2

Microsoft Teams Video Conferencing



3

- Introductions and Purpose of Meeting
- Gunnison Basin Water Supply Outlook – Ashley Nielson (CBRFC)
- Weather Outlook – Aldis Strautins (NWS)
- Aspinall Unit Operations – Erik Knight (Reclamation)
- Drought Response Operations Agreement (DROA) Plan Update – Robert Henrie (Reclamation)
- Overview of Aspinall endangered fish flows and fishery investigations (FWS/Reclamation)
- Special Flow Requests and Discussion
  Reports of Agencies and Organizations – All
- Conclusions (Next meeting date – April 14th)

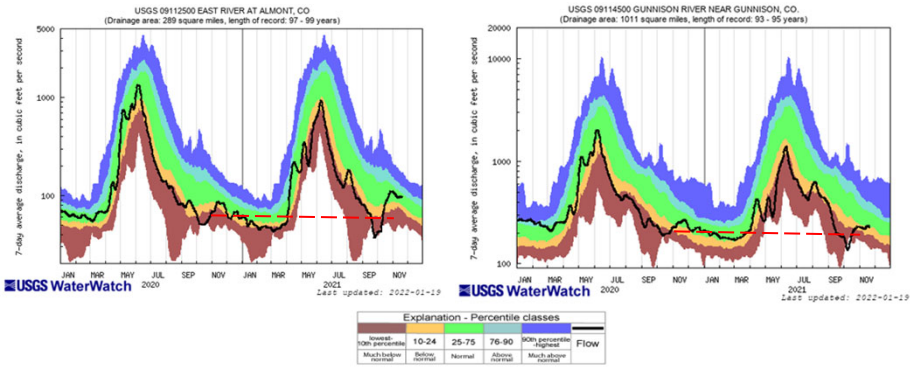
4

Aspinall Operations Meeting
Water Supply Outlook
January 2022

Ashley Nielson
Senior Hydrologist
Colorado Basin River Forecast Center
National Weather Service/NOAA

5

Streamflow Conditions



- Two consecutive years of below normal spring runoff
- Improvement in conditions from October precipitation
- Streamflow conditions have improved from last year.

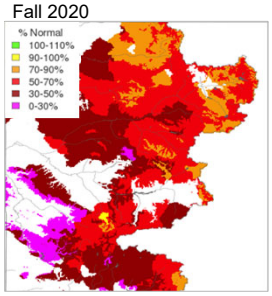
6

Fall Modeled Soil Moisture Conditions: 2020 vs. 2021

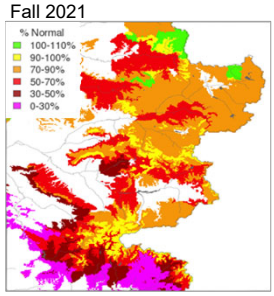
- Soil moisture conditions have improved from near record dry levels last year but still remain below normal.
- Soil moisture conditions can impact spring runoff efficiency
  - Degree of impact is uncertain in every year
  - Timing/magnitude of runoff is ultimately a result of spring weather (precipitation/temperature), 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

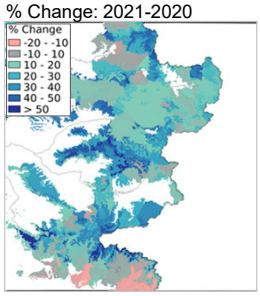
Fall 2020



Fall 2021



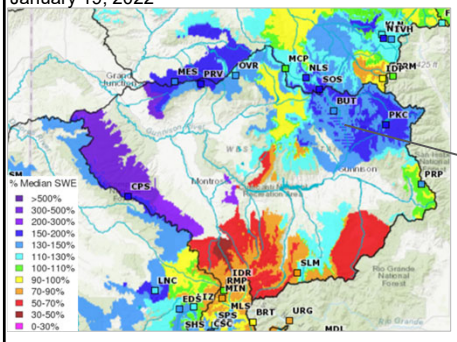
% Change: 2021-2020



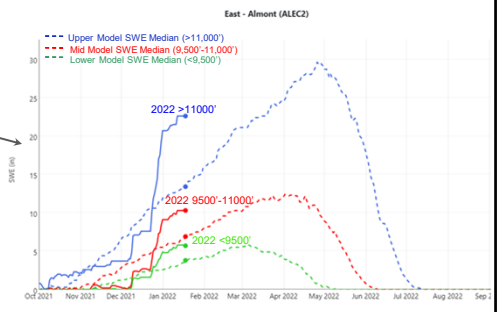
7

Snow Conditions: CBRFC Model Snow Water Equivalent

January 19, 2022



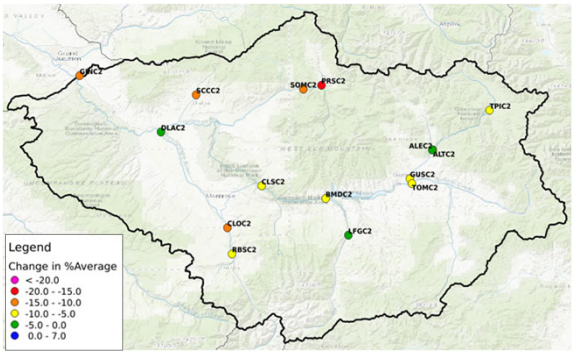
Model snow includes areas above and below SNOTEL sites.
- SNOTEL locations range from ~9,000-11,500'
- Some modeled basins extend to over 14,000'



- Snow accumulation had a slow start
  - Warm and dry November; dry early December
- Impressive storms and significant SWE accumulation in late December
- Snow conditions:
  - Above normal: Northern half of basin
  - Below normal: Southern half of basin
- Still early in the snow accumulation season

8

1981-2010 vs 1991-2020 Averages: Gunnison River Basin



- Averages are updated every 10 years
- New averages represent most recent trends

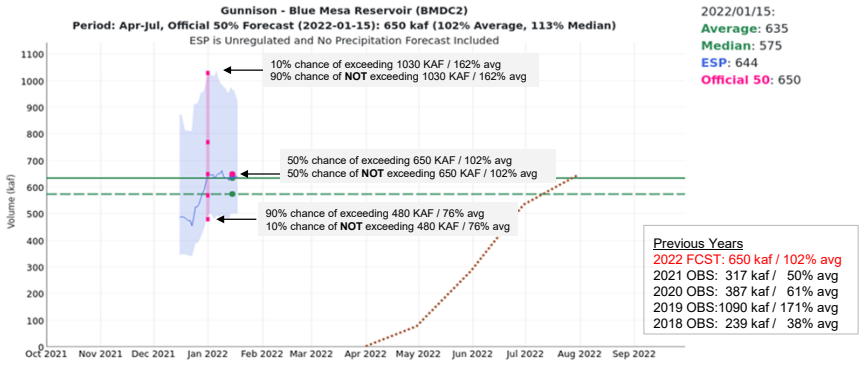
- Averages in the Gunnison River Basin decreased by ~5-15%
- Water supply volumes, both forecast and observed, will be higher as a percent of average compared to the same volume last year.

Blue Mesa Forecast - Comparison of Period Normal %Avg

	Apr-Jul Fcst (KAF)	1981-2010 (675 KAF)	1991-2020 (635 KAF)
10%	1030	153%	162%
50%	650	96%	102%
90%	480	71%	76%

9

Forecast Progression: Blue Mesa Reservoir Inflow



2022/01/15:
Average: 635
Median: 575
ESP: 644
Official 50: 650

Previous Years
2022 FCST: 650 kaf / 102% avg
2021 OBS: 317 kaf / 50% avg
2020 OBS: 387 kaf / 61% avg
2019 OBS:1090 kaf / 171% avg
2018 OBS: 239 kaf / 38% avg

Blue shading: Daily Raw Model Guidance 90% - 10% exceedance range
Blue line: Daily Raw Model Guidance 50% exceedance
Pink line: Official forecast 90%, 70%, 50%, 30%, 10% exceedance

Green solid: 1991-2020 average April-July volume
Green dotted: 1991-2020 median April-July volume

Brown dotted: Average observed

Blue Mesa Reservoir Inflow Forecast Plot Link

10

Early Season Forecast Uncertainty

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

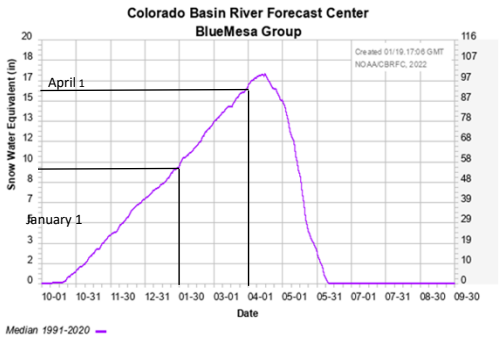
Average January Forecast Error: ~185 KAF

April 1st Forecast:

What we **KNOW**:
- ~95% of snowpack accumulation
- Dec-March weather

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

Average April Forecast Error: ~100 KAF



11

Summary

- **Soil moisture**
  - Conditions have improved from last year but are still below normal.
  - Soil moisture deficits still exist.
  - Impact on runoff uncertain and will depend on spring weather and snow conditions.
- **Snow**
  - Slow start to the snow season
  - Above normal: Northern half of basin
  - Below normal: Southern half of basin
- **Averages**
  - Moved from 1981-2010 to 1991-2020
  - 1991-2020 are ~5-15% lower in the Gunnison River Basin
- **January Water Supply Forecasts**
  - Near to above average
    - Impacted by below normal modeled soil moisture conditions
  - Large range of possibilities and high uncertainty at this time
  - Forecast uncertainty decreases through the season

12

CBRFC Contacts

Basin Forecasters

Brenda Alcorn - Green, Duchesne, White/Yampa
brenda.alcorn@noaa.gov

Ashley Nielson – Gunnison, San Juan, Dolores, Lake Powell
ashley.nielson@noaa.gov
801-524-5130 x 333

Cody Moser – Upper Colorado Mainstem
cody.moser@noaa.gov

Patrick Kormos – Great Basin/Sevier
patrick.kormos@noaa.gov

Trevor Grout - Virgin, Lower Colorado
trevor.grout@noaa.gov

Brent Bernard – Hydrologist
brent.bernard@noaa.gov

Tracy Cox - Hydrometeorologist
tracy.cox@noaa.gov

Nanette Hosenfeld - Senior Hydrometeorologist
nanette.hosenfeld@noaa.gov

Wolfgang Hanft - Hydrometeorologist
wolfgang.hanft@noaa.gov

Michelle Stokes – Hydrologist In Charge
michelle.stokes@noaa.gov

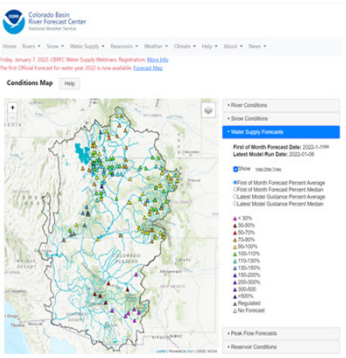
Paul Miller– Service Coordination Hydrologist
paul.miller@noaa.gov

John Lhotak – Development and Operations Hydrologist
john.lhotak@noaa.gov

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



13

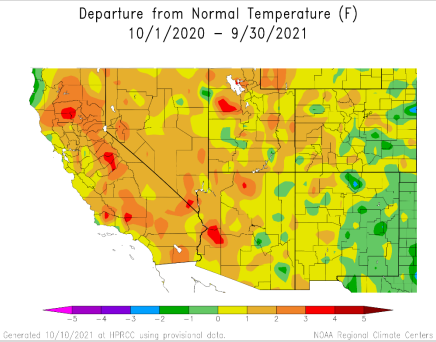
Weather Outlook
January 20, 2022

Aldis Strautins
National Weather Service
Grand Junction, CO
http://www.weather.gov/gjt

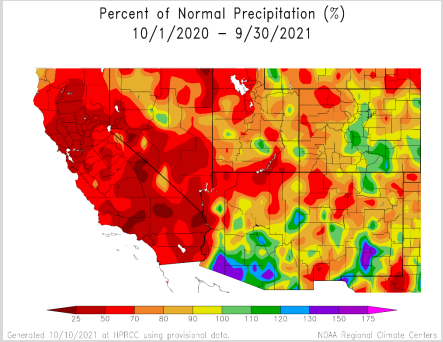
14

The Past
January 2022

Temperature
Departure from normal



Precipitation
% of normal

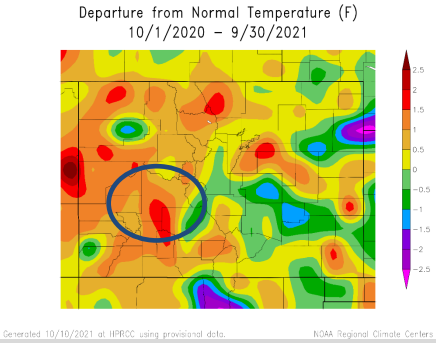


Water Year 2021

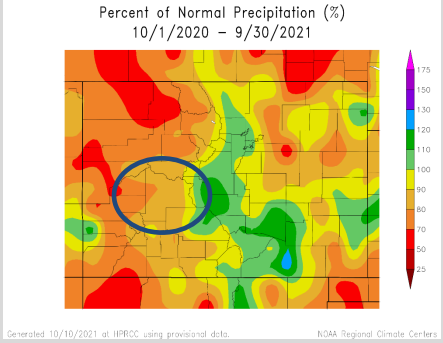
15

The Past
January 2022

Temperature
Departure from normal



Precipitation
% of normal

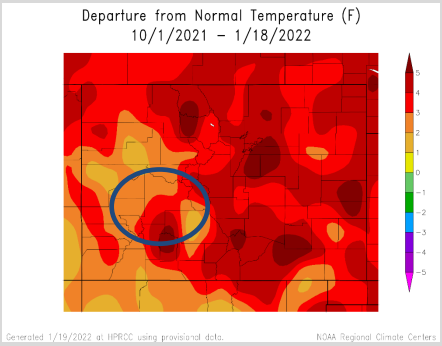


Water Year 2021

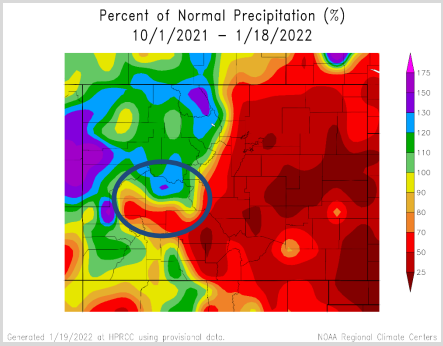
16

The Past
January 2022

Temperature
Departure from normal



Precipitation
% of normal



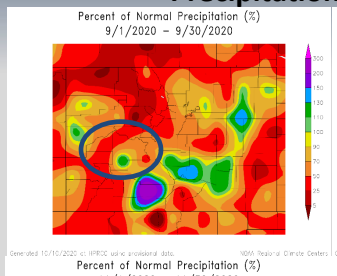
Water Year 2022

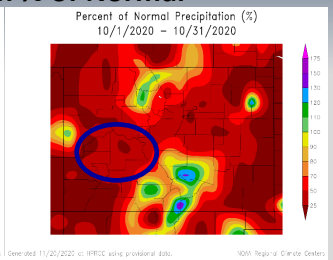
17

The Past
January 2022

Precipitation % of Normal

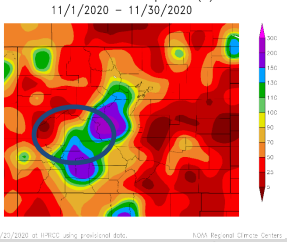
Sep

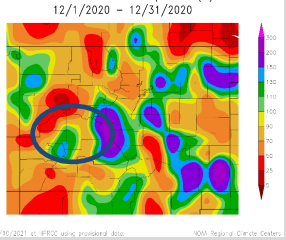




Oct

Nov





Dec

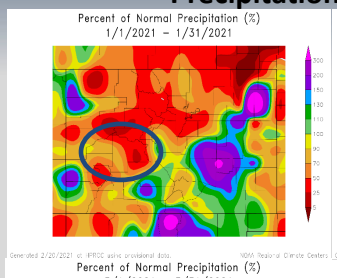
September to December 2020

18

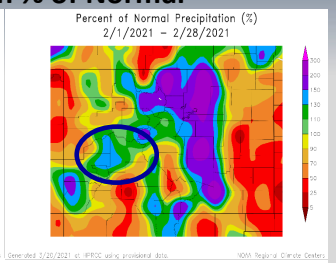
The Past
January 2022

Precipitation % of Normal

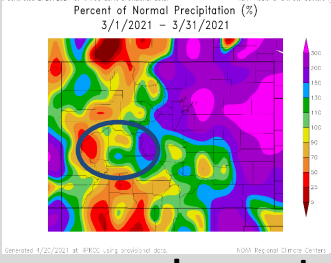
Jan



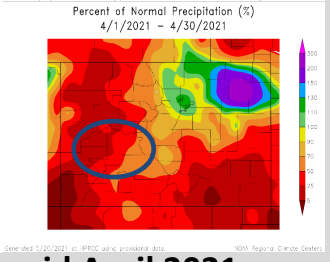
Feb



Mar



Apr



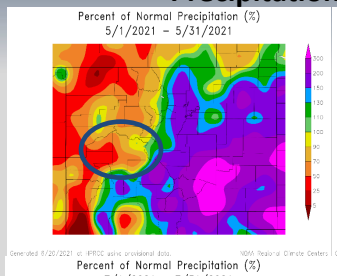
January to mid April 2021

19

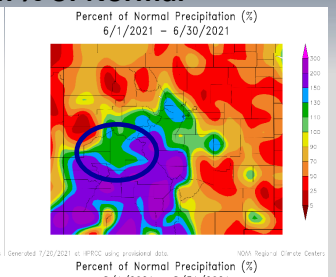
The Past
January 2022

Precipitation % of Normal

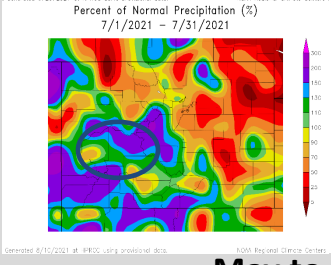
May



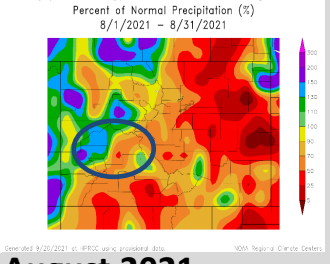
Jun



Jul



Aug



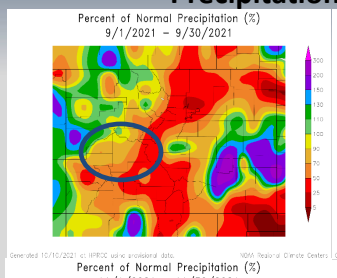
May to August 2021

20

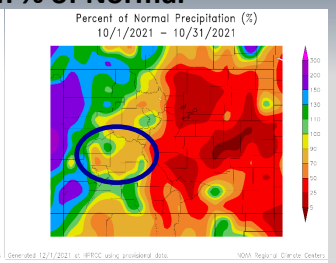
The Past
January 2022

Precipitation % of Normal

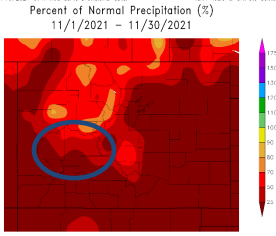
Sep



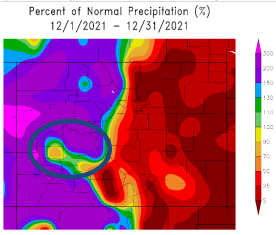
Oct



Nov



Dec

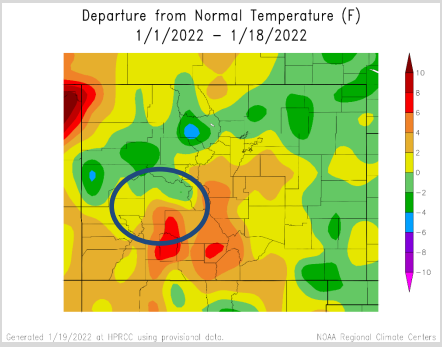


September to December 2021

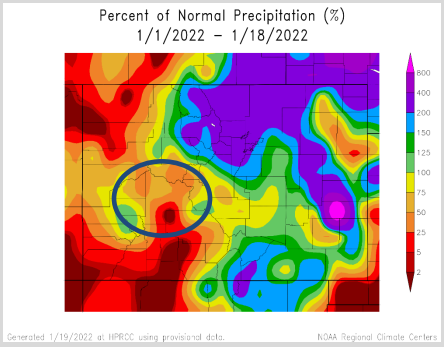
21

The Past
January 2022

Temperature
Departure from normal



Precipitation
% of normal



From January 1 to 18, 2022

22

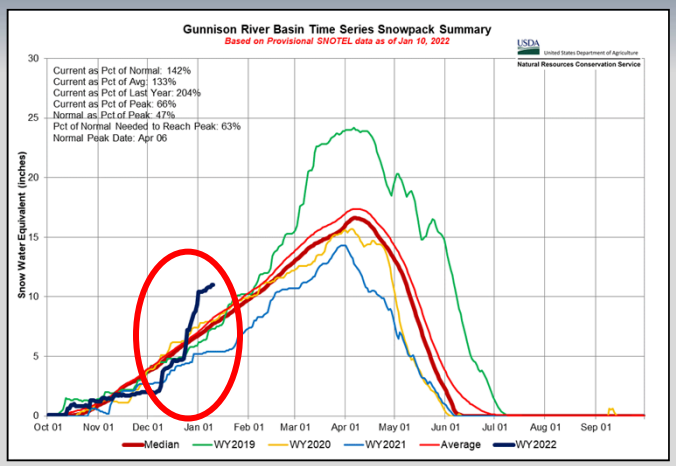
Snow
January 2022

142% of normal

66% of normal peak

Normal peak Apr 6

Yeah, Late December snow!

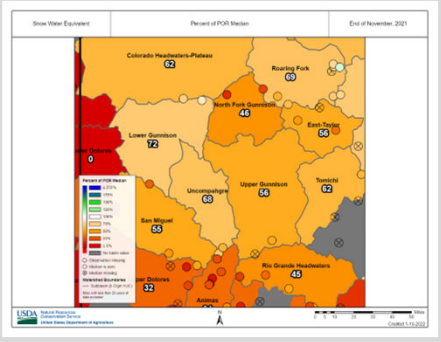


SNOTEL Snow Water Equivalent – NRCS Gunnison River Basin

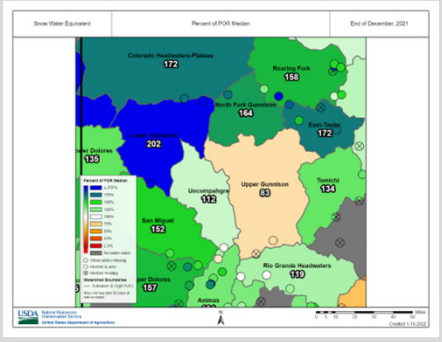
23

The Past
January 2022

SWE November 2021

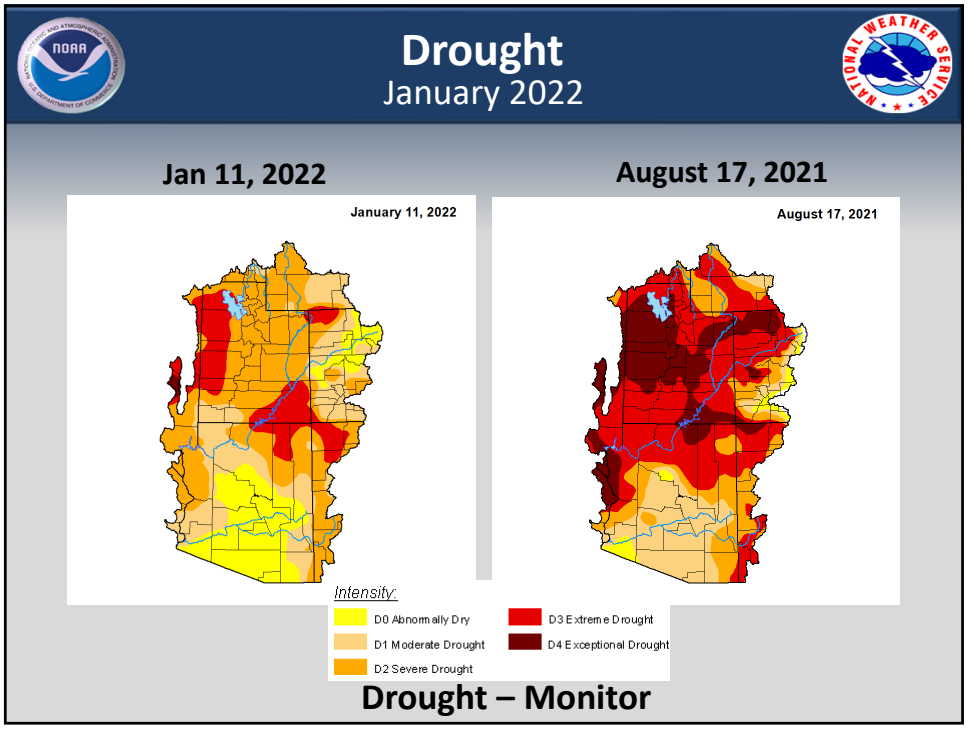


SWE December 2021

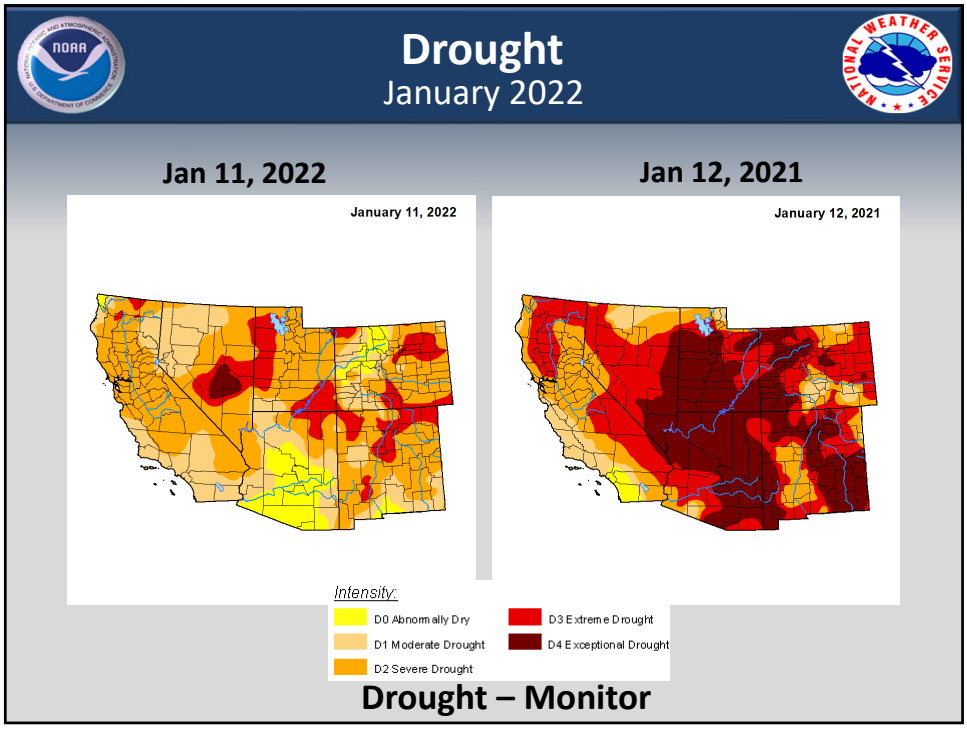


SNOTEL – Percent of Median

24


Drought
January 2022
Jan 11, 2022
August 17, 2021
January 11, 2022
August 17, 2021
Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
Drought – Monitor

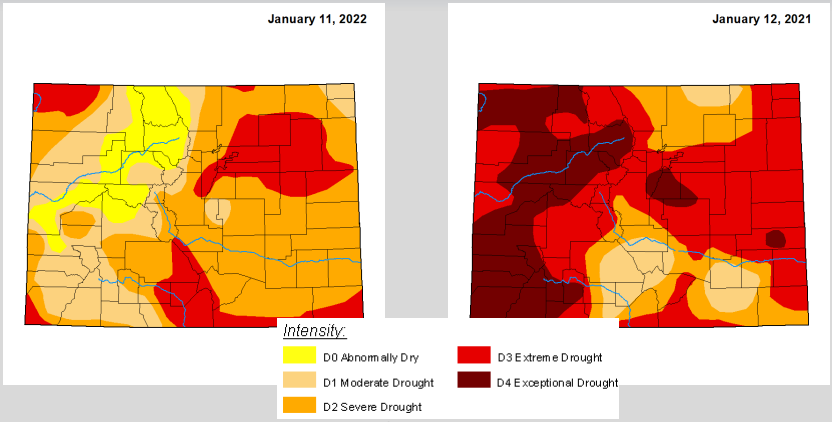
25


Drought
January 2022
Jan 11, 2022
Jan 12, 2021
January 11, 2022
January 12, 2021
Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
Drought – Monitor

26

Drought
January 2022

January 11, 2022 | **January 12, 2021**



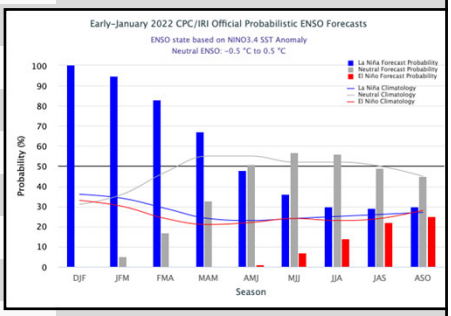
Drought – Monitor

27

ENSO
January 2022

CPC/IRI Early-Month Consensus ENSO Forecast Probabilities
(using NWS CPC classification system)

Season	La Niña	Neutral	El Niño
DJF	100	0	0
JFM	95	5	0
FMA	83	17	0
MAM	67	33	0
AMJ	48	51	1
MJJ	36	57	7
JJA	30	56	14
JAS	29	49	22
ASO	30	45	25



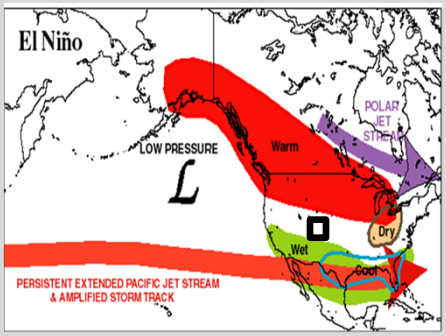
ENSO – Outlook

La Nina becoming Neutral this spring

28

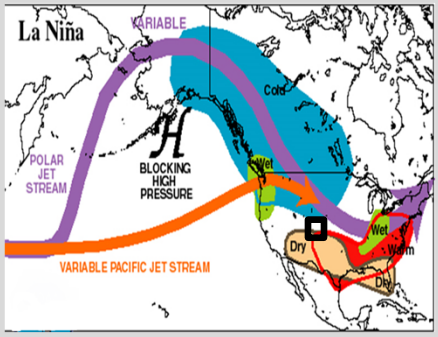
Weather Outlook
January 2022

El Nino



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

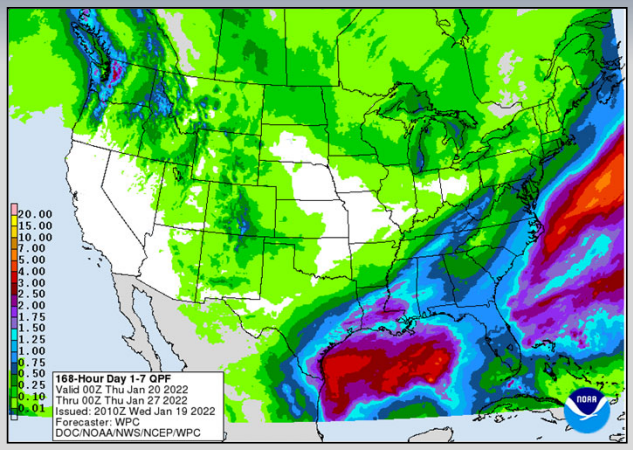
La Nina



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

29

Weather Outlook
January 2022

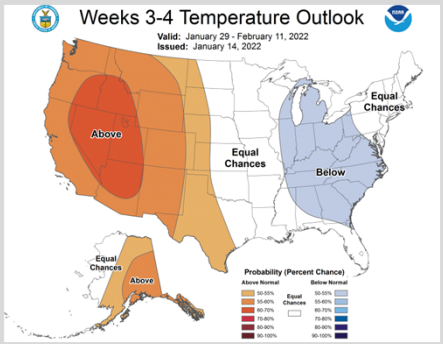


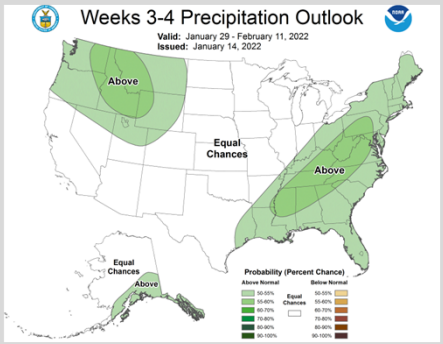
WPC 7-Day Precipitation Outlook
Accumulation period from Jan 20-27

30

Weather Outlook
January 2022

Temperature | **Precipitation**



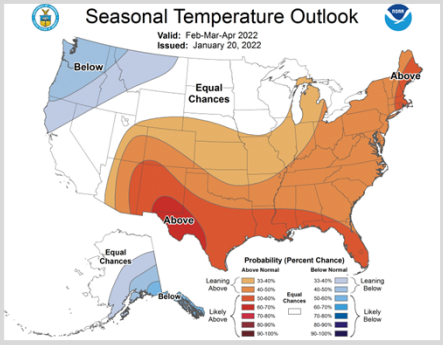


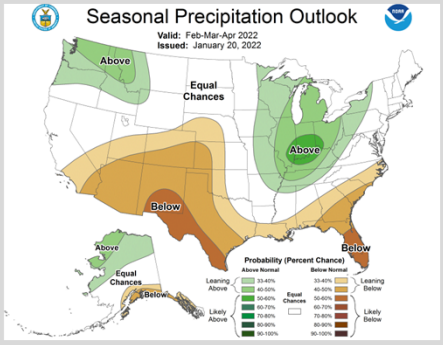
Jan 20 – Feb 11 Outlook

31

Weather Outlook
January 2022

Temperature | **Precipitation**



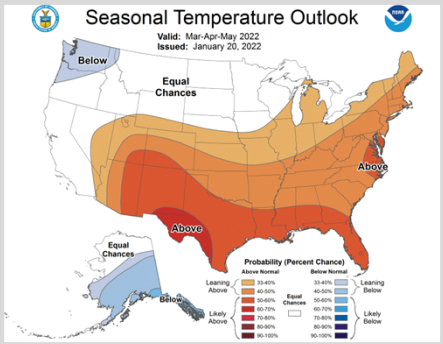


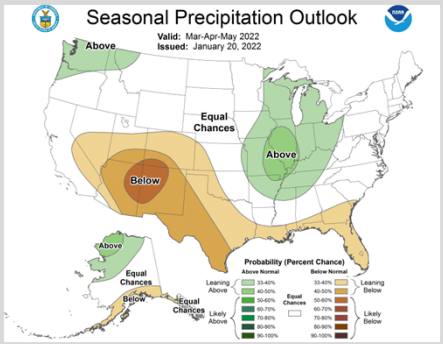
Feb/Mar/Apr – Outlook

32

Weather Outlook
January 2022

Temperature | **Precipitation**



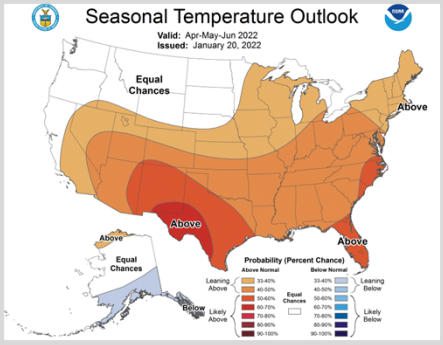


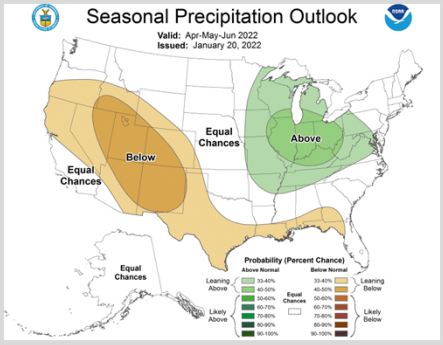
Mar/Apr/May – Outlook

33

Weather Outlook
January 2022

Temperature | **Precipitation**



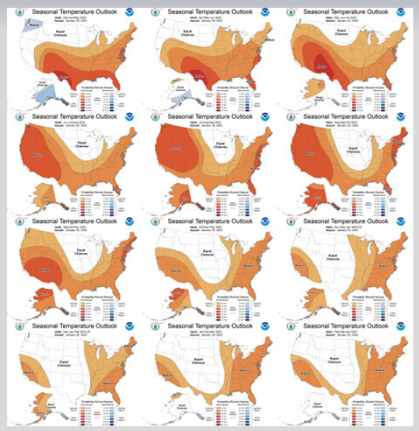


Apr/May/Jun – Outlook

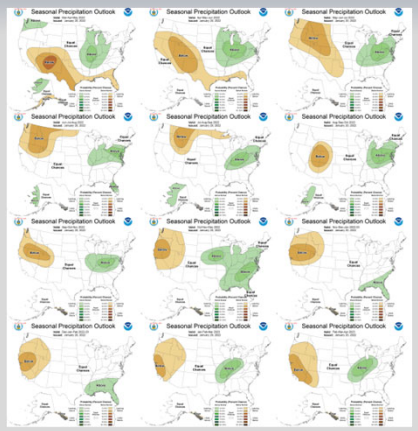
34

Weather Outlook
January 2022

Temperature



Precipitation

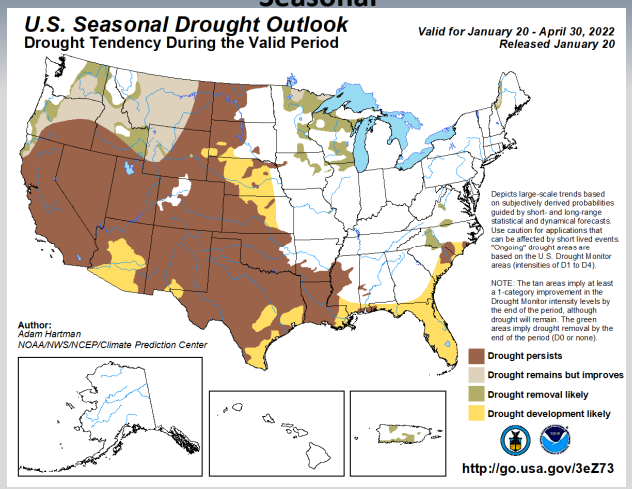


Outlooks

35

Weather Outlook
January 2022

Seasonal



Drought– Outlook

36

Weather Outlook
January 2022

Aldis Strautins
NWS Grand Junction, CO
http://www.weather.gov/gjt

37

RESERVOIR AND RIVER STATUS

Blue Mesa Reservoir ended 2021 at an elevation of 7434.5 ft, 55 feet below the winter target elevation of 7490 ft

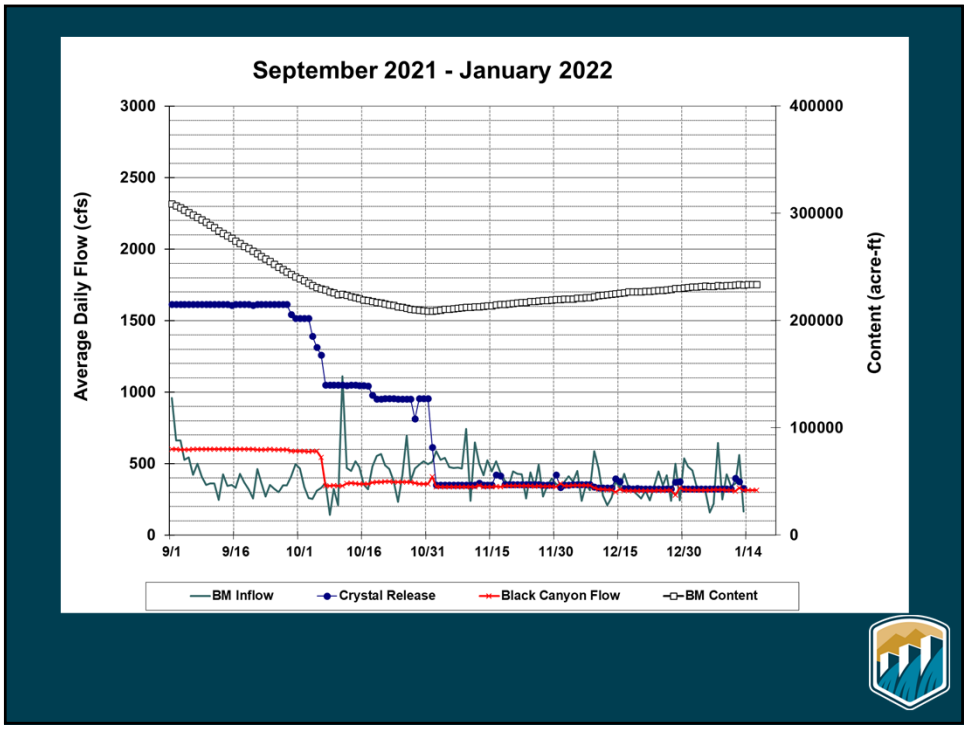
Blue Mesa Reservoir content is currently at 235,000 acre-feet at an elevation of 7435 feet.

Crystal Dam is releasing 325 cfs and flows in the Gunnison River through the Black Canyon are 325 cfs

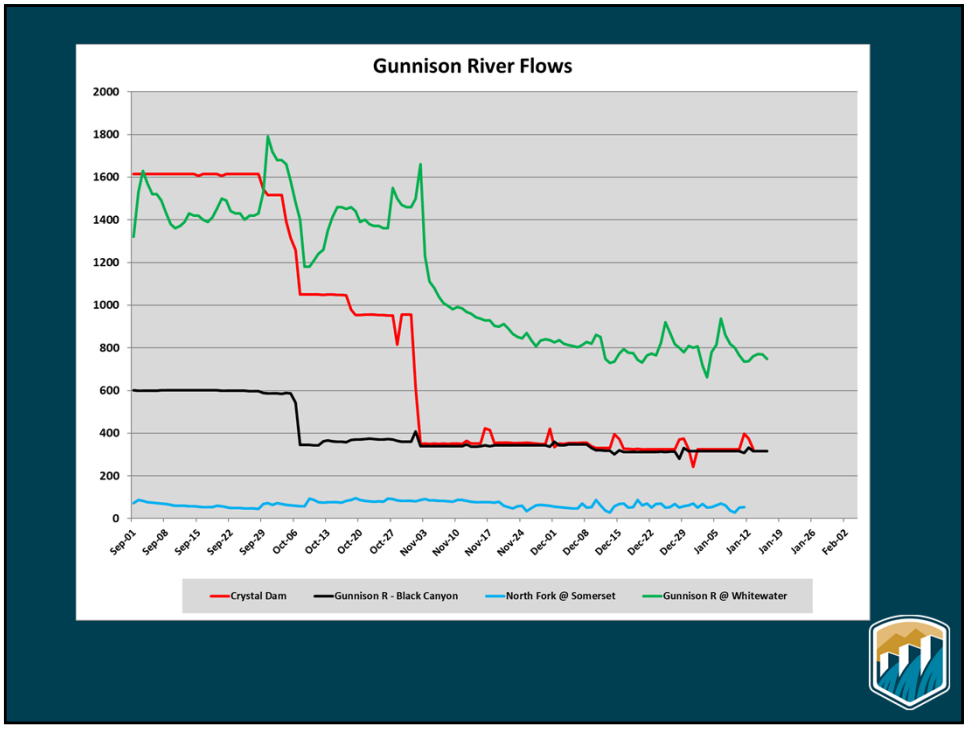
Releases/river flows will likely remain unchanged until the start of runoff

Flows in the lower Gunnison River at the Whitewater gage are estimated to be just above the baseflow target of 750 cfs

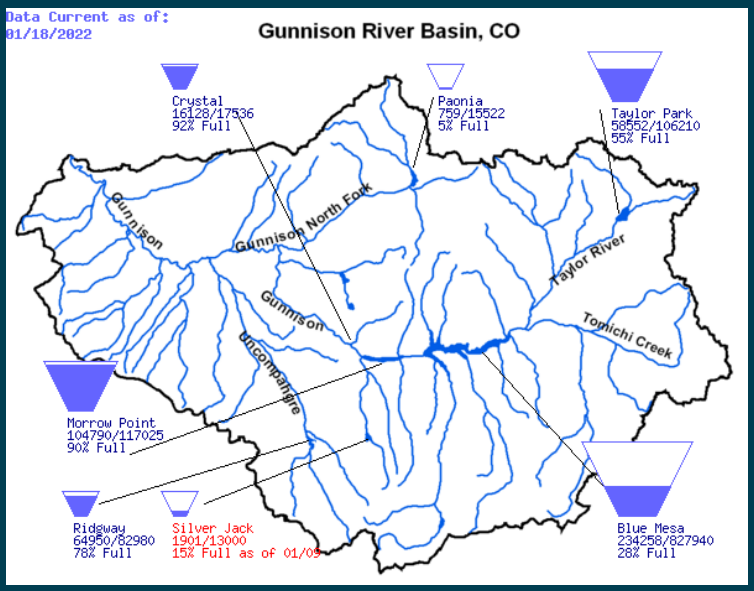
38


September 2021 - January 2022
Average Daily Flow (cfs)
Content (acre-ft)
3000
2500
2000
1500
1000
500
0
400000
300000
200000
100000
0
9/1
9/16
10/1
10/16
10/31
11/15
11/30
12/15
12/30
1/14
BM Inflow
Crystal Release
Black Canyon Flow
BM Content

39


Gunnison River Flows
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Sep-01
Sep-08
Sep-15
Sep-22
Sep-29
Oct-06
Oct-13
Oct-20
Oct-27
Nov-03
Nov-10
Nov-17
Nov-24
Dec-01
Dec-08
Dec-15
Dec-22
Dec-29
Jan-05
Jan-12
Jan-19
Jan-26
Feb-02
Crystal Dam
Gunnison R - Black Canyon
North Fork @ Somerset
Gunnison R @ Whitewater

40



41

SNOW CONDITIONS

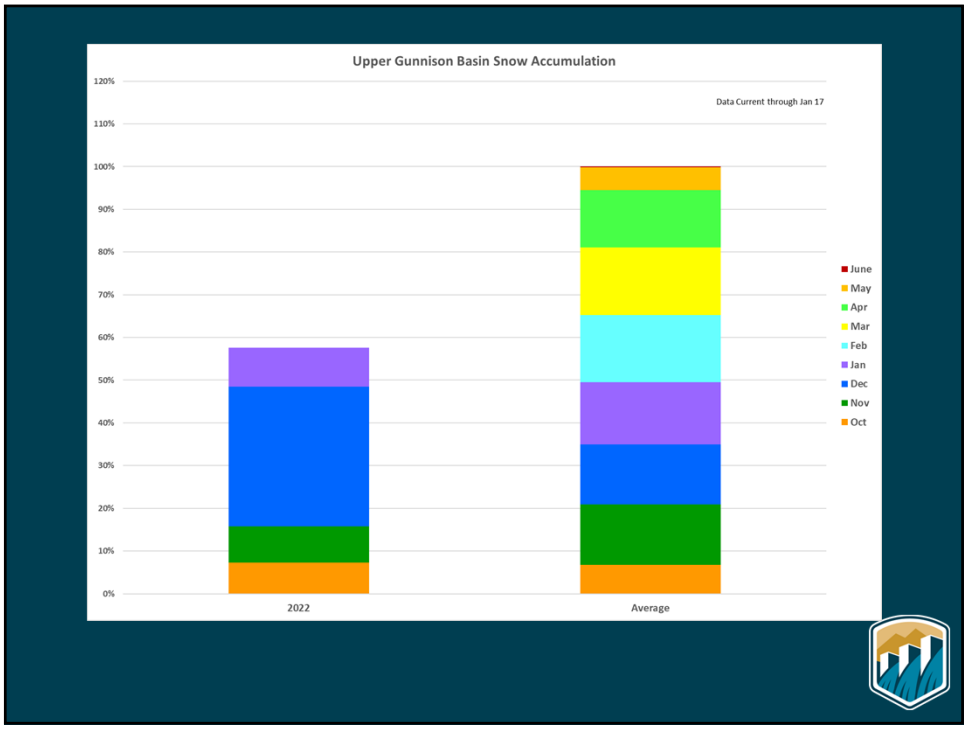
Snow accumulation in the Upper Gunnison Basin:

- Oct = 105% of average
- Nov = 60% of average
- Dec = 225% of average
- Jan = 95% of average (so far)

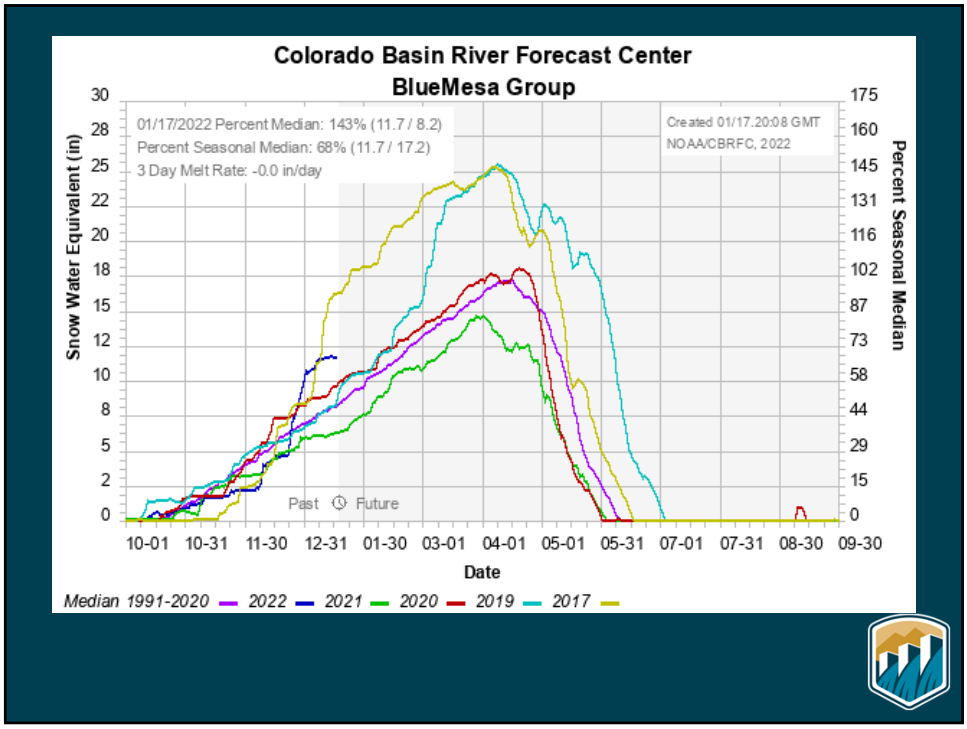
December snow exceeded the total for a normal Dec + Jan

Snow on north side of Upper Gunnison Basin ~ 140% of average
Snow on south side of Upper Gunnison Basin ~ 80% of average

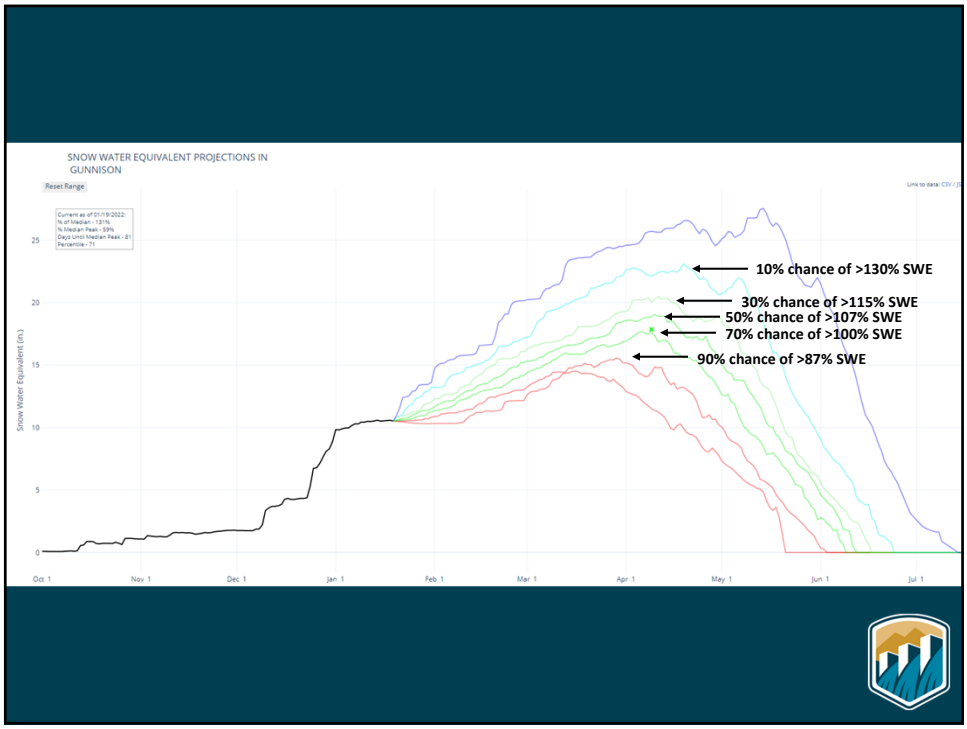
42


Upper Gunnison Basin Snow Accumulation
Data Current through Jan 17
120%
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2022
Average
June
May
Apr
Mar
Feb
Jan
Dec
Nov
Oct

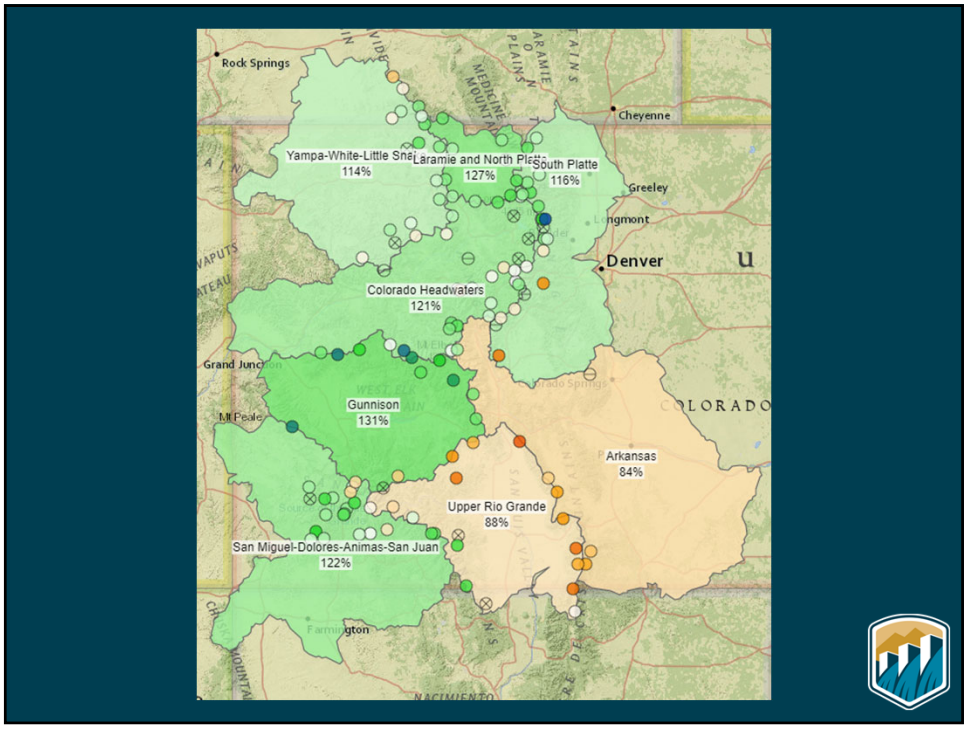
43


Colorado Basin River Forecast Center
BlueMesa Group
01/17/2022 Percent Median: 143% (11.7 / 8.2)
Percent Seasonal Median: 68% (11.7 / 17.2)
3 Day Melt Rate: -0.0 in/day
Created 01/17.20:08 GMT
NOAA/CBRFC, 2022
Snow Water Equivalent (in)
Percent Seasonal Median
30
28
25
22
20
18
15
12
10
8
5
2
0
175
160
145
131
116
102
87
73
58
44
29
15
0
Past
Future
10-01
10-31
11-30
12-31
01-30
03-01
04-01
05-01
05-31
07-01
07-31
08-30
09-30
Date
Median 1991-2020
2022
2021
2020
2019
2017

44


SNOW WATER EQUIVALENT PROJECTIONS IN GUNNISON
Reset Range
Snow Water Equivalent (in.)
25
20
15
10
5
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
10% chance of >130% SWE
30% chance of >115% SWE
50% chance of >107% SWE
70% chance of >100% SWE
90% chance of >87% SWE

45


Rock Springs
Cheyenne
Yampa-White-Little She
114%
Laramie and North Platte
127%
South Platte
116%
Greeley
Denver
Colorado Headwaters
121%
Grand Junc
Gunnison
131%
Arkansas
84%
Upper Rio Grande
88%
San Miguel-Dolores-Animas-San Juan
122%

46

SPRING RUNOFF FORECASTS AND TARGETS

Early season runoff forecasts for major rivers in the Gunnison Basin are in the 80-110% of average range

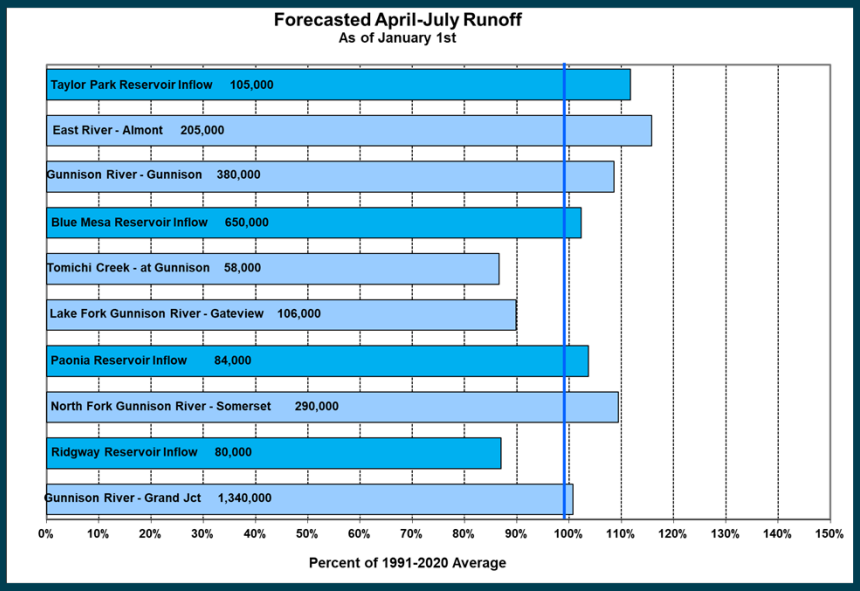
The Jan 15th runoff forecast for Blue Mesa Reservoir puts 2022 into the Average Dry hydrologic category

The ROD targets in the Average Dry category call for a peak flow of 8,070 cfs at Whitewater. This is the half bankfull flow and the duration at this flow should be 10 days.

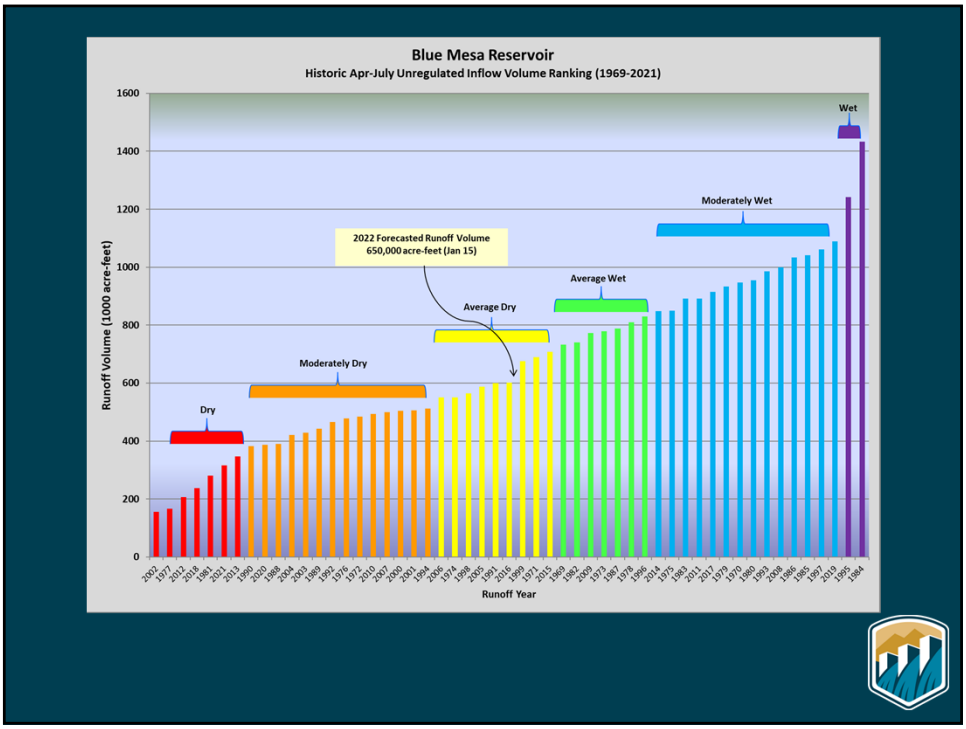
The Black Canyon water right peak flow target is ~5,250 cfs.

Shoulder flow targets in the Black Canyon are 540 cfs for May 1 – July 25

47



48

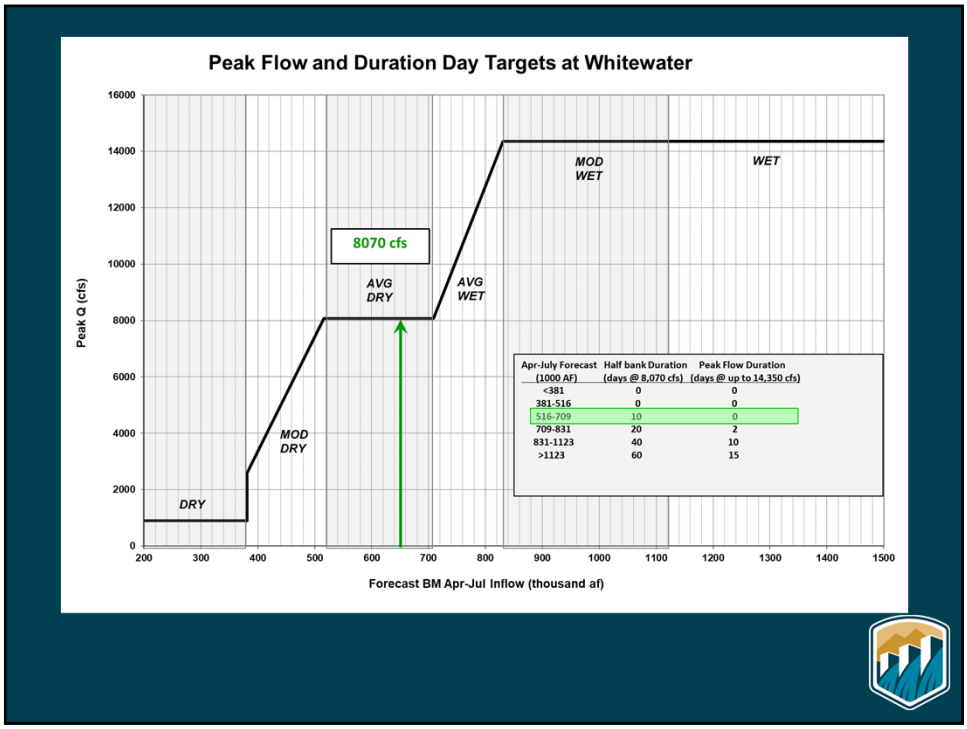


49

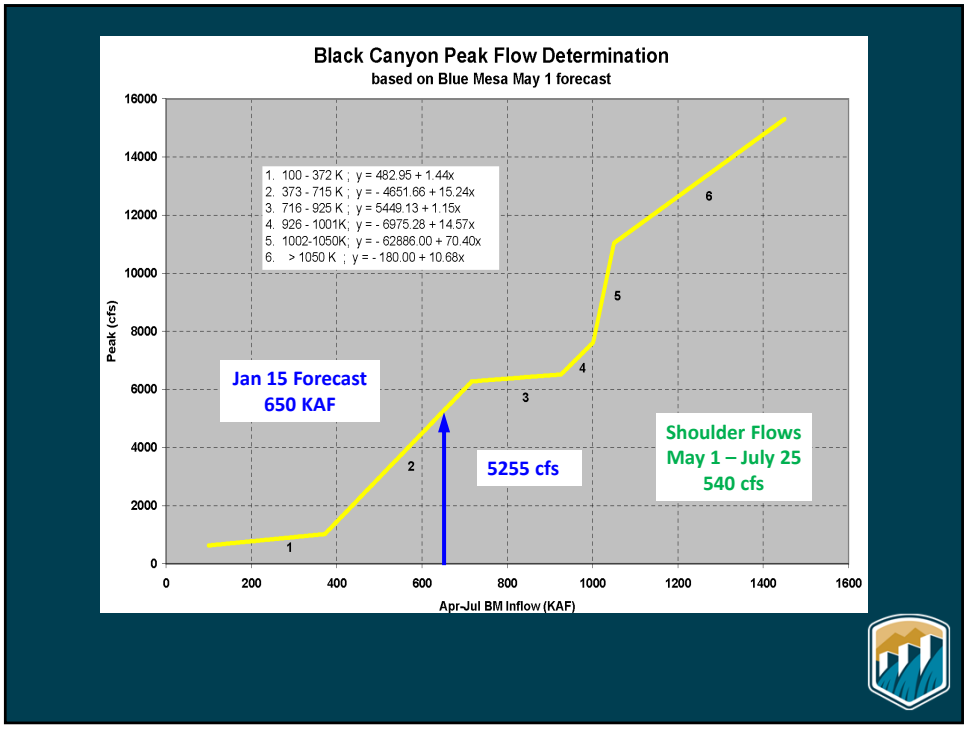
Spring Peak & Duration Targets Based on Hydrologic Year Type

	Year Type	Blue Mesa Forecasted April-July Inflow Af	Desired Peak at Whitewater cfs	Duration of Half Bank (8,070 cfs) Days	Duration of Peak Flow (up to 14,350 cfs) Days
	DRY	< 381,000	900	0	0
Min Prob 480,000	MOD DRY	381,000 to 516,000	2,600 to 8,070	0	0
Most Prob 650,000	AVG DRY	516,001 to 709,000	8,070	10	0
	AVG WET	709,001 to 831,000	8,070 to 14,350	20	2
Max Prob 1,030,000	MOD WET	831,001 to 1,123,000	14,350	40	10
	WET	>1,123,000	14,350	60	15

50


Peak Flow and Duration Day Targets at Whitewater
Peak Q (cfs)
Forecast BM Apr-Jul Inflow (thousand af)
DRY
MOD DRY
AVG DRY
AVG WET
MOD WET
WET
8070 cfs
Apr-July Forecast (1000 AF)
Half bank Duration (days @ 8,070 cfs)
Peak Flow Duration (days @ up to 14,350 cfs)
<381 0 0
381-516 0 0
516-709 10 0
709-831 20 2
831-1123 40 10
>1123 60 15

51


Black Canyon Peak Flow Determination
based on Blue Mesa May 1 forecast
Peak (cfs)
Apr-Jul BM Inflow (KAF)
1. 100 - 372 K ; y = 482.95 + 1.44x
2. 373 - 715 K ; y = - 4651.66 + 15.24x
3. 716 - 925 K ; y = 5449.13 + 1.15x
4. 926 - 1001K; y = - 6975.28 + 14.57x
5. 1002-1050K; y = - 62886.00 + 70.40x
6. > 1050 K ; y = - 180.00 + 10.68x
Jan 15 Forecast 650 KAF
5255 cfs
Shoulder Flows May 1 – July 25 540 cfs

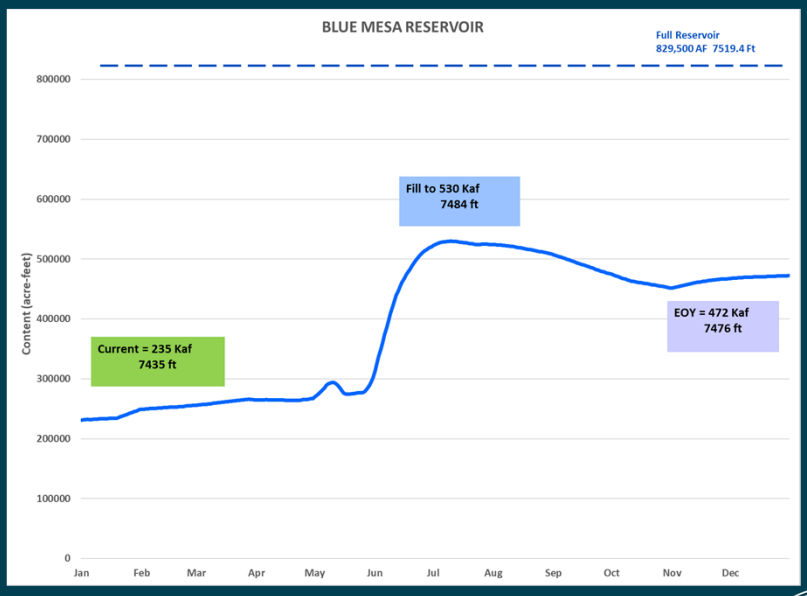
52

Baseflow Targets

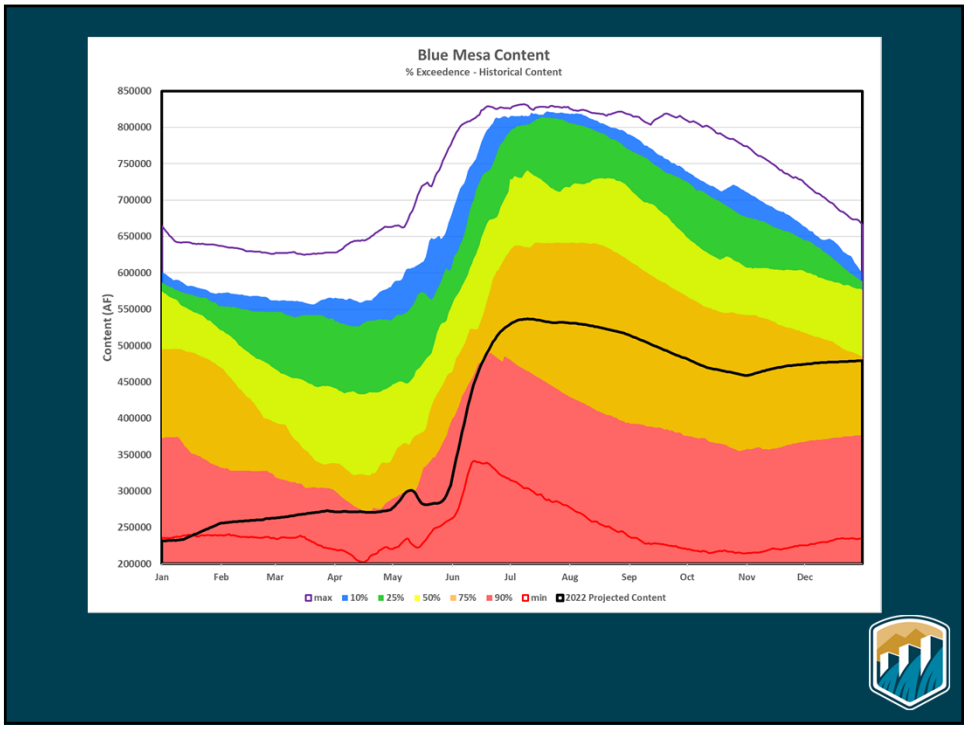
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet	1050	1050	1050	1050	1050	1500	1500	1500	1050	1050	1050	1050
Mod Wet	1050	1050	1050	1050	1050	1500	1500	1500	1050	1050	1050	1050
Avg Wet	1050	1050	1050	1050	1050	1500	1500	1050	1050	1050	1050	1050
Avg Dry	1050	1050	1050	1050	1050	1500	1500	1050	1050	1050	1050	1050
Mod Dry*	750	750	750/790	750/890	750/890	1050	1050	1050	750/890	750/790	750/790	750
Dry*	750	750	750/790	750/890	750/890	1050	1050	750/890	750/890	750/790	750/790	750

*During March through November in Moderately Dry and Dry type years, additional releases will be made as necessary to provide flows above the 750 cfs anticipated to be diverted by the Redlands Water and Power Company, for the fish ladder and fish screen as shown.

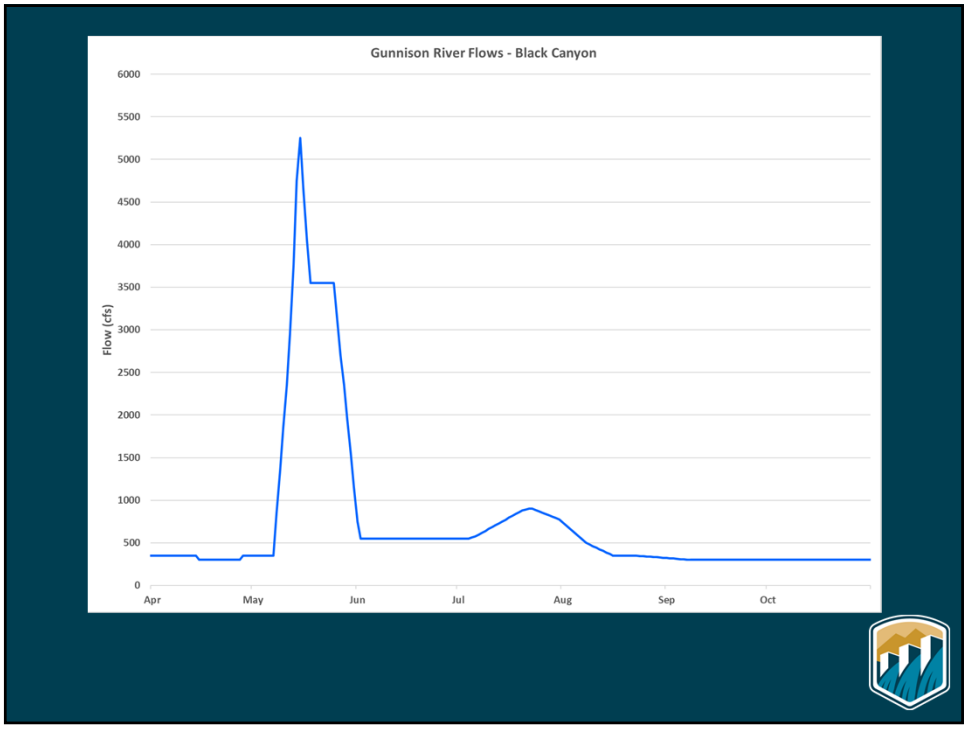
53



54


Blue Mesa Content
% Exceedence - Historical Content
Content (AF)
850000
800000
750000
700000
650000
600000
550000
500000
450000
400000
350000
300000
250000
200000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
max
10%
25%
50%
75%
90%
min
2022 Projected Content

55


Gunnison River Flows - Black Canyon
Flow (cfs)
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Apr
May
Jun
Jul
Aug
Sep
Oct

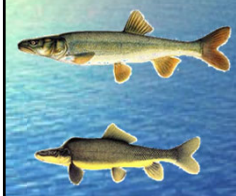
56

Questions…??

57

58

Upper Colorado River Endangered Fish Recovery Program



Dale Ryden
U.S. Fish & Wildlife Service
Grand Junction, CO

The Recovery Program was established in 1988 to address conflicts between the Endangered Species Act and water development

59

Recovery Program Partners

State of Colorado
State of Wyoming
Colorado River Energy Distributors Association
National Park Service
U.S. Fish and Wildlife Service
Western Area Power Administration
Wyoming Water Association

State of Utah
Bureau of Reclamation
Colorado Water Congress
The Nature Conservancy
Utah Water Users Association
Western Resource Advocates

60

Goal: Recover the endangered fish as water development proceeds in compliance with the Endangered Species Act and all applicable water laws, compacts, and agreements.

61

Flow Recommendations, Endangered Fish and Federally-Owned/Operated Dams

Numerous rivers in the upper Colorado River basin that have federally owned/operated dams on them also have flow recommendations and/or Programmatic Biological Opinions that allow for instream flows to be used to benefit endangered Colorado River fish species.

Green River: Flaming Gorge Reservoir
White River: Kenney Reservoir

Colorado River: Several upstream reservoirs (e.g., Green Mountain, Wolford, Rudei)
Gunnison River: Aspinall Unit dams

San Juan River: Navajo Reservoir

The implementation of these flow recommendations to benefit endangered fish species, along with other work performed by the Upper Colorado River Endangered Fish Recovery Program provides Endangered Species Act compliance for continued operation of federal water and power projects in accordance with project purposes.

Covers approximately 2,500 water projects in the upper Colorado River basin

62

Studies & Documents Used To Develop Aspinall Unit Reoperation Flows

1991. McAda and Kaeding. Physical changes in the Gunnison and Colorado rivers resulting from construction of the Aspinall Unit and related projects, with hypothesis to assess the effects on the endangered fishes (68 pages)

1999. Pitlick et al. Geomorphology and hydrology of the Colorado and Gunnison rivers and implications for habitats used by endangered fishes (66 pages)

2003. McAda, C.W. Flow Recommendations to benefit endangered fishes in the Colorado and Gunnison Rivers (237 pages)

2008: BoR. Programmatic Biological Assessment: Operations of the Wayne N. Aspinall Unit (178 pages)

2009: USFWS. Final Gunnison River Basin Programmatic Biological Opinion (123 pages)

2011: Aspinall Unit Study Plan ad hoc Committee. Study Plan To Evaluate Effects of Aspinall Unit Operations to Benefit Habitat and Recovery of Endangered Fishes in the Gunnison and Colorado Rivers (85 pages)

2012: Federal Register notices. February 27 (by BoR) and March 9 (by EPA), 2012 (2 pages each)

2012: Record of Decision for the Aspinall Unit Operations Final Environmental Impact Statement. April (12 pages)

63

Flow Recommendations (McAda 2003) Attempt To Provide Flexibility For Flow Recommendations

4.3.1 Spring Peaks (Page 4-18)
Specific flow recommendations were developed for six hydrologic categories based on that year's annual hydrology. These flows correspond to the Pitlick et al. (1999) recommendations for channel maintenance.

4.4.2 Base Flows (Page 4-27)
Base-flow recommendations are presented for different time periods depending on the annual hydrological category. The base-flow period begins after spring runoff is completed and continues through initiation of spring runoff the following
year, depending on inflow to the upper Colorado River subbasin (= a far longer period than the peak flow period).

4.5.2 Physical Uncertainties (Page 4-30)
Finally, it is uncertain if mimicry of a natural hydrograph will restore riverine habitats sufficiently to recover the four endangered fishes. The flow regime has changed substantially over the last century, and recommendations for level and duration of spring peaks are considerably less than occurred historically. In other words even if we had the water to make the recommended peak flows (which we haven't really had), it won't be the same as pre-dam peak flows!

Table A-2 (Page A-3)
List of 10 primary hypotheses addressed in the Aspinall Unit Investigations (McAda and Kaeding 1991a).

64

Record Of Decision (ROD)

The proposed action modifies reservoir operations that will result in higher and more natural downstream spring flows and moderate base flows.

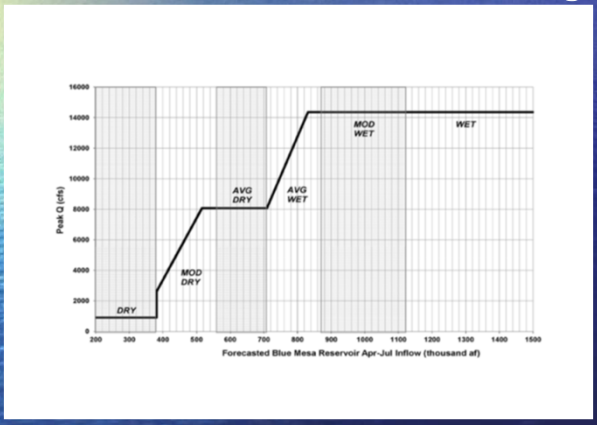
The modified operation is based on Flow Recommendations prepared by the Upper Colorado River Endangered Fish Recovery Program.

The purpose of the action is to operate the Aspinall Unit to avoid jeopardy to endangered species while maintaining and continuing to meet the congressionally authorized purposes.

The decision shall be implemented beginning with 2012 reservoir operations.

65

Record of Decision (ROD) Alternative B: Page 5



Both the Record of Decision (2012) and the Programmatic Biological Opinion (2009) have very good, detailed explanations of the hydrologic flow categories and the flows recommended for each category, based on annual hydrology for peak and base flows.

66

Things To Keep In Mind As You View The Following Presentations

The Recovery Program and the documents that guide reoperation flows from the Aspinall Unit dams are intended to promote recovery of endangered fish species in the Gunnison River basin, while still allowing for water use & development to continue. But, there has to be water available to achieve these goals.

From 2000-2015, the Colorado River Basin has experienced the driest 16-year period in over 100 years of historical natural flows (Bureau of Reclamation, 2015). This period also ranks as the fifth driest 16-year period in the last 1,200 years (Meko et al., 2007a and 2007b). The period from 2016-2021 was no better.
https://www.doi.gov/water/owdi.cr.drought/en/

Data from the fish community monitoring study should be viewed in light of this historic 20-year drought and the associated inability to deliver high spring flows (and/or elevated base flows) downstream to benefit endangered fish. In other words, little to no available water for fish flows equals little to no changes to downstream habitats or the downstream fish community.

The reoperation flows have allowed the Redlands Water and Power Fish Passage Facility to continue to operate from mid-April through mid-October of each year. This has been a great benefit, with record numbers of endangered Colorado pikeminnow using this fish passage facility in 2016 (n = 33), 2018 (n = 39), and 2020 (n = 32) to access the Gunnison River.

67

Year	Hydrologic Category		Peak Flow (cfs)	Peak Duration (days)	Half Bank Duration (days)	Baseflows % time met
2012	DRY	Target	900			95%
		Actual	1200			
2013	DRY	Target	900			83%
		Actual	3150			
2014	MOD WET	Target	14350	10	40	97%
		Actual	12500	0	24	
2015	MOD DRY	Target	4990			98%
		Actual	5300			
2016	AVG DRY	Target	8070		10	98%
		Actual	9900		10	
2017	MOD WET	Target	14040	10	40	100%
		Actual	15900	4	23	
2018	DRY	Target	900			93%
		Actual	2030			
2019	MOD WET	Target	14350	10	40	95%
		Actual	16500	6	23	
2020	MOD DRY	Target	3167			98%
		Actual	4515			
2021	DRY	Target	900			86%
		Actual	1900			

68

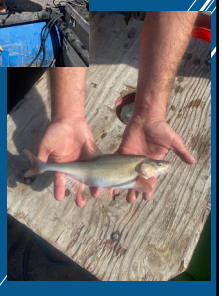
MONITORING THE FISH COMMUNITY IN RESPONSE TO REOPERATIONS OF THE ASPINALL UNIT RESERVOIRS

Darek Elverud
USFWS – Grand Junction Fish and Wildlife Conservation Office
January 20, 2022

69

BACKGROUND

- Flows provide - spawning cues, clean spawning substrate, habitat creation and maintenance, fish ladder operation
- Fish community monitoring began in 2011
  - Delta to Grand Junction
- Two electrofishing sampling passes per year
- Larval and young-of-year monitoring
- Fish community primarily natives species
  - Four endangered fishes
    - Bonytail, Colorado pikeminnow, humpback chub, razorback sucker
  - Bluehead sucker, flannelmouth sucker, and roundtail chub
    - State of Colorado sensitive species
    - Abundant in the Gunnison River vs. other rivers
  - Problematic nonnatives largely absent from the Gunnison River
    - Smallmouth bass, northern pike, walleye



70

COLORADO PIKEMINNOW

- Redlands Dam
  - Fish ladder installed in 1996
- Colorado pikeminnow existed until 1990s
- 260 Colorado pikeminnow moved upstream since 1996
- 8 Colorado pikeminnow captures
- In 2021, two Colorado pikeminnow moved upstream in 2020 were recaptured
  - These are the first two Colorado pikeminnow that have persisted upstream of Redlands Dam for more than 1 year

71

RAZORBACK SUCKER

Year	Number of Razorback Sucker Captures
2011	11
2012	25
2013	21
2014	18
2015	6
2016	27
2017	61
2018	177
2019	46
2020	76
2021	197

- Wild Produced razorback sucker existed until 1980s
  - Stocking began in late 1990s
  - Stocking occurs annually now
- Captures of razorback suckers are increasing in the Gunnison River
- All razorback suckers in the Gunnison River are likely the result of stocking efforts

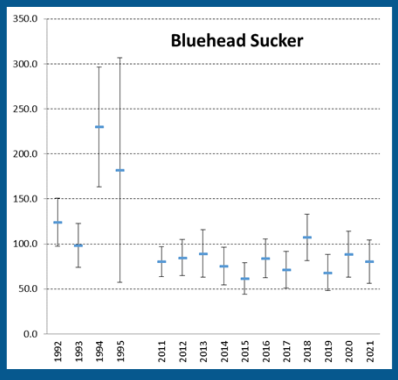
72

LARVAL AND YOUNG-OF-YEAR FISH RESULTS

- Razorbacks suckers
  - Sporadic captures of larval razorbacks when this project began
  - Now, larval razorbacks are captured each year
  - No young-of-year razorbacks have been captured in the Gunnison
- Colorado pikeminnow
  - No larval captures of larval Colorado pikeminnow
    - Timing of larval sampling extending in 2014
  - A single young-of-year captured in 2015
- Due to COVID-19 affecting laboratory operations, results are not yet available from 2020 and 2021

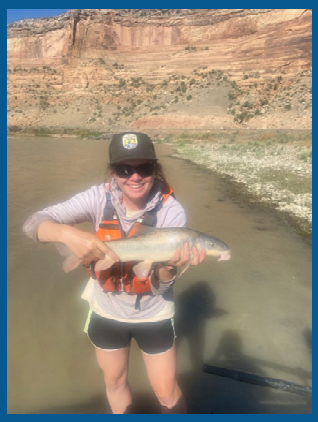
73

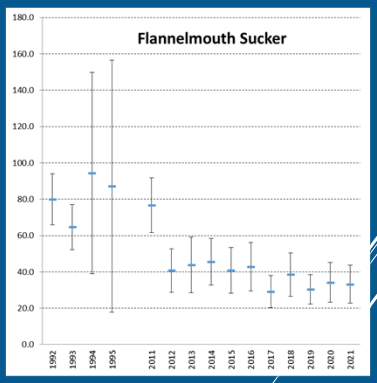
BLUEHEAD SUCKER



74

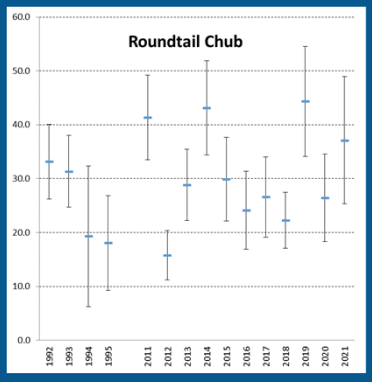
FLANNELMOUTH SUCKER





75

ROUNDTAIL CHUB



76

CONCLUSIONS

- Number of Colorado pikeminnow remains low
  - Most Colorado pikeminnow return to the Colorado River
  - Two captured in 2021 persisting since 2020
- Number of razorback suckers is increasing
  - Due to continued stocking
- Larval fish sampling data confirms razorbacks are successfully spawning in the Gunnison River
- Bluehead sucker, flannelmouth sucker and roundtail chub are steady and still abundant
- Persistent drought inhibiting our ability to assess the effects of flow recommendations on endangered fishes
- Stable populations of bluehead sucker, flannelmouth sucker and roundtail chub are evidence flows are providing a benefit

77

The Aspinall Unit is one of the four main units of the Upper Colorado River Storage Project (UCRSP). The other large dams in this project include Navajo Dam in New Mexico, Flaming Gorge Dam in Utah, and Glen Canyon Dam in Utah.

Blue Mesa Dam
Completed 1965
390 feet high

The three Aspinall Unit dams

Morrow Point Dam
Completed 1967
469 feet high
12 miles below
Blue Mesa Dam

Crystal Dam
Completed 1976
323 feet high
6 miles below
Morrow Point Dam

QUESTIONS?

78


Reports of Agencies and Organizations – All

79


Reclamation Contacts:
Ryan Christianson: 970-248-0652 rchristainson@usbr.gov
Erik Knight: 970-248-0629 eknight@usbr.gov

80