A Colorado Update for the Upper Missouri River Basin DEWS Stakeholder Forum

Peter Goble

August 28, 2019

COLORADO CLIMATE CENTER

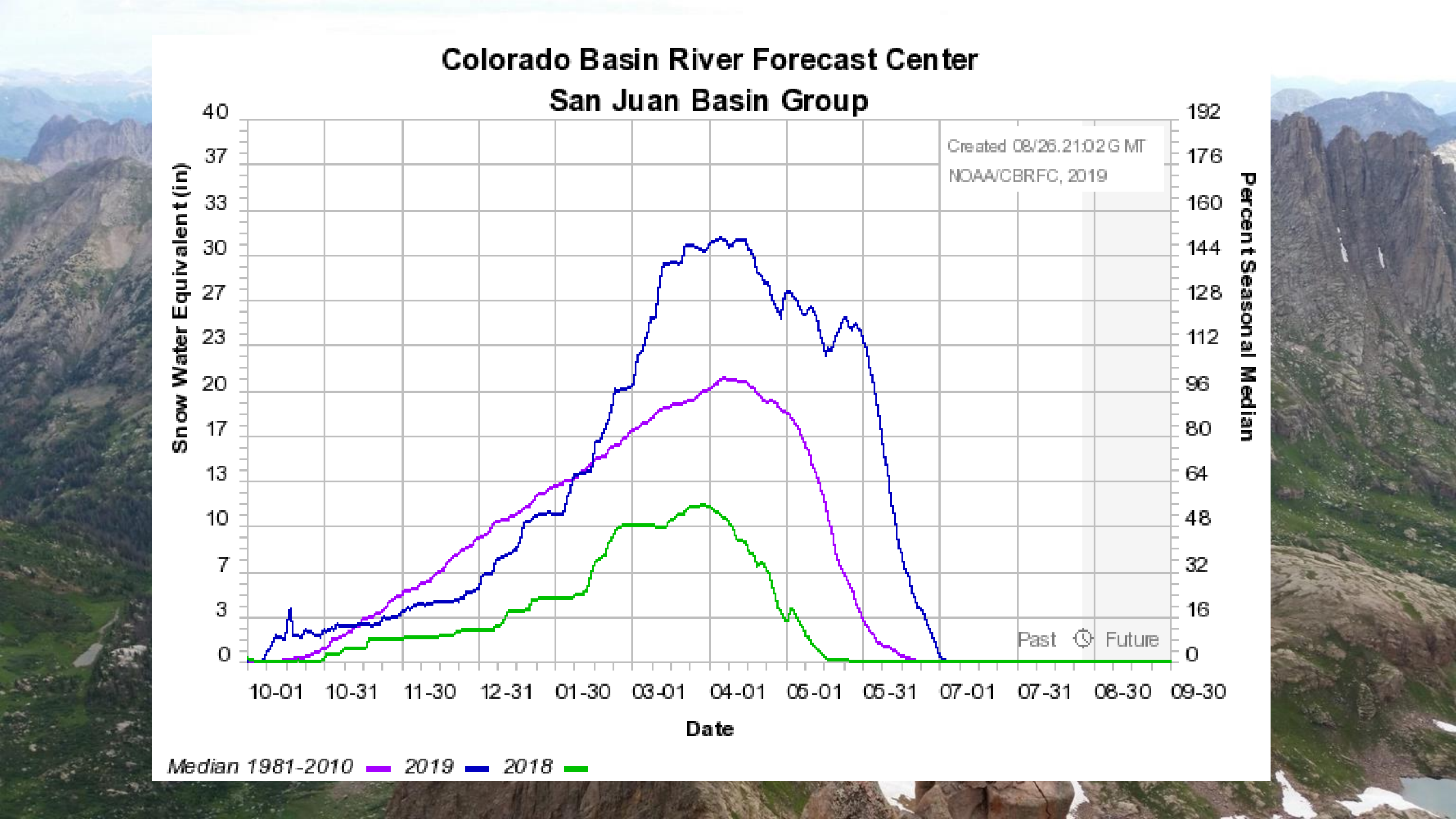
ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

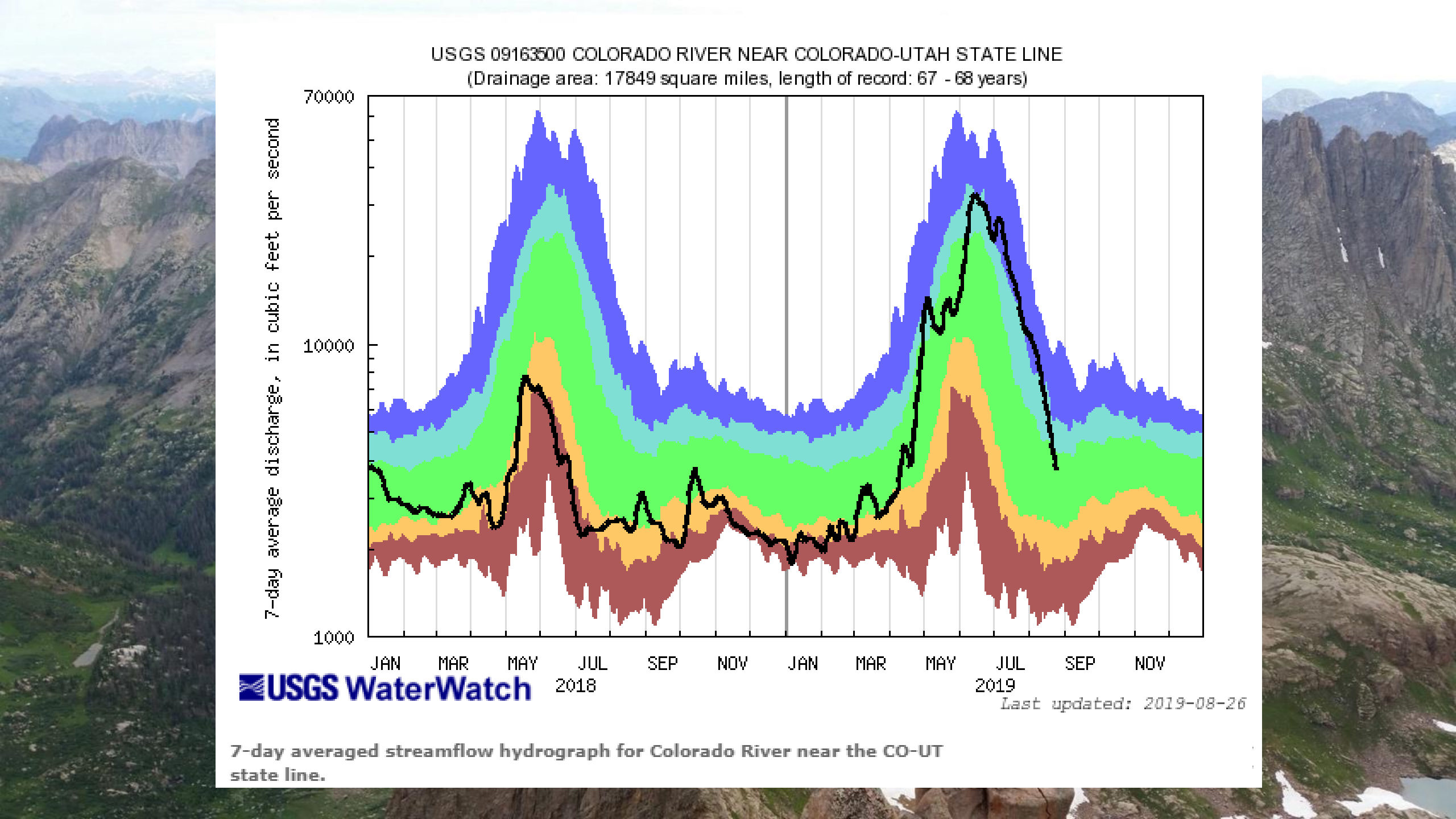
Topics of Discussion

- Operations
- Coordination
- Research

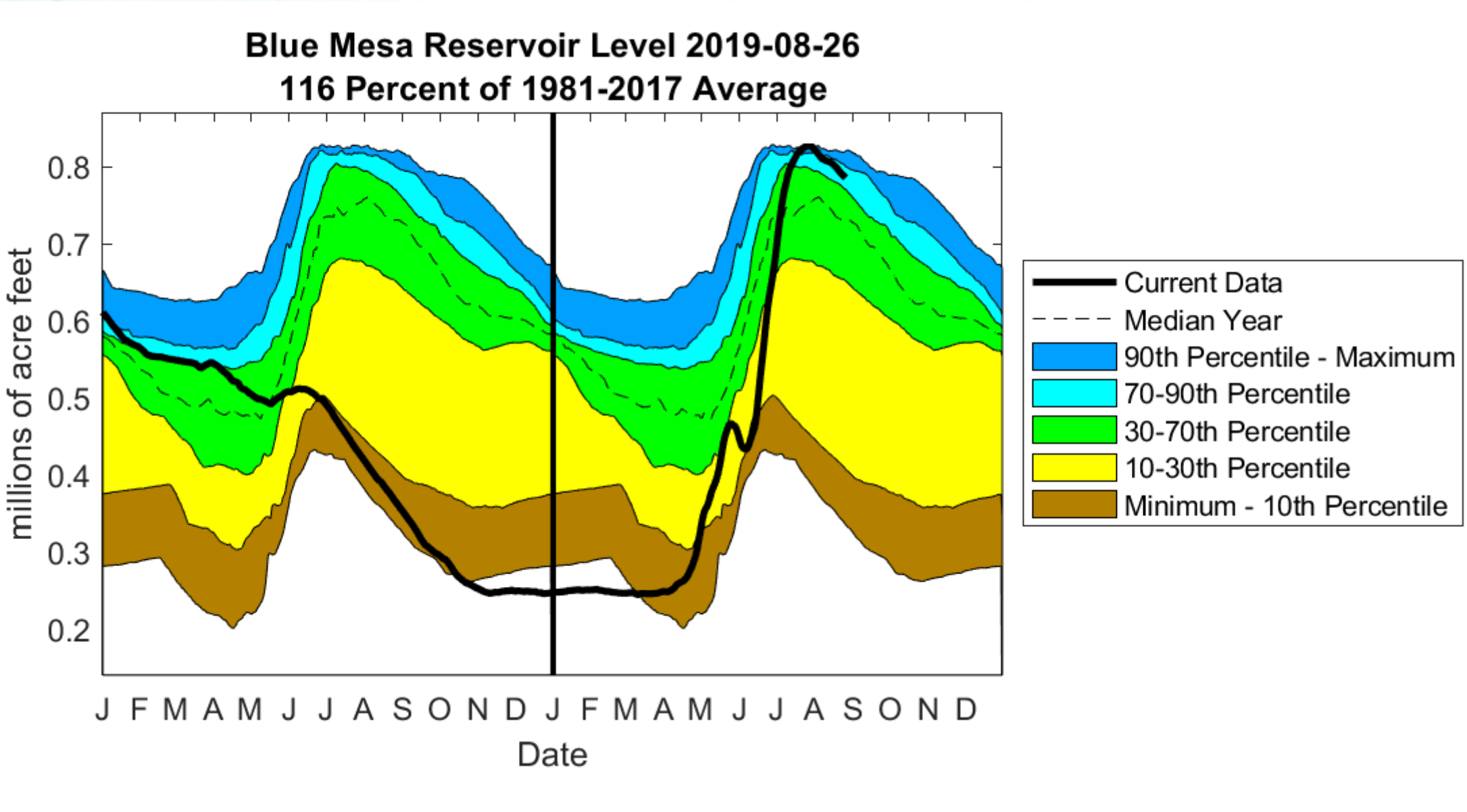
Operations

- Colorado has undergone precipitation whiplash over the last two years, going from one of the worst snowpack years on record to one of the best
- Following an event that was D4 in some areas of the state, Colorado's streams and reservoirs rebounded remarkably in 2019
- Things are moving the wrong direction again. We are on track for one of our hottest, driest Augusts on record with much thanks to climate change and a lackluster monsoon


Colorado Basin River Forecast Center
San Juan Basin Group
Snow Water Equivalent (in)
Percent Seasonal Median
Created 08/26.2102 G MT
NOAA/CBRFC, 2019
Past
Future
Date
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
Median 1981-2010
2019
2018



7-day averaged streamflow hydrograph for Colorado River near the CO-UT state line.

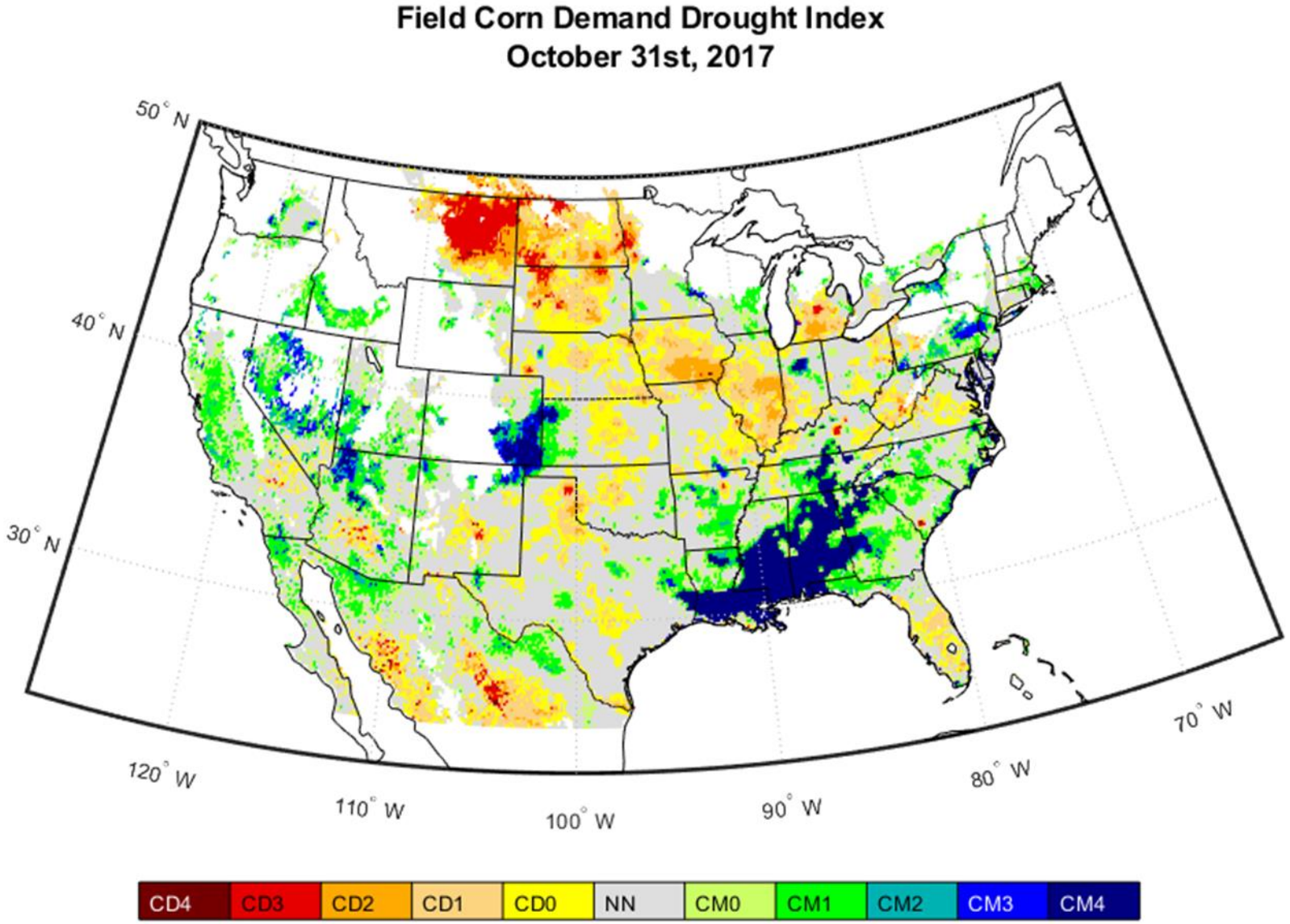

Blue Mesa Reservoir Level 2019-08-26
116 Percent of 1981-2017 Average
millions of acre feet
0.8
0.7
0.6
0.5
0.4
0.3
0.2
J F M A M J J A S O N D J F M A M J J A S O N D
Date
Current Data
Median Year
90th Percentile - Maximum
70-90th Percentile
30-70th Percentile
10-30th Percentile
Minimum - 10th Percentile

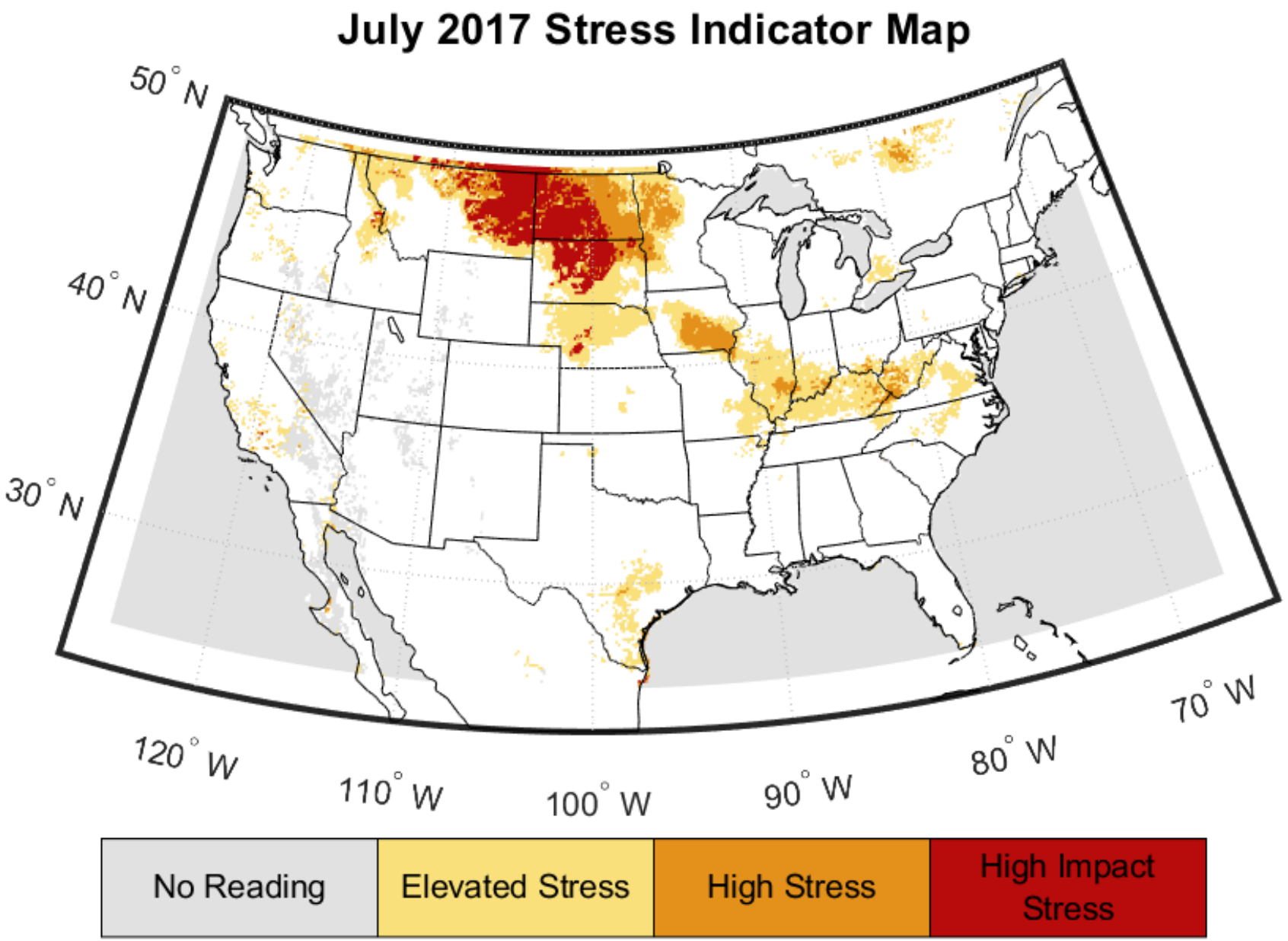
Coordination

- The Colorado Climate Center hosts regular drought update webinars for the Intermountain West NIDIS Region (Colorado, Wyoming, Utah, Arizona, and New Mexico
- We provide weekly recommendations to the US Drought Monitor for much of the Colorado, Wyoming, Utah area
- The Climate Center routinely meets/coordinates with CSU extension, and FSA personnel
- Recently, drought webinar participation has picked up in Utah, and we are benefitting from more tribal engagement with the Navajo in the Four Corners area
- We also have a presence on the Climate Prediction Center's Monthly Drought Outlook updates

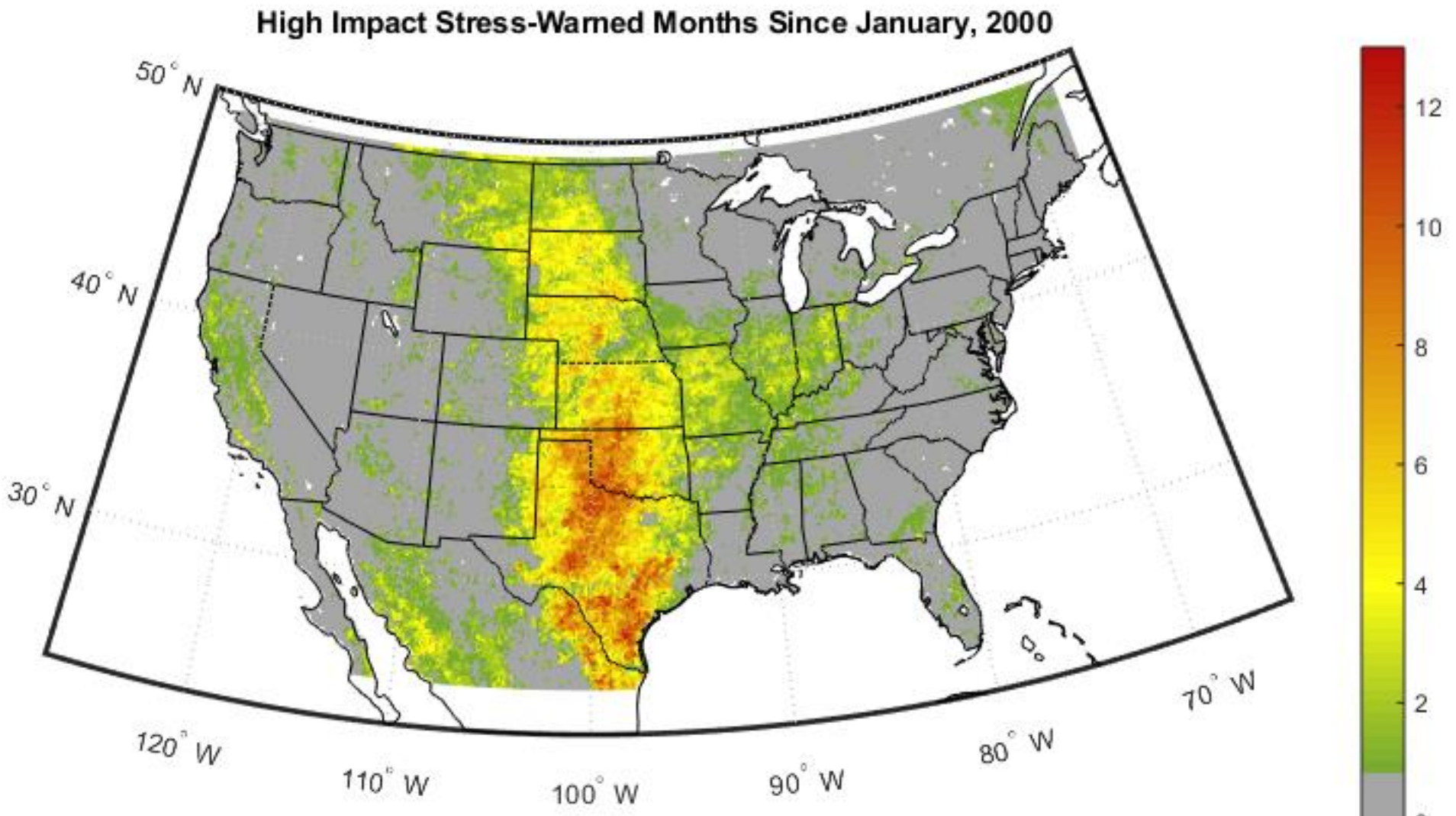
Research

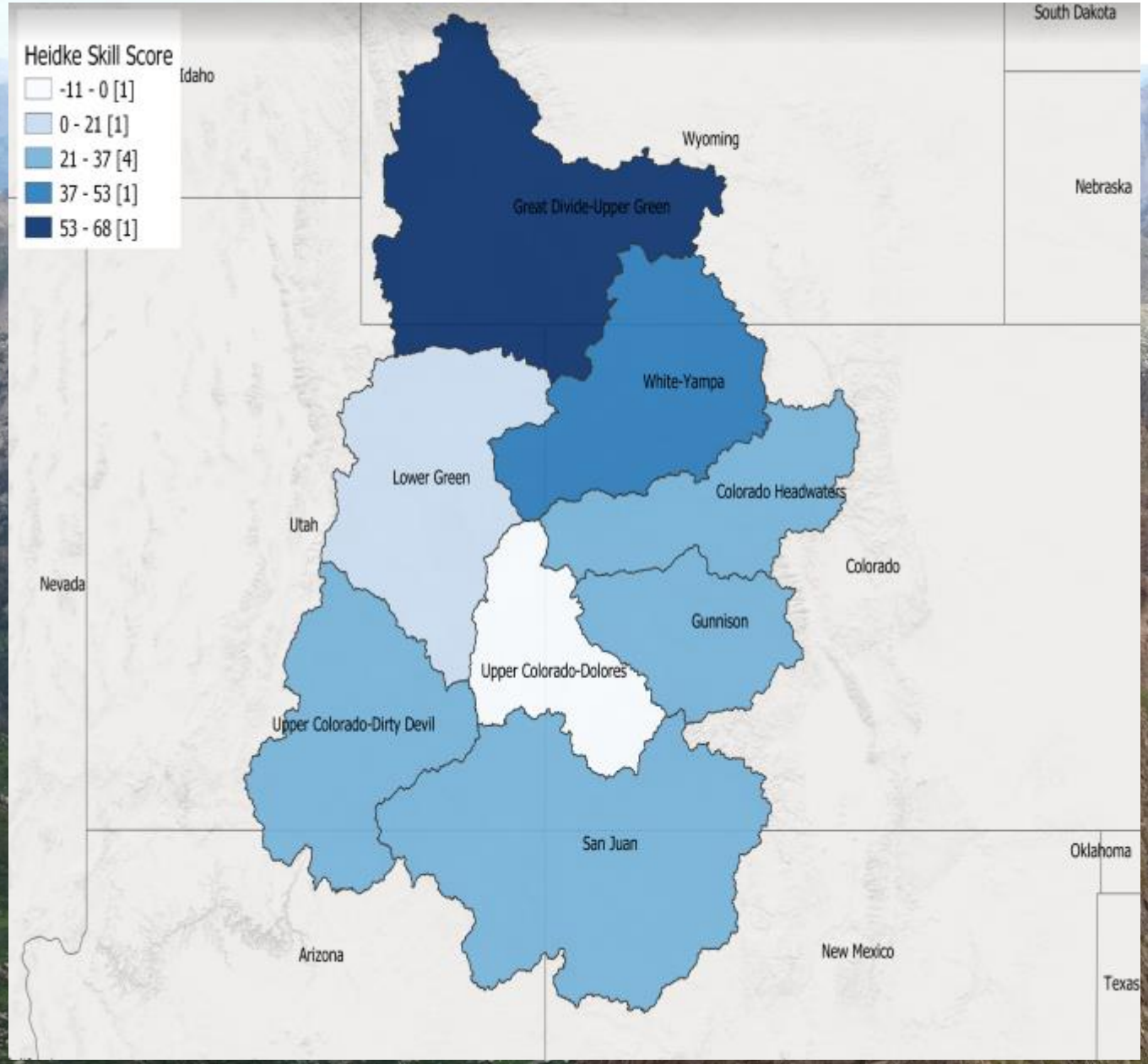
- New drought monitoring products are being developed at the CCC. We hope to operationalize them
- One product is designed to estimate and display irrigation demand/irrigation demand anomalies for several cash crops (ie corn and wheat)
- Another product is being used to identify transitional zones between water and energy-limited landscapes, and to identify high impact evaporative stress events
- We are using random forest algorithms to improve precipitation prediction in the Upper Colorado River Basin
- More on these products at the US Drought Monitor Forum next month


Field Corn Demand Drought Index
October 31st, 2017
50° N
40° N
30° N
120° W
110° W
100° W
90° W
80° W
70° W
CD4
CD3
CD2
CD1
CD0
NN
CM0
CM1
CM2
CM3
CM4



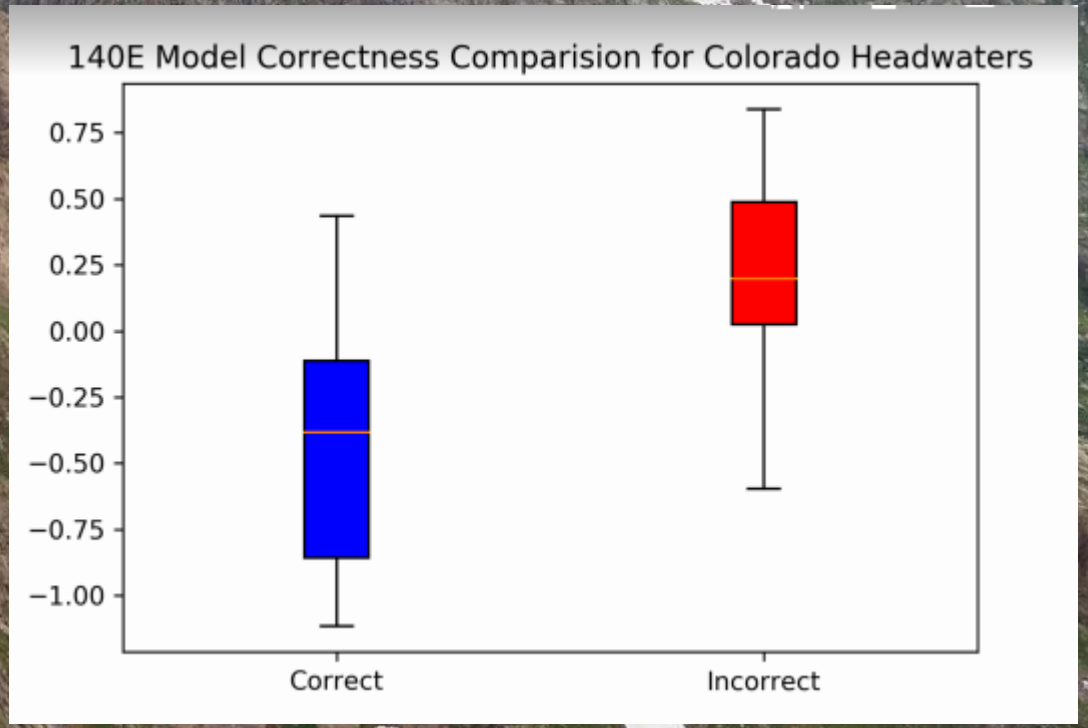
- This product (name TBD) is designed to pinpoint areas where Actual ET (from SSEBop) and Potential ET (from NARR) are more divergent than usual
- We did not feel it was appropriate to standardize this product by percentile, but such a version could be made
- High impact stress means AET was below normal by at least 1.5”, PET was above normal, and PET was at least 6”

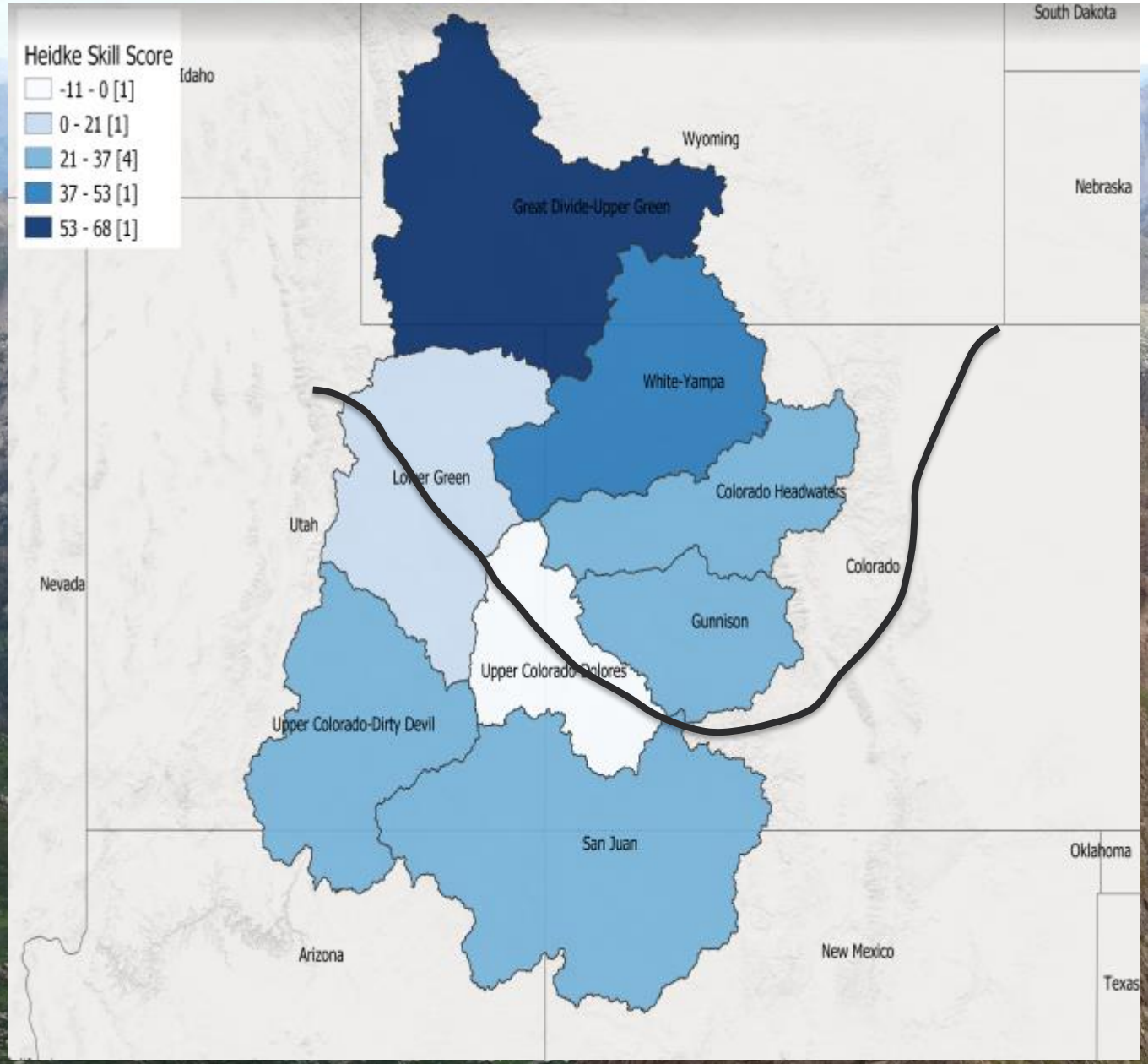

High Impact Stress-Warned Months Since January, 2000
50° N
40° N
30° N
120° W
110° W
100° W
90° W
80° W
70° W
0
2
4
6
8
10
12



Forecast skill improvements in the Upper Colorado River Basin Using Random Forests:

- Best skill away from ENSO Neutral Line
- Negative MJO leads to more skillful forecasts





Forecast skill improvements in the Upper Colorado River Basin Using Random Forests:

- Best skill away from ENSO Neutral Line
- Negative MJO leads to more skillful forecasts