



The Growing Importance of Stream Flow Forecasting





First-ever Colorado River water shortage is now almost certain, new projections show

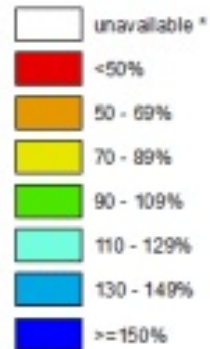
By Pedram Javaheri and Drew Kann, CNN
Thu May 27, 2021



Jan 05, 2018

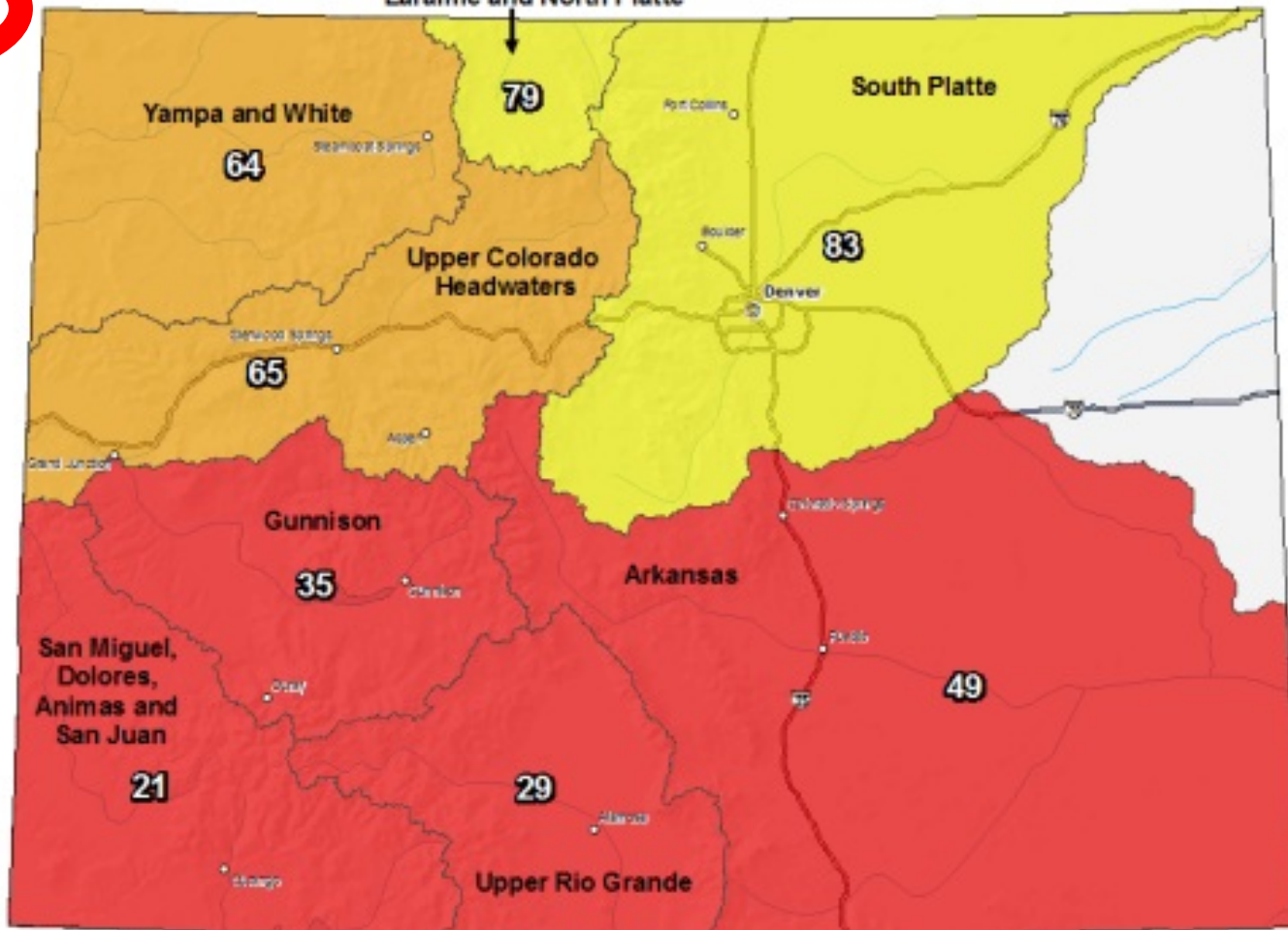
Colorado SNOTEL Current Snow Water Equivalent (SWE) % of Normal Laramie and North Platte

Current Snow Water Equivalent (SWE)
Basin-wide Percent
of 1981-2010 Median



* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional Data
Subject to Revision



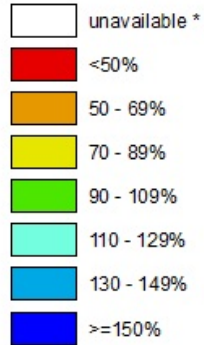
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>

Jun 08, 2021

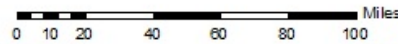
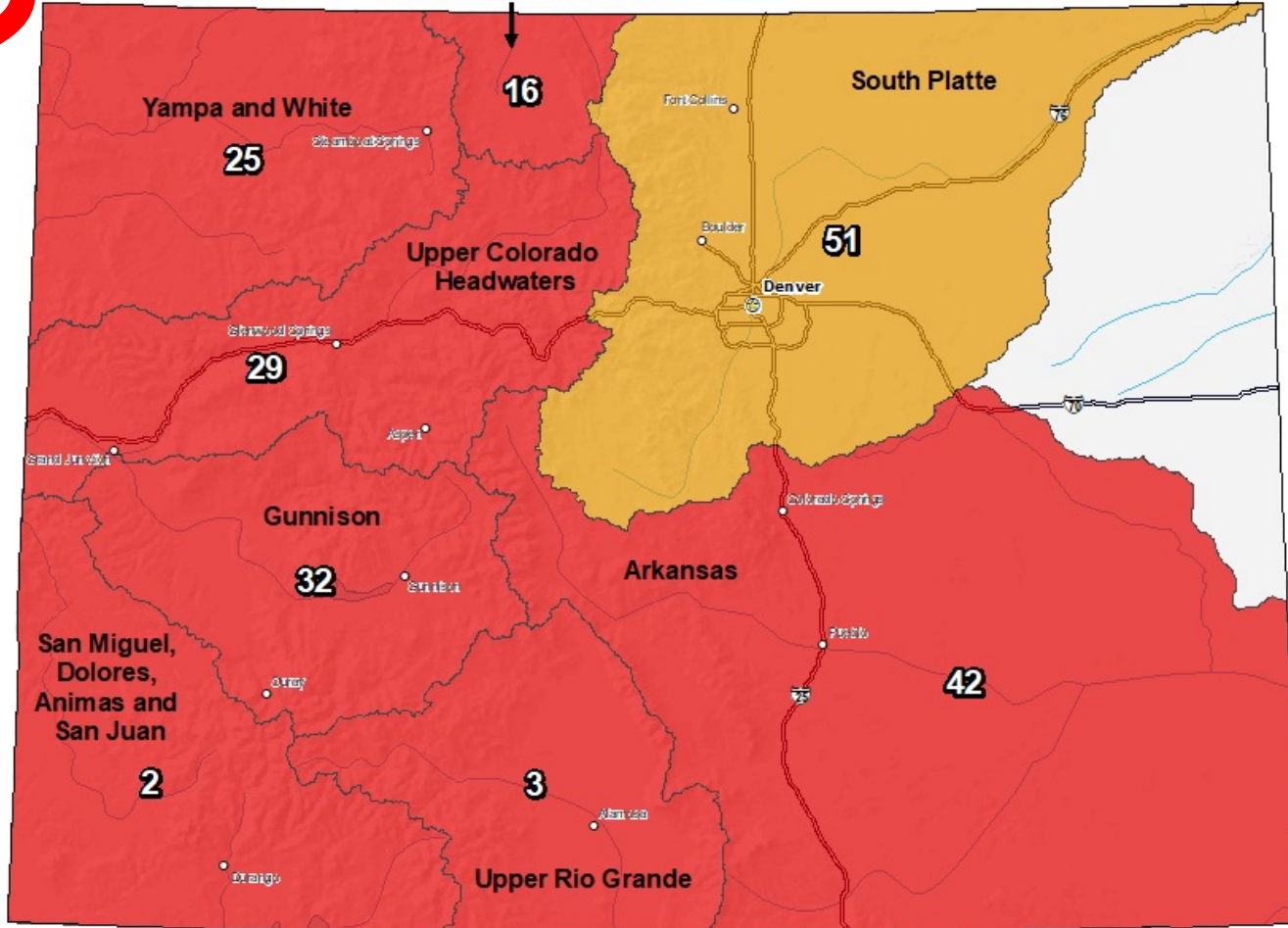
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Upper Rio Grande Basin Snowfall Measurement and Streamflow (RIO-SNO-FLOW) Forecasting Improvement Project



COLORADO
Division of Water Resources
Department of Natural Resources



COLORADO
Colorado Water Conservation Board
Department of Natural Resources



January 22, 2016

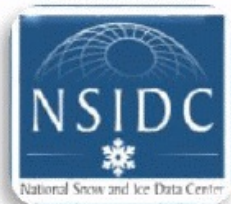
Prepared by:

David J. Gochis, National Center for Atmospheric Research

Joe Busto, Colorado Water Conservation Board

Kenneth Howard, NOAA National Severe Storms Laboratory

Jeff Deems, National Snow and Ice Data Center



January 22, 2016

The Graphic Below – the State of Colorado is outlined in White – Shows that Vast Majority of Western Colorado has Poor to No Radar Coverage

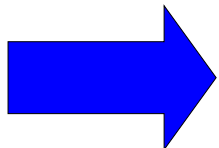
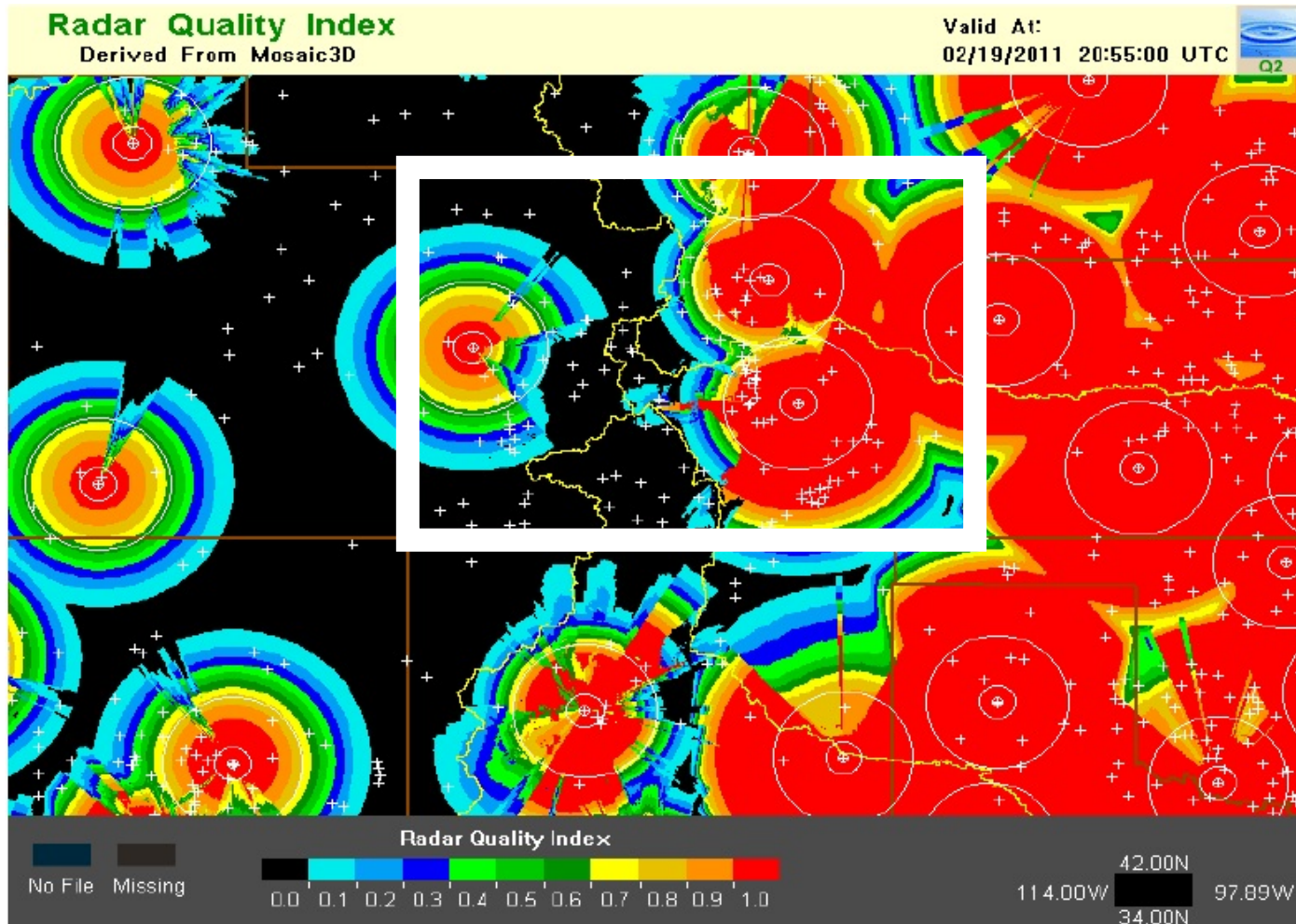
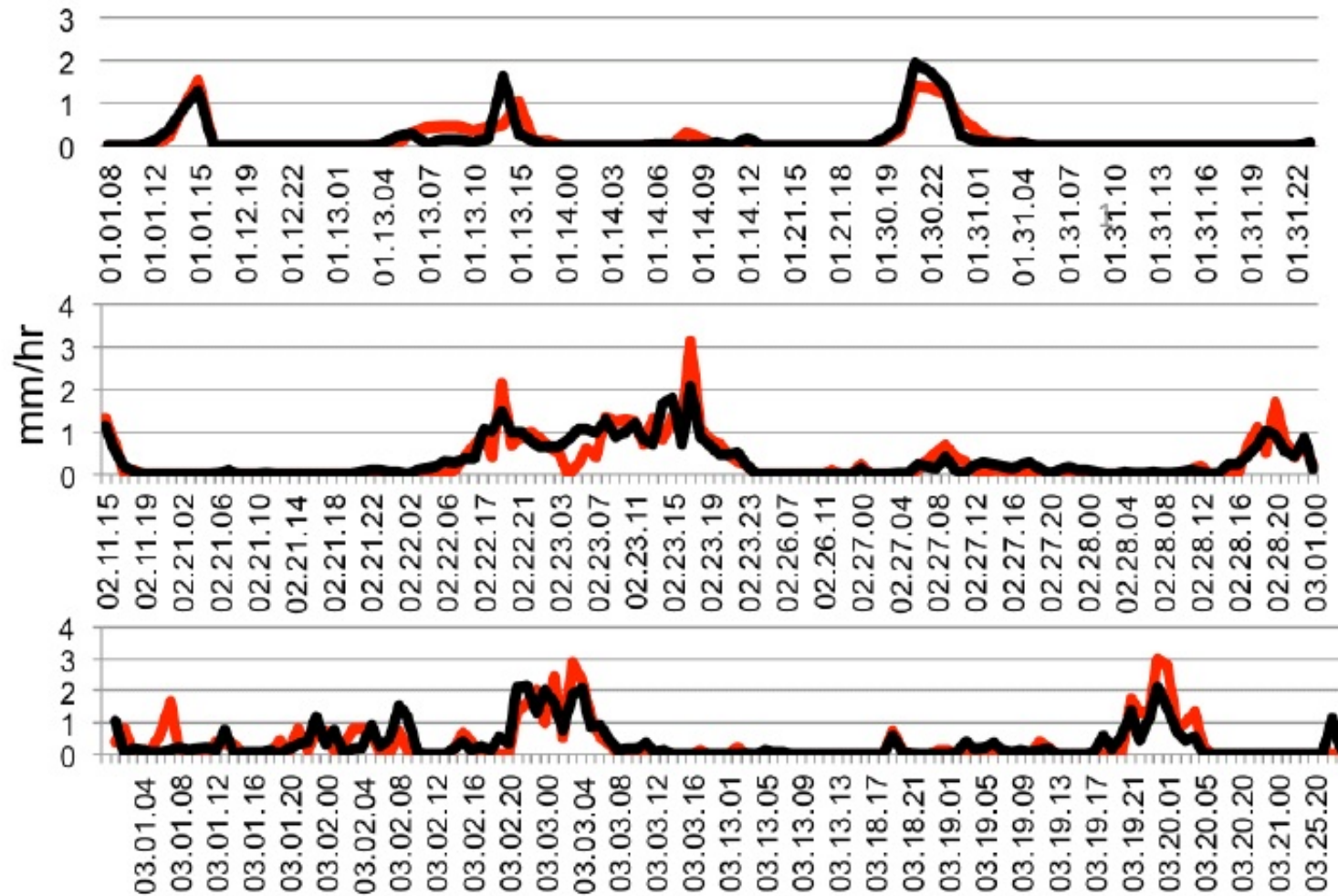


Figure 2. The RQI shows red as good radar coverage and black as no or poor radar coverage. 80% of Colorado's snowpack and water comes from the mountains that are poorly covered by existing NWS radars.

RIO-SNO-FLOW SUMMARY REPORT

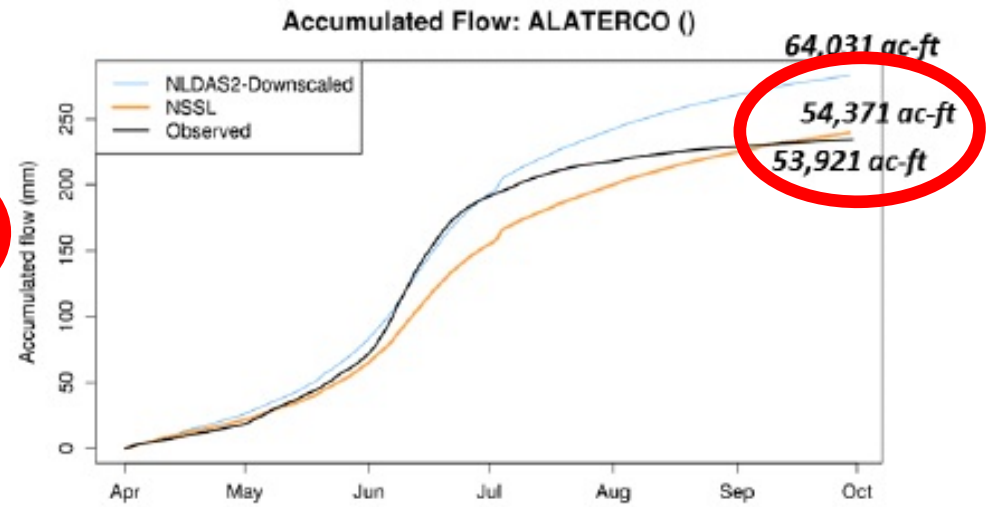
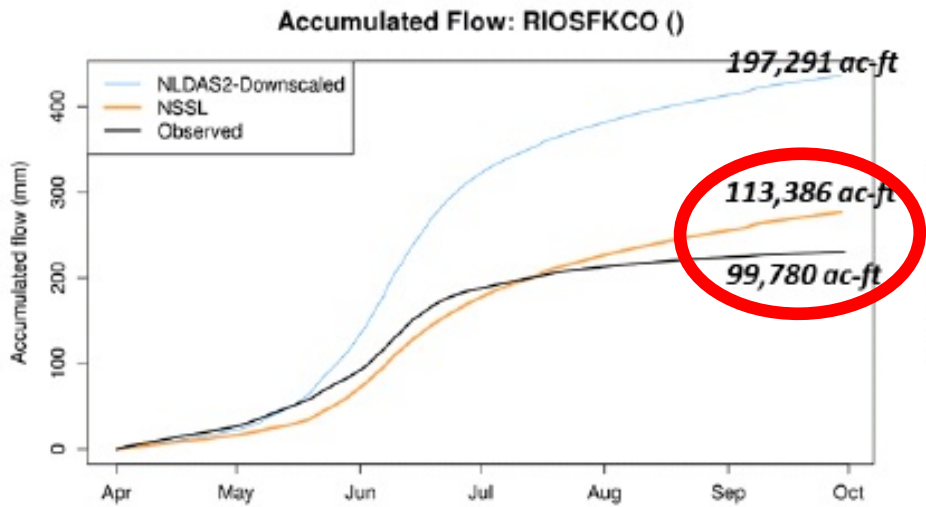
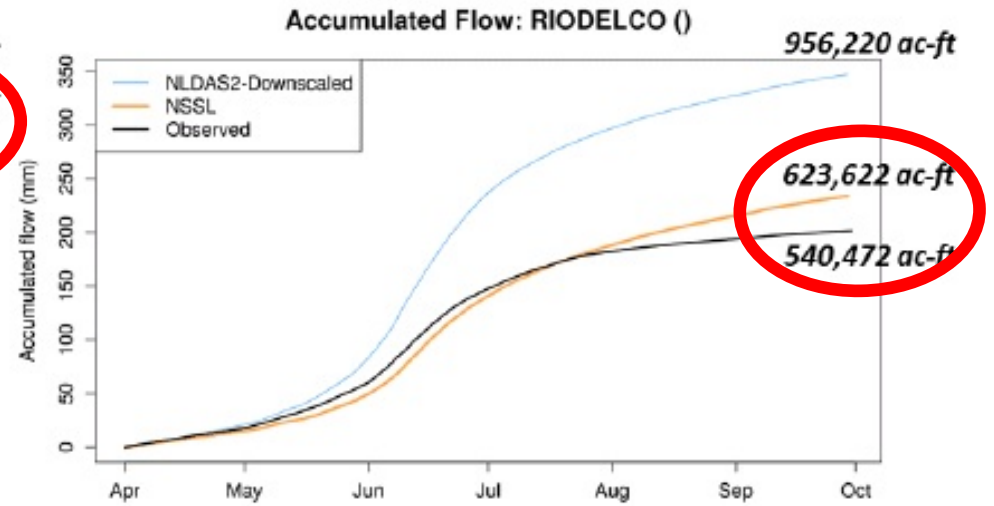
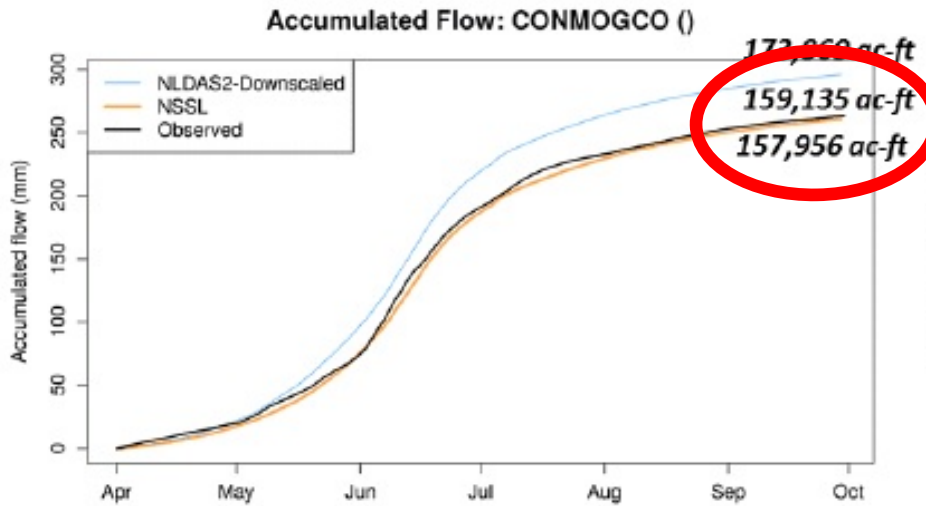
URG6 1hr accumulation vs. QPE 1h accumulation



Red – Actual from Gauge

Black – Predicted via Radar

RIO-SNO-FLOW SUMMARY REPORT



Black – Actual

Blue – Existing Models

Orange – WRF Hydro

7. Conclusions and Recommendations

As a team that worked on this from all levels from water users, water administrators, water planners, research and development agencies, forecasters, and consultants, the following are our recommendations:

- Accurate determination of snowfall liquid water, snowpack and associated runoff remains a significant challenge in the local, state and federal water communities and only through collaborations and sponsorships as fulfilled in the project would fundamental progress be realized.
- Gap-filling, watershed-based radars would provide great benefit to Colorado for land, water, and weather management. Local, state, and federal coalitions should be built to purchase and maintain permanent and mobile radars to provide a more complete depiction of precipitation for use in hydrologic models such as WRF-Hydro and for flash flood prediction.



OUR MISSION

**Furthering the Organizational Goals
of our Founding Member,
the [Colorado Wildlife Foundation](#),
by using innovation, Public Private Partnerships
and
non-traditional funding sources to address
unresolved legacy water and weather
related issues within
Colorado and the Western US.**



OUR APPROACH

**Western States Water Partnership
is designed to fill the
“Mission, Timing and Funding Gaps”
that exist within
local, county, state and federal agencies
and
that impede their ability to effectively address
legacy water issues
critical to Colorado and other Western States.**



OUR TECHNICAL PARTNER



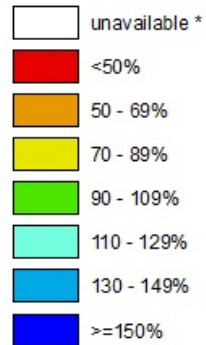
ARC was founded by the ~~ADVANCED RADAR COMPANY~~ Foundation
to commercialize a new generation of advanced weather radars
(hardware, software and customized products).
These systems are simple to maintain, calibrate and operate
while maintaining accuracy and reliability.

Colorado
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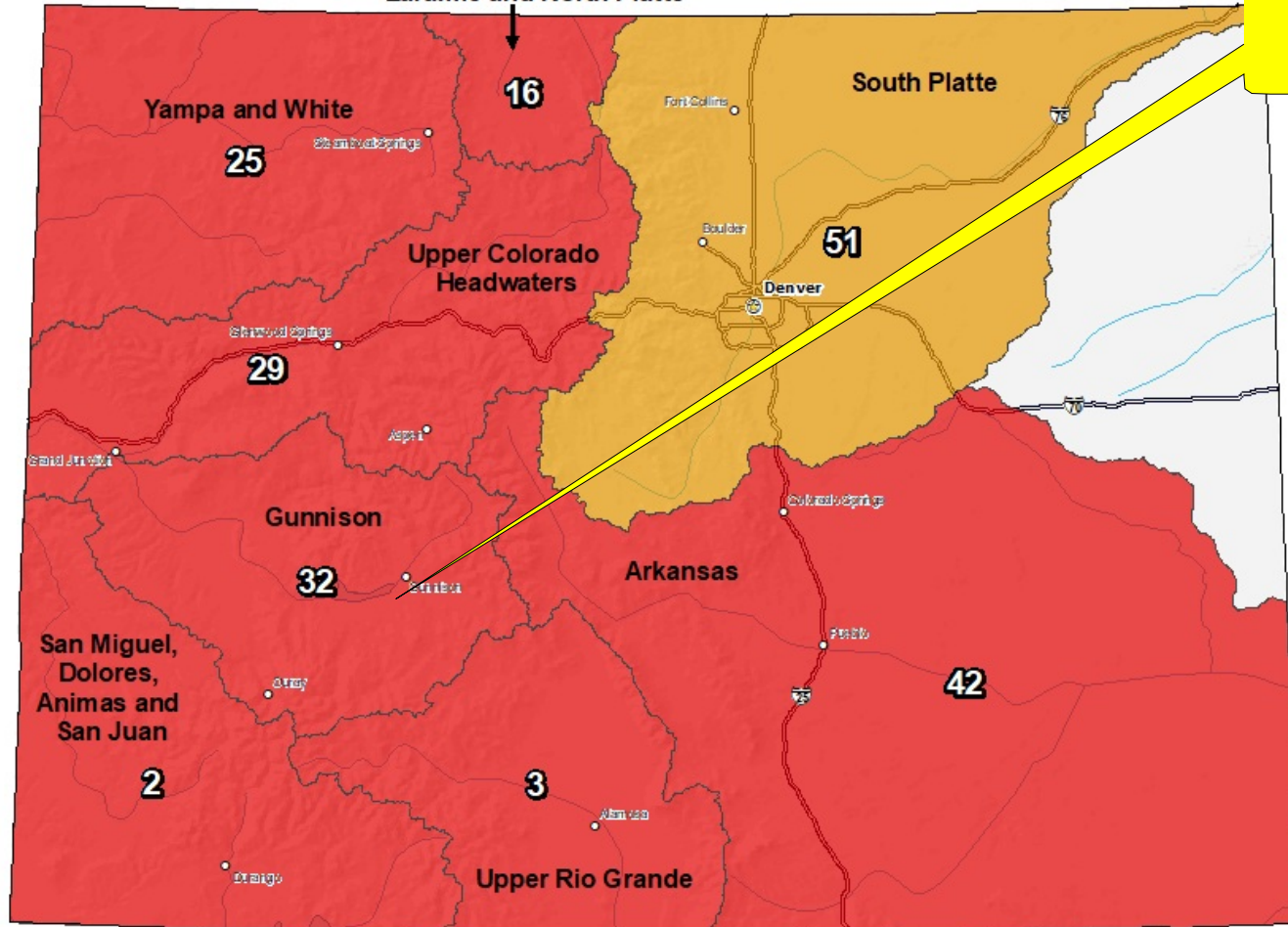
Gap Radar

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



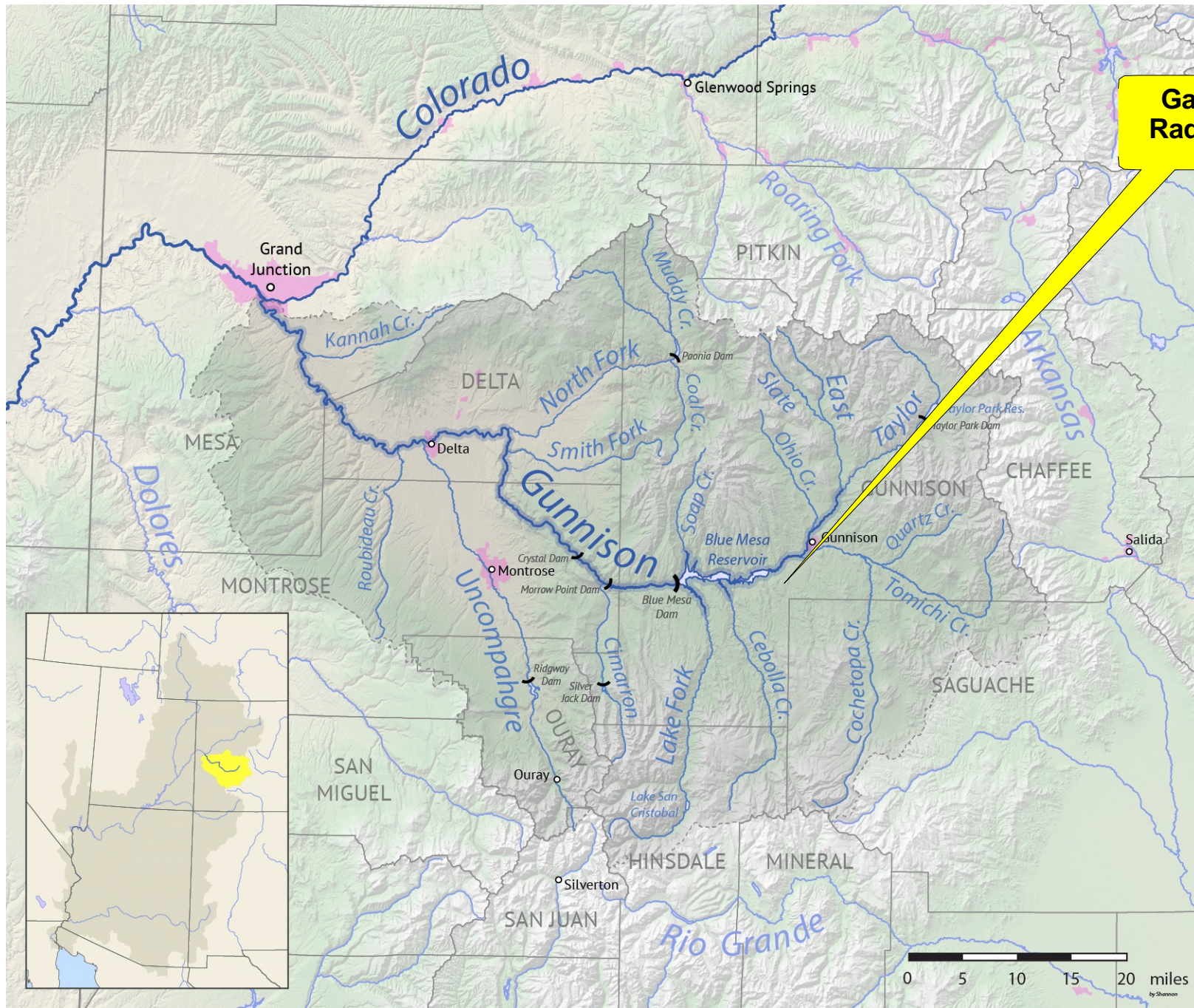
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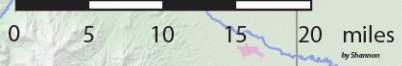
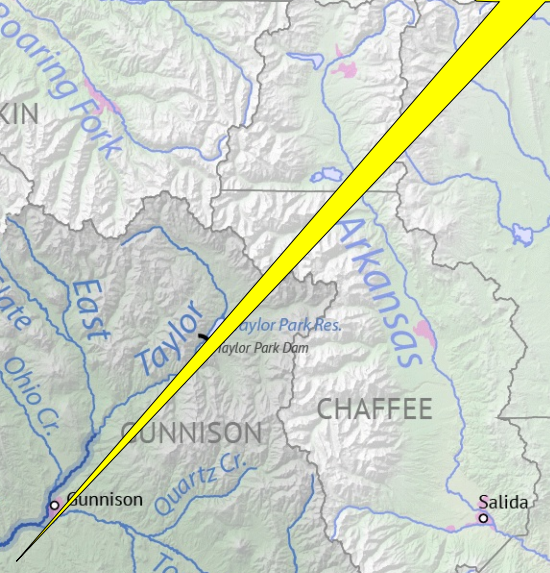


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Gap Radar



by Shannon



WE WORK IN PARTNERSHIPS

Upper Gunnison Water Conservation District

Colorado River Water Conservation District

Gunnison County

US DOE – Surface Atmosphere Integrated Field Laboratory (SAIL)

USGS – Next Generation Water Observing System (NGWOS)



WHAT OUR RADAR CAN DO

Radar Data Enhance by Advanced Forecasting Software Products

Streamflow Forecasting {Spring thru Fall}

Forecasting Roadway Weather – From Rain to Freezing Drizzle to Snow

Forecasting Severe Weather Events – 30 to 60 minutes in advance

Flash Flood Forecasting

Precipitation (Rain / Snow) Accumulation daily / monthly

Windshear Detection and Warning at Regional Airport

Providing hyper-local wind speeds & directions to assist local fire fighting efforts



THE BOTTOM LINE



NCAR

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Better Data + Better Forecasting Tools = Better Asset Management