WY Conditions & Outlooks:
Precipitation, Temperatures, Drought, Floods, & Everything In-between

September 15, 2022
Presentation Outline

● **Current Conditions:** Overview
  ○ Streamflow
  ○ Water Calls & Allocations
  ○ Harmful Cyanobacterial Blooms

● **Outlooks:** Temperature & Precipitation
  ○ Fuels’ Status & Wildland Fire Outlook

● **Questions**
Current Conditions
Improvements and degradations since the last webinar. Recent precipitation in the north has resulted in Improvements in a large area of north central Wyoming. Degradation in Hot Springs County as well as in the northeast prior to last week’s precipitation,
14-Day Precipitation Percentile (01 Sep 2022 to 14 Sep 2022)

Above Median:
- Northeast
- North Central
- Parts Natrona/Converse Counties

Below Median (Areas of Concern):
- Southeast & West of the Divide

First Snows

Daily precipitation data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 15 Sep 2022 http://www.wrds.uwyo.edu
Daily percentiles created from PRISM daily precipitation grids
90-Day Precipitation Percentile (17 Jun 2022 to 14 Sep 2022)

Above Median:
- Scattered…
- North Central
- Parts of Northeast
- Central
- Far Southeast

Below Median (Areas of Concern):
- Goshen
- Park
- Lincoln/Sweetwater

Daily precipitation data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 15 Sep 2022 http://www.wrds.uwyo.edu
Daily percentiles created from PRISM daily precipitation grids
**Standardized Precipitation Evapotranspiration Index (SPEI)**

**Short term:** Emerging concerns in the west and south, as well as Goshen County area. Bighorns wetter.

**Long term:** Dryness in southeast and northern Johnson County.

https://drought.climate.umt.edu
14-Day Average Minimum Temperature (01 Sep to 14 Sep)

- Night time lows dropping below freezing in places.

14-Day Average Minimum Temperature (Departure from 1991-2020 Average) for 01 Sep 2022 to 14 Sep 2022

Temperature Departure from Normal (F)
- < -15
- -15 to -12
- -12 to -9
- -9 to -6
- -6 to -3
- -3 to 0
- 0 to 3
- 3 to 6
- 6 to 9
- 9 to 12
- 12 to 15
- > 15

14-Day Departure from Normal Average Minimum Temperature

- Generally 3F-6F above average
- Some scattered areas up to 3F below average
14-Day Average Maximum Temperature (01 Sep to 14 Sep)

- >60F Statewide
- 85F+ East of Divide and Southeast

14-Day Departure from Normal

- West 9F to 12F above average
- Rest of WY 6F to 9F above average
- …Except southern Laramie County & a few small pockets at 3F to 6F above average
Soil Moisture Percentile

Two Weeks Ago

September 14, 2022

Conditions worsened except Powder/Tongue Basin

http://www.wrds.uwy.edu/Soil/Current_SoilMoisture_Ptile.html
Wyoming Area Affected: 90.14% D0-D4 ; 53.81% D1-D4

http://www.wrds.uwyo.edu/drought/droughttimeline.html
Percentage of Wyoming in each Drought Category by Week
01 Jan 2020 to 13 Sep 2022

http://www.wrds.uwyo.edu/drought/droughttimeline.html
La Niña Threepeat this winter?

A cooling of the waters in the equatorial Pacific

Opposite of El Niño, a warming of the same region.

El Niño was recognized by fishermen of the area around Peru for centuries. La Niña was “discovered” in the 1980s, though has been occurring for millennia.

Winter La Niña conditions have only happened three years in a row twice since 1950:

- 1973-74 to 1975-76
- 1998-99 to 2000-01

Climate Prediction Center considers La Niña conditions to exist when the average Sea Surface Temperature in the 3.4 area is 0.5°C or more below average. Those conditions must be forecasted to persist for 3 consecutive months.
Eastern Equatorial Pacific

Strong Trade Winds

Sea Surface

Warmer surface water pushed westward

Deep colder water upwells to surface
High Pressure pushing jet stream north - wet/dry/cold conditions
“It's tough to make predictions, especially about La Niña.”

–Yogi Berra (Sort of)
Boundary zone between influences is variable and shifts.
December to February Total Precipitation Compared to 1921-2020 Average

Strong

Moderate

Weak
December to February Average Temperature Compared to 1921-2020 Average

Strong

Moderate

Weak
January to March Average Temperature Compared to 1921-2020 Average

Strong

Moderate

Weak
“There are three kinds of lies. Lies, Damned Lies, and La Niña Statistics.”

–attributed to Mark Twain and Others (Sort of)
Percent of La Niña Years with **Nov-Jan Precipitation** Total Above 1921-2020 Average
Percent of La Niña Years with **Dec-Feb Precipitation** Total Above 1921-2020 Average
Percent of La Niña Years with **Jan-Mar Precipitation** Total Above 1921-2020 Average
Percent of La Niña Years with **Feb-Apr Precipitation** Total Above 1921-2020 Average
Percent of La Niña Years with **Nov-Jan Temperatures** Above 1921-2020 Average

Monthly temperature data from PRISM Climate Group. Copyright ©2022, PRISM Climate Group, Oregon State University, https://prism.oregonstate.edu

Map created 07 Sep 2022, Wyoming State Climate Office and Water Resources Data System: http://www.wrds.uwyo.edu
Percent of La Niña Years with **Dec-Feb Temperatures** Above 1921-2020 Average
Percent of La Niña Years with **Jan-Mar Temperatures** Above 1921-2020 Average

![Map showing percent of La Niña years with Jan-Mar temperatures above the 1921-2020 average.](image-url)
Percent of La Niña Years with **Feb-Apr Temperatures** Above 1921-2020 Average
What does this mean for Wyoming?

Increasing chances that La Niña will persist into winter

   Early August forecasts had January-March period being Neutral. Current odds favor La Niña in that period

   Conditions expected to be ENSO-Neutral starting the February-April timeframe.

Next few months: Above normal temperatures, below normal precipitation at least in southern part of WY

Then, better probability of above average precipitation, especially in the northwest as we move into winter months

If La Niña weakens as expected further into 2023, there is less guidance and we rely more on Climatology for conditions

Hopefully this means more normal conditions in late winter and spring. CPC Outlooks into next summer are showing a leaning toward and even likelihood of above normal temperatures in the west
Current Streamflow Conditions (Sept 15, 2022)

Streamflow Status

https://dashboard.waterdata.usgs.gov/
Select WY Streamflows

https://dashboard.waterdata.usgs.gov/
https://waterdata.usgs.gov/

North Fork Shoshone River at Wapiti, WY
Last updated Sept 15, 2022
Select WY Streamflows

https://dashboard.waterdata.usgs.gov/
https://waterdata.usgs.gov/
Select WY Streamflows

https://dashboard.waterdata.usgs.gov/
https://waterdata.usgs.gov/

North Platte River at WY-NE State Line
Last updated Aug 18, 2022
Select WY Streamflows

https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/
Select WY Streamflows

Sweetwater River near Sweetwater Station, WY
Last updated Sept 15, 2022

https://dashboard.waterdata.usgs.gov/
https://waterdata.usgs.gov/
**WY Reservoirs** (Sept 15, 2022)

- Decreases across the state
- Larger decreases- Palisades, Jackson, Buffalo Bill, Pathfinder, Fontenelle

http://www.wrds.uwyo.edu/surface_water/teacups.html
WY SEO Divisions and Superintendents

Contact information for calls and administration

Division 1
Cory Rinehart, 532-2248

Division 2
David Schroeder, 674-7012

Division 3
Joshua Fredrickson, 856-0747

Division 4
Kevin Payne, 279-3441
Division 1

1. May 1, 2022 BOR call on North Platte limits Irrigation Pumpers, between Pathfinder and Guernsey, to 6,600 acre feet every 2 weeks, through Sept 30th.

1. June 15, 2022 call on Horseshoe Creek and tribs, Dist 3, to a priority date of 4/05/1879.

1. June 24, 2022 call on Laramie River and Tribs, Dist 3, 4A, 4B, 4C, to a priority date of 12/31/1881.

1. June 26, 2022 call on Laramie River and Tribs, Dist 3, 4A, 4B, 4C, to a priority date of 5/23/1883 and priority No. 17 of Laramie River Court Decree.
Division 1

5. June 27, 2022 call on Laramie River and Tribs, Dist 3, 4A, 4B, 4C, to a priority date of 12/31/1875.

5. June 29, 2022 call on Rattlesnake Creek and tribs, Dist 16 to a priority date of 4/1885.

5. June 29, 2022 call on Rattlesnake Creek and tribs, Dist 16 to a priority date of 12/19/1889.
Division 2

1. May 14, 2022 Call on Big Goose Creek, Dist 4, to a priority date of 9/18/1962.

1. July 12, 2022 Call on Little Goose Creek, Dist 4, to a priority date of 4/15/1880.

1. July 12, 2022 Call on Piney Creek, Dist 9 to a priority date of summer 1884.

1. July 13, 2022 Call on Upper Clear Creek, Dist 2, to a priority date of spring 1883.

1. July 21, 2022 Call on Lower Clear Creek, Dist 2, to a priority date of 4/30/1882.
Division 2

6. 7/18/22 Distribution of Dull Knife Reservoir water to shareholders.

6. 7/15/22 Distributions of Willow Park and Cloud Peak Reservoirs water to shareholders.

6. 8/2/22 Call on Wolf Creek, Dist 5, to a priority date of 9/01/1881.

6. 8/1/22 Call on Powder River, Dist 8, to a priority date of 2/21/1902
Division 3
1. April 8, 2022, Call on Owl Creek, Dist 5, to a priority date of Fall 1885.

1. May 6, 2022, Call on Grass Creek, Dist 14, to a priority date of Spring 1903.

1. June 30, 2022, Call on Gooseberry Creek, Dist 13, to a priority date of 12/21/1906.

1. July 12, 2022, Call on Greybull River, Dist 8, to a priority date of 6/20/1888 and 6/18/1900.
Division 3

5. July 18, 2022, Call on Cottonwood Creek, Dist 14, to a priority date of 11/10/1904.


5. August 17, 2022, Call on Big or Middle Popo Agie River, Dist 1, to a priority of 1885.

5. August 22, 2022, Call on Nowood River, Dist 12, to a priority date of 7/7/1958
1. May 9, 2022, call on Central Bear River, Dist 2, multiple dates for interstate call.

1. May 16, 2022, call on Fish Creek, Dist 10, to a priority date of 7/13/1889.

1. May 17, 2022, call on Blacks Fork River, Dist 15, to a priority date of 1891, delivery of storage water from Meeks Cabin Res.

1. May 27, 2022, call on South Piney Creek, Dist 10, to a priority date of 12/31/1886.

1. June 8, 2022, call on Smith’s Fork, Dist 3, to a priority date of 3/2/1935, delivery of storage water from Stateline Res.
Division 4

7. June 13, 2022, call on Corral Creek, Dist 9, to a priority date of 6/30/1890.

7. June 30, 2022, call on Upper Bear River, Dist 4, to a priority of 1874, interstate call.

7. July 25, 2022, call on Teton Creek, Dist 13, interstate call.
Contact Information for Calls/Administration

Division 1 Superintendent–Cory Rinehart, 532-2248

Division 2 Superintendent–David Schroeder, 674-7012

Division 3 Superintendent–Joshua Fredrickson, 856-0747

Division 4 Superintendent–Kevin Payne, 279-3441
Harmful Cyanobacterial Blooms (HCBs)

- Dense concentrations of cyanobacteria (AKA blue-green algae)
- Can be green, blue-green, tan, or brown in color
- Appear as surface scums, clumps, and/or diffuse in water column
- Can produce toxins that can affect the nervous system, liver, kidneys, and skin
- Can affect tourism, recreation, drinking water, agriculture, and wildlife
What causes HCBs?

**Environmental Conditions**
- Abundant light
- High temperatures
- High pH levels
- Stagnant water
- Excess nutrients

**Sources of Excess Nutrients**

**Agriculture:**
Fertilizer runoff (nitrogen & phosphorus) and animal waste

**Industry:**
Chemical discharge and waste

**Urban Life:**
Sewage and waste runoff
HCB Action Plan for Publically Accessible Waterbodies in Wyoming

- Developed by the WDEQ, the WDH, the WLB, resource management agencies, and other stakeholders
- Identify potential HCBs in Wyoming surface waters and inform collaborators and the public of the potential health risks

STEP 1: Surveillance and Reporting
STEP 2: Optional Preliminary Screening
STEP 3: Data Collection and Issuing Advisories
STEP 4: Lifting Advisories
The WDH issues a Bloom Advisory cyanobacteria abundance exceeds 20,000 cells/mL.
Current Bloom Advisories in Wyoming

**Western Wyoming**

- Big Sandy Reservoir
- Bighorn (Yellowtail Reservoir)
- Boysen Reservoir
- Brooks Lake
- Clendenning Lake
- Eden Reservoir
- Flaming Gorge Reservoir
- Fontenelle Reservoir
- Kisinger Lakes
- Lake Viva Naughton
- Murray Lake
- Ocean Lake
- Rainbow Lake
- Rainbow Lake on Burroughs Loop

- Scouts Pond
- Upper Brooks Lake
- Upper Jade Lake
- V Lake
- Virgin Lake
- Woodruff Narrows Reservoir
Current Bloom Advisories in Wyoming

**Eastern Wyoming**

- Alcova Reservoir
- Diamond Lake
- Festo Lake
- Gillette Fishing Lake
- Glendo Reservoir
- Goshen Hole Reservoir
- Granite Springs Reservoir
- High Savery Reservoir
- Keyhole Reservoir
- Leazenby Lake
- Miller Lake
- Pathfinder Reservoir
- Saratoga Lake
- Sloans Lake
- Twin Buttes Lake

- Toltec Reservoir
- Wheatland Reservoir #1
- Wheatland Reservoir #3
Current Toxin Advisories in Wyoming

The WDH issues a Toxin Advisory when toxins exceed recreational thresholds.

- Diamond Lake
- Eden Reservoir
- Goshen Hole Reservoir
- Leazenby Lake
- Saratoga Lake
- Upper Brooks Lake
If You Encounter a Bloom

- Do not swim or come in contact with green water, scums, or clumps
- Do not ingest water from a bloom
- Rinse fish with clean water and eat only the fillet portion
- Avoid water spray from a bloom
- Do not allow pets or livestock to drink water near a bloom, eat bloom material, or lick fur after contact

- Report the bloom to DEQ
- Report any HCB related illnesses to WDH
Forecasts & Outlooks
Temperatures seasonal to above normal through Tuesday

Cooler air coming in on day 7 with possible freezing temperatures in west.

Increased precipitation chances today through Saturday

Dry Saturday night through Monday.

Increased rain chances Tuesday-Thursday next week

https://bit.ly/7_dayQPForecast
Moderate above normal signal in the SE, weakening to neutral in the NW

Moderate above normal signal for most of WY, weak signal on E border
Below normal precip for all WY, weak in most of state strengthening to North

Moderate above normal temperature signal across the state

3-Month Temp & Precip Outlook
October-November-December 2022

Seasonal Temperature Outlook
Valid: Oct-Nov-Dec 2022
Issued: September 15, 2022

Seasonal Precipitation Outlook
Valid: Oct-Nov-Dec 2022
Issued: September 15, 2022

Above normal signal for all WY. Weak in North strengthening to S and SW

Weak below normal signal in SE, otherwise neutral precip signals
Fuel Moistures and Energy Release Component

Energy Release Component (ERC)

- A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire.
- It may also be considered a composite fuel moisture value as it reflects the contribution that all live and dead fuels have to potential fire intensity.
- Generally expressed as a Percentile.

1000-Hour Fuel Moisture (1000-hr FM)

- General indicator of drought and correlates with fire danger for a Fire Danger Rating Area
- Represents the modeled moisture content in dead fuels in the 3 to 8 inch diameter class
- The 1000-hr FM value is based on a running 7-day computed average using length of day, daily temperature and relative humidity extremes (maximum and minimum values) and the 24-hour precipitation duration values.

100-Hour Fuel Moisture (100-hr FM)- 1” to 3” Dead Fuels
10-Hour Fuel Moisture (10-hr FM)- ¼” to 1” Dead Fuels
1-Hour Fuel Moisture (1-hr FM)- 0” to ¼” Dead Fuels

Live Fuel Moisture- Fuels transition from dormancy to green-up in the spring and early summer, then back to dormancy in the fall.
Energy Release Component
Current Status as of 09/15/2022

- Entire state below 90th Percentile
  - 90th percentile and above typically seen as “critical”

- Periodic and sometimes substantial moisture in the last month continues moderating conditions.

- Abundant fine fuels across state, seasonal curing will occur.
  - Day length and cooler temps should moderate fire danger.
Energy Release Component
Current Status: Medicine Bow (valid 9/14/22)
100 Hr. Fuel Moisture
Current Status: Medicine Bow (valid 9/14/22)
Energy Release Component
Current Status: Shoshone (valid 9/14/22)
1000 Hr. Fuel Moisture
Current Status: Shoshone (valid 9/14/22)
Energy Release Component
Current Status: Black Hills SW (valid 9/14/22)
Energy Release Component
Current Status: Great Divide Basin (valid 9/14/22)
How to get involved ...
US Drought Monitor for September 13, 2022
(Released Thursday, September 15, 2022)
Valid 8 a.m. EDT

Improvements and degradations since the last webinar. Recent precipitation in the north has resulted in Improvements in a large area of north central Wyoming. Degradation in Hot Springs County as well as in the northeast prior to last week’s precipitation,

https://youtu.be/45MQ1GB-uTc

https://droughtmonitor.unl.edu
The Wyoming Conditions Monitoring Team (WCMT) organized and hosted this webinar. The WCMT is a collaborative effort of state, federal, tribal, and university partners that monitor conditions & impacts throughout the state on a weekly basis – and communicate this information to the U.S. Drought Monitor among others.

Learn more at: https://drought.wyo.gov

Thank you! Questions?

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