



Northern Arapaho  
Tribe

# Wind River Indian Reservation and Surrounding Area Climate and Drought Summary Summer Events & Fall Outlook 2015



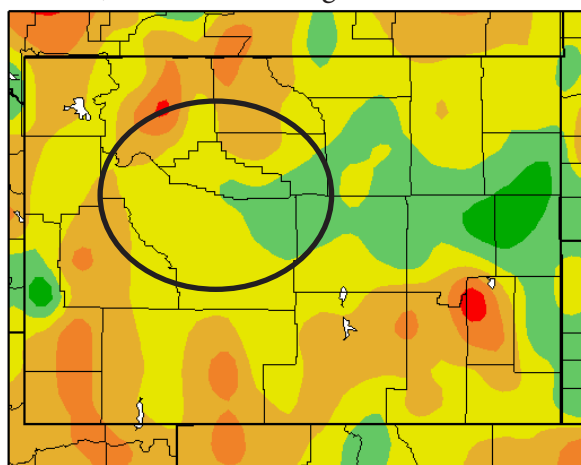
Eastern Shoshone  
Tribe

## Summer Was Near Normal, Precipitation Was Highly Variable Across The Region

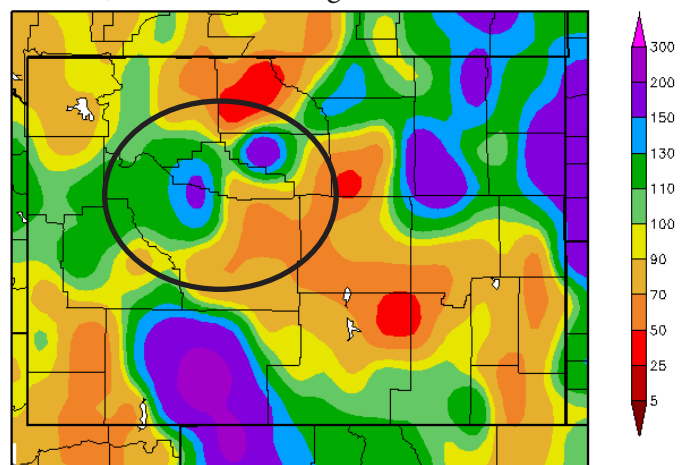
The big story of the summer season for the Wind River Region\* was the stark contrast in precipitation amounts that divides the northern and western parts of the region from the southern and eastern parts of the region. In the north and west, precipitation was generally 110-200 percent of normal, while it was only about 50-70 percent of normal in the south and east (see map below right). A steep precipitation gradient exists across the region, which means the precipitation amounts are highly variable over short distances. For instance, Worland had its wettest summer on record (periods of record are on Page 2), recording a whopping 7.20 inches of precipitation, which is 4.87 inches above normal. Basin, which is only about 30 miles north of Worland, had its 12th driest summer on record with only 0.76 inches of precipitation, which is 1.13 inches below normal. The average temperature for the summer season for the Wind River Region was near normal to about 3°F above normal (see map below left).

June was very warm across the region with temperatures 2-6°F above normal. Most of the stations listed in the data table at the top of Page 2 (with the exception of Diversion Dam and Lander 1N) had a top five warmest June on record. The primary contributor to this warmth was above normal nighttime temperatures. For example, the average minimum temperature in June at the Riverton station was 53.0°F, which is the warmest on record for that month. The precipitation pattern in June is reflected in the seasonal pattern - as much as 150-200 percent of normal precipitation fell in the north and west, but only 50-70 percent of normal precipitation fell in the south and east. July's temperatures were quite the contrast from June, as most of the area was cooler at 1-4°F below normal. Precipitation continued to follow the same pattern as the previous month. In August, temperatures were closer to normal, ranging from about 1°F above normal to 2°F below normal. Once again, precipitation was strongly divided between wetter conditions in the north and west and drier conditions in the south and east. (\*Note: The Wind River Region refers to the Wind River and Upper Bighorn Basins.)

Departure from Normal Temperature (°F)  
June 1, 2015 - August 31, 2015



Percent of Normal Precipitation (%)  
June 1, 2015 - August 31, 2015



Maps produced by the High Plains Regional Climate Center and are available at: <http://www.hprcc.unl.edu/maps/current>

## Summary of Station Data (June 2015-August 2015)

Station	Average Temp. (°F)	Dep. from Normal Temp. (°F)	Temp. Rank	Total Precip. (in.)	Dep. from Normal Precip. (in.)	Percent of Normal Precip.	Precip. Rank	Period of Record
Basin	72.2	2.0	10th warmest	0.76	-1.13	40	12th driest	1898-present
Black Mtn <sup>1</sup>	69.9	-0.3	near normal	4.29	0.82	124	16th wettest	1963-present
Boysen Dam	71.2	0.1	-	1.68	-0.80	68	19th driest	1948-present
Burris	62.6*	0.9	-	3.49*	0.69	125	18th wettest	1963-present
Diversion Dam	65.3*	0.7	-	3.51	0.60	121	27th wettest	1920-present
Dubois	-	-	-	3.69*	0.44	114	28th wettest	1905-present
Lander 1N	65.1	0.5	-	2.42	-0.45	84	-	1999-present
Riverton	68.7	0.7	6th warmest	1.80	-0.69	72	near normal	1907-present
Thermopolis	71.3	-0.6	-	2.58*	-	-	-	1899-present
Worland	71.2	1.1	5th warmest	7.20	4.87	309	WETTEST	1907-present

A dash (-) indicates insufficient data for calculation. An asterisk (\*) indicates some missing data for this period.

All data are preliminary and subject to change.

Data were retrieved from the Applied Climate Information System (ACIS): rcc-acis.org

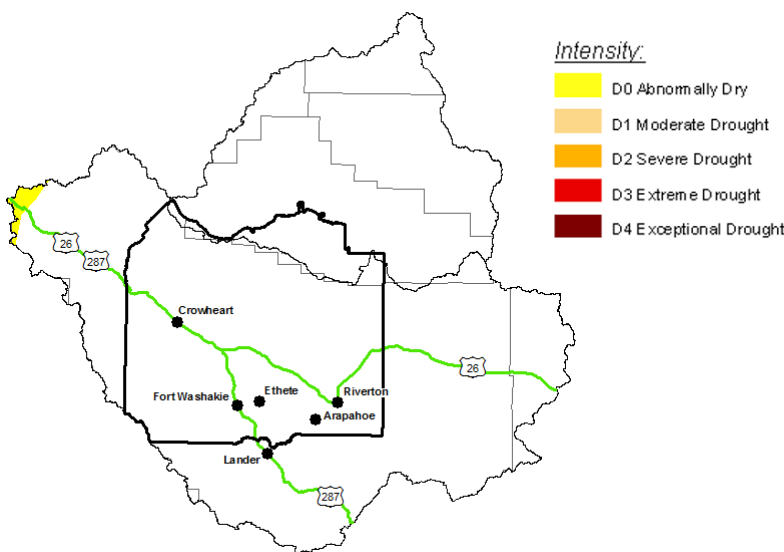
<sup>1</sup>The Black Mtn station is east of Thermopolis and does not refer to Black Mountain in the Wind River Range.

### Near Normal Climate Conditions Prevent Drought Development This Summer

Summer precipitation was variable across the Wind River Region, with some areas ending the season with above normal precipitation while other areas had below normal precipitation. Summer temperatures were slightly on the warm side but drought indicators are pointing toward normal conditions at this time. The extreme western portion of the Wind River Basin is still in the abnormally dry (D0) category of the U.S. Drought Monitor (see the U.S. Drought Monitor map and table below), as conditions have changed very little in that region. However, streamflow is slightly below normal in some streams across the region and is causing some impacts, so conditions will need to be monitored closely.

#### U.S. Drought Monitor of the Wind River Indian Reservation and Surrounding Area - August 25, 2015

Released August 27, 2015 Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	99.55	0.45	0.00	0.00	0.00	0.00
<b>Last Week</b> 08-18-2015	99.55	0.45	0.00	0.00	0.00	0.00
<b>3 Months Ago</b> 05-26-2015	99.55	0.45	0.00	0.00	0.00	0.00
<b>Start of Calendar Year</b> 12-30-2014	100.00	0.00	0.00	0.00	0.00	0.00
<b>Start of Water Year</b> 09-30-2014	100.00	0.00	0.00	0.00	0.00	0.00
<b>One Year Ago</b> 08-26-2014	100.00	0.00	0.00	0.00	0.00	0.00

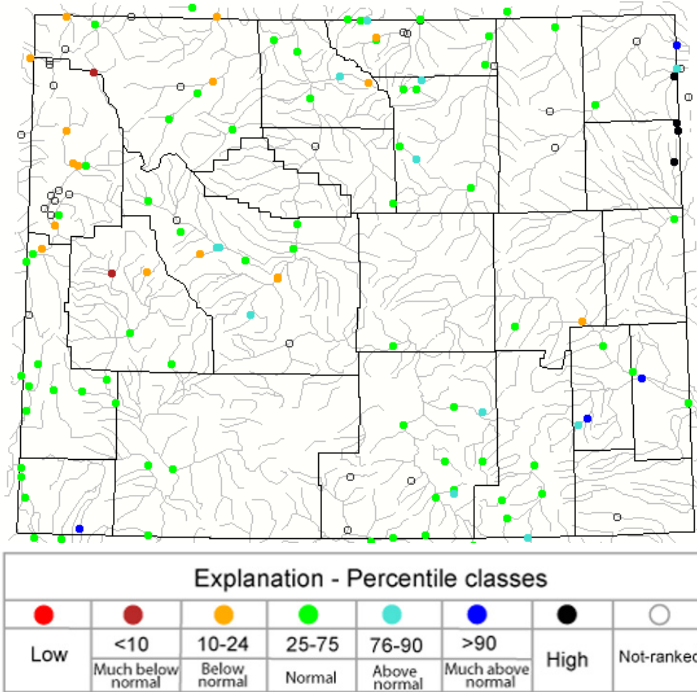
(Note: Statistics are for reservation and surrounding area.)

The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL. For more information on the U.S. Drought Monitor, go to: <http://droughtmonitor.unl.edu>

## Variable Precipitation Causing Above And Below Normal Streamflow In Region

Streamflow has been relatively normal to below normal for this time of year across the Wind River Region. However, there are three stream gauge stations that are above normal: Little Popo Agie River near Lander, Wind River near Crowheart, and Bull Lake Creek near Lenore (see streamflow map and corresponding stream gauge data below). Aside from these stream gauge stations, streamflow conditions are beginning to dwindle due to the recent lack of precipitation and the snowpack not being a contributing factor to the streamflows. Bull Lake Creek above Bull Lake, Wind River at Riverton, and Little Wind River near Riverton are running below normal for late summer. Due to the low reservoir levels of Ray Lake, Washakie Reservoir, and Dinwoody Lake (see reservoir data table at the bottom of this page), there have been adverse impacts on local farming, instream flow for the Little Wind River system, and fire hazards in the surrounding areas, including the Little Wind River drainage area. In fact, the elevation for Washakie Reservoir is not currently providing accurate readings due to low flows into the reservoir. According to the precipitation outlook for the next season (see Page 4), above normal precipitation is expected, which could positively impact reservoirs that have been low.

28-Day Average Streamflow Compared To Historical Streamflow For August 31 (Wyoming)



Stream Gauge	Percentile
Wind River near Dubois	37th
Wind River above Red Creek, near Dubois	52nd (NR*)
Dinwoody Creek above lakes, near Burris	27th
Bull Lake Creek above Bull Lake	11th
Bull Lake Creek near Lenore	85th
Wind River near Crowheart	80th
Wind River near Kinnear	33rd
Wind River at Riverton	10th
Little Wind River near Riverton	14th
Little Popo Agie River near Lander	76th
Fivemile Creek near Shoshoni	50th
Wind River below Boysen Reservoir	38th
Bighorn River at Worland	33rd (NR*)
Bighorn River at Basin	51st

\*NR=Not Ranked. A percentile is a value on a scale of one hundred that indicates the percent of a distribution that is equal to or below it. The streamflow data and map shown represent 28-day average streamflow compared to historical streamflow for the day of the year (August 31). Streamflow data and map provided by the U.S. Geological Survey: <http://waterwatch.usgs.gov>

Reservoir Data as of August 31, 2015

Reservoir Name	Reservoir Elevation (feet)	Reservoir Storage (acre-feet)	Reservoir % Full	Reservoir Name	Reservoir Elevation (feet)	Reservoir Storage (acre-feet)	Reservoir % Full
Anchor	6,365.3	641.8	3.7	Pilot Butte	5,437.3	16,126.0	47.8
Boysen	4,720.6	659,936	89.0	Ray Lake	5,520.74	no data	no data
Bull Lake	5,787.5	100,889	66.2	Washakie	6,320*	no data	no data
Dinwoody	no data	no data	no data				

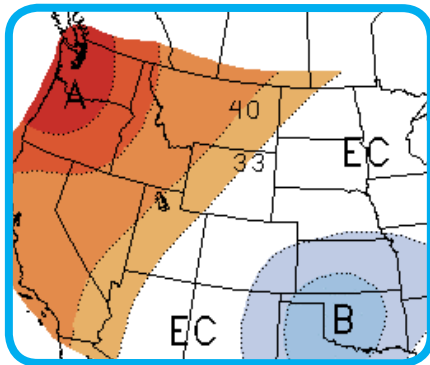
\*Reservoir elevation is estimated.

Data sources: Bureau of Indian Affairs (not available online), Bureau of Reclamation ([http://www.usbr.gov/gp/lakes\\_reservoirs/wyoming\\_lakes.htm](http://www.usbr.gov/gp/lakes_reservoirs/wyoming_lakes.htm))

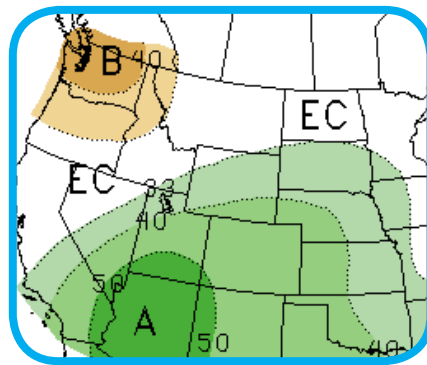
## Warm And Wet Conditions Expected This Fall

El Niño is present in the Pacific. There is a greater than 90 percent chance that it will last through the 2015-16 winter, and it is likely to be strong (its impacts are reflected in the outlooks). The Climate Prediction Center is calling for an increased chance of above normal temperatures for the western half of Wyoming this fall, including the Wind River Region (see map below left). Above normal precipitation is also expected for the next three months (see map below center), so drought is not expected to develop through the end of November in the region (see map below right). The National Weather Service long-range flood outlook calls for less than a 50 percent chance of flooding through the end of October for the upper reaches of the Wind River. The National Interagency Fire Center predicts wildfire potential to be normal for the Wind River Region through November. CPC outlooks are available at: <http://www.cpc.ncep.noaa.gov/>

**3-Month Temperature Outlook**  
Valid September-November 2015

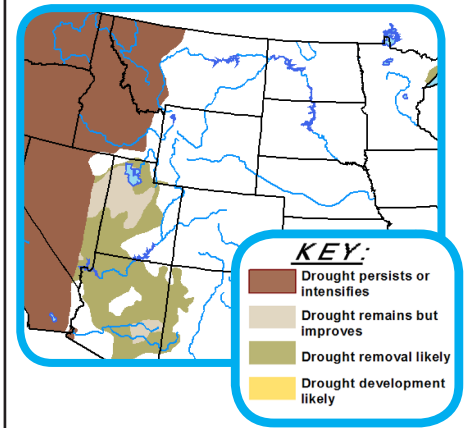


**3-Month Precipitation Outlook**  
Valid September-November 2015



EC: Equal chances of above, near, or below normal  
A: Above normal B: Below normal

**U.S. Seasonal Drought Outlook**  
Valid August 20-November 30, 2015



### Drought Outlook explanation:

The Climate Prediction Center issues a seasonal drought outlook for the U.S. that is based on probabilities for drought development, persistence and intensification, improvement, and removal at a large scale. Local-scale changes in drought conditions may not be captured by this outlook. “On-going” drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4). The tan areas on the map imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none). The white areas imply no drought present.

### Three-Month Temperature and Precipitation Outlook explanation:

Each month, the Climate Prediction Center issues a new three-month outlook for temperatures and precipitation for the lower 48 states and Alaska. These outlooks indicate the probability of temperatures and precipitation being above, near, or below normal. (“Normal” is what is expected based on average temperatures and precipitation during the period of 1981-2010.) In general, the colors on the map will indicate warmer/cooler or wetter/drier conditions. In the temperature outlook, the oranges signify above normal temperatures, while the blues signify below normal temperatures. In the precipitation outlook, the greens indicate above normal precipitation, while the browns indicate below normal precipitation. You will also see probabilities on the map (e.g. 33, 40, 50, 60, 70, and 80). For a location and season, forecasters divide the 30 observations from 1981-2010 into thirds: 1/3 is the coldest or driest, 1/3 is the warmest or wettest, and 1/3 is in between. When forecasters indicate that an area will have above normal precipitation, for example, they are saying that the probability is greater than 33 percent. The outlooks are for the 3-month period as a whole and do not indicate when certain conditions would occur or the duration and intensity of any particular event. Areas of white are marked by “EC,” which means equal chances of above, near, or below normal temperatures/precipitation. EC does not mean near normal.

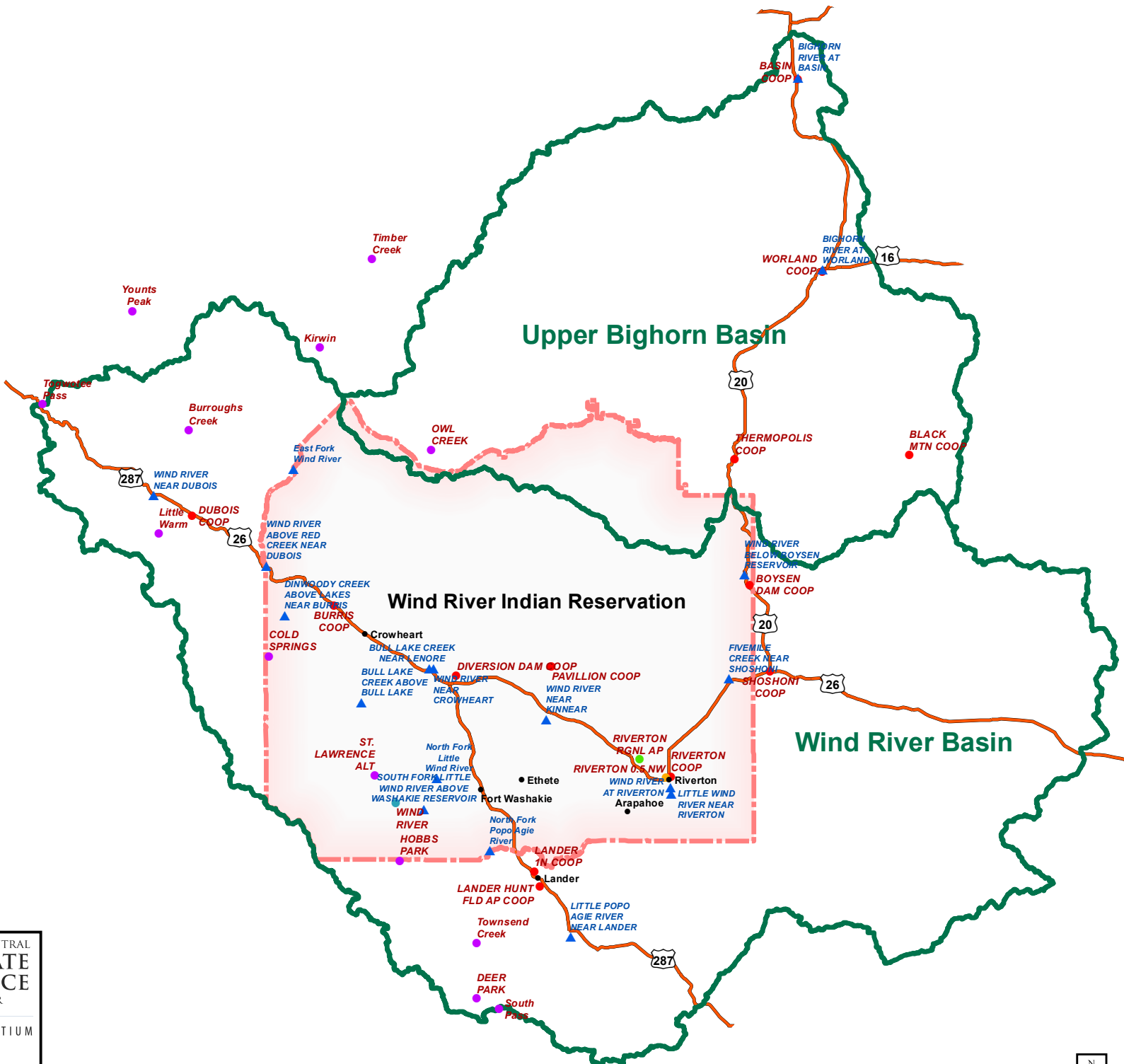
### Collaborators and Partners:



**Contact Information:** Please direct questions and feedback on this climate summary to Al C’Bearing, Office of the Tribal Water Engineer, 307-332-6464.

# Wind River Indian Reservation and Surrounding Area

Revised 6/18/2015



**Legend**

- WR Stream Gauges**  
▲
- WR Weather Stations**
  - COOP
  - CoCoRaHS
  - RAWS
  - SNOTEL
  - WBAN
- ▭ Basin Boundary



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Contact Information:  
Shannon McNeeley, PhD  
shannon.mcneeley@colostate.edu  
970-491-1852