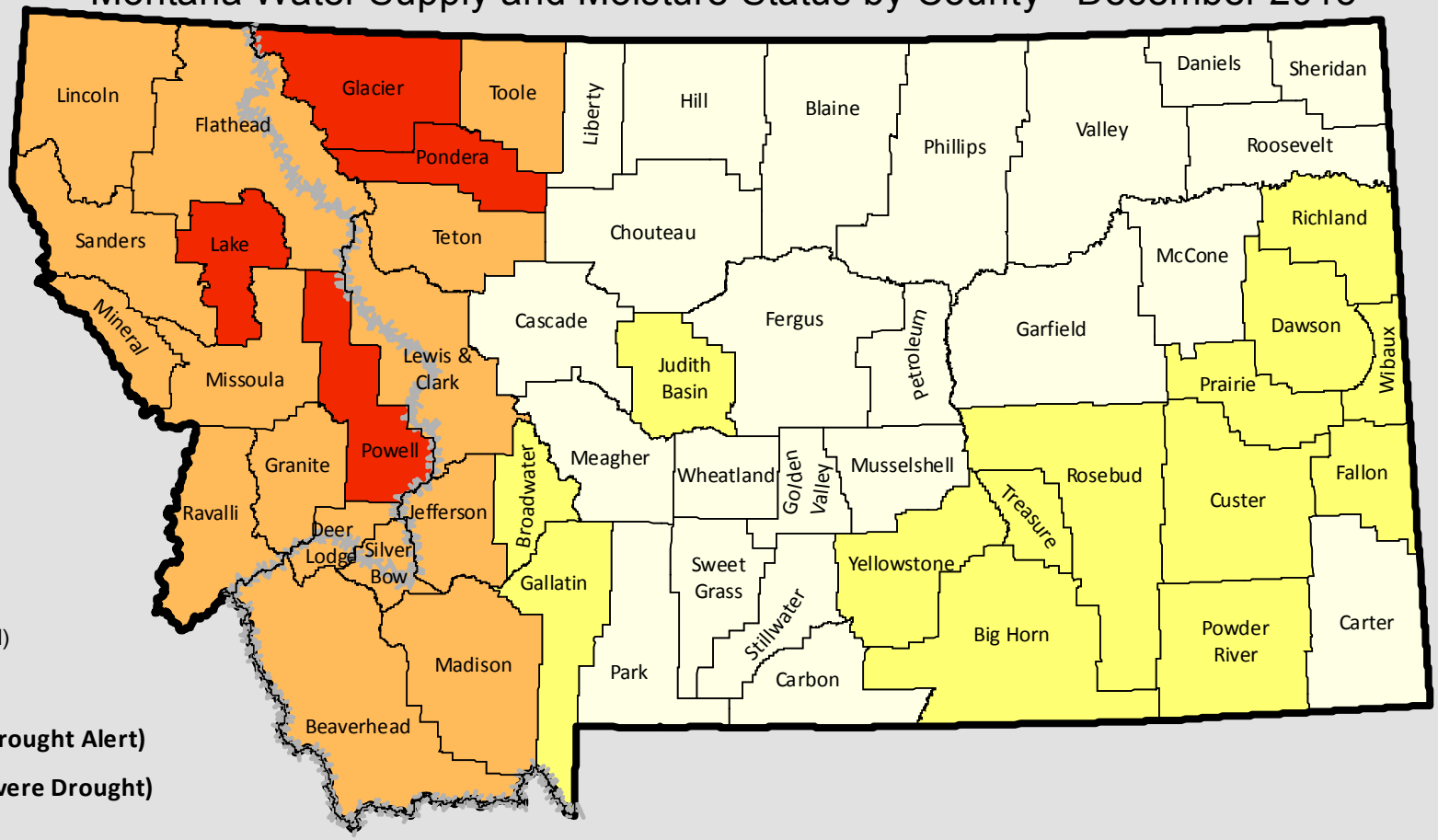
Montana Water Supply and Moisture Status by County - December 2015

http://drought.mt.gov



Water Supply and Moisture Status Map
December 23, 2015

Map Key

Drought Impact Type

ContinentalDivide

Moisture Status

Current Month

- Extremely Moist
- Moderately Moist
- Slightly Moist
- Near Average (Normal)
- Slightly Dry
- Moderately Dry **(Drought Alert)**
- Extremely Dry **(Severe Drought)**

Drought Impact Types -

A = Agricultural - Soil Moisture, Range conditions

H = Hydrological - Water Supplies, Streamflow, Groundwater

Drought Alert - Governor's Drought Advisory Committee strongly encourages local officials to convene local drought committees.

Severe Drought - Local officials should have local drought planning efforts underway or should reconvene the local drought committee at the earliest opportunity.
For recommended responses, see the Montana Drought Plan

According to the National Weather Service Forecast Office in Great Falls, Montana, water year precipitation (October 1, 2015 - December 22, 2015) the Western Division ranges from about 80 to 160 percent of average; the Southwest Division about 120 to over 200 percent; Central 90 to over 200 percent; the South-central 80 to 200 percent; the Northeast 60 to 200 percent; and Southeast 40 to 150 of average. Statewide, 19 of 56 counties are rated as Moderate to Extremely Dry, and 15 counties east of the Continental Divide improved one category due to precipitation brought in by a series of storm systems.

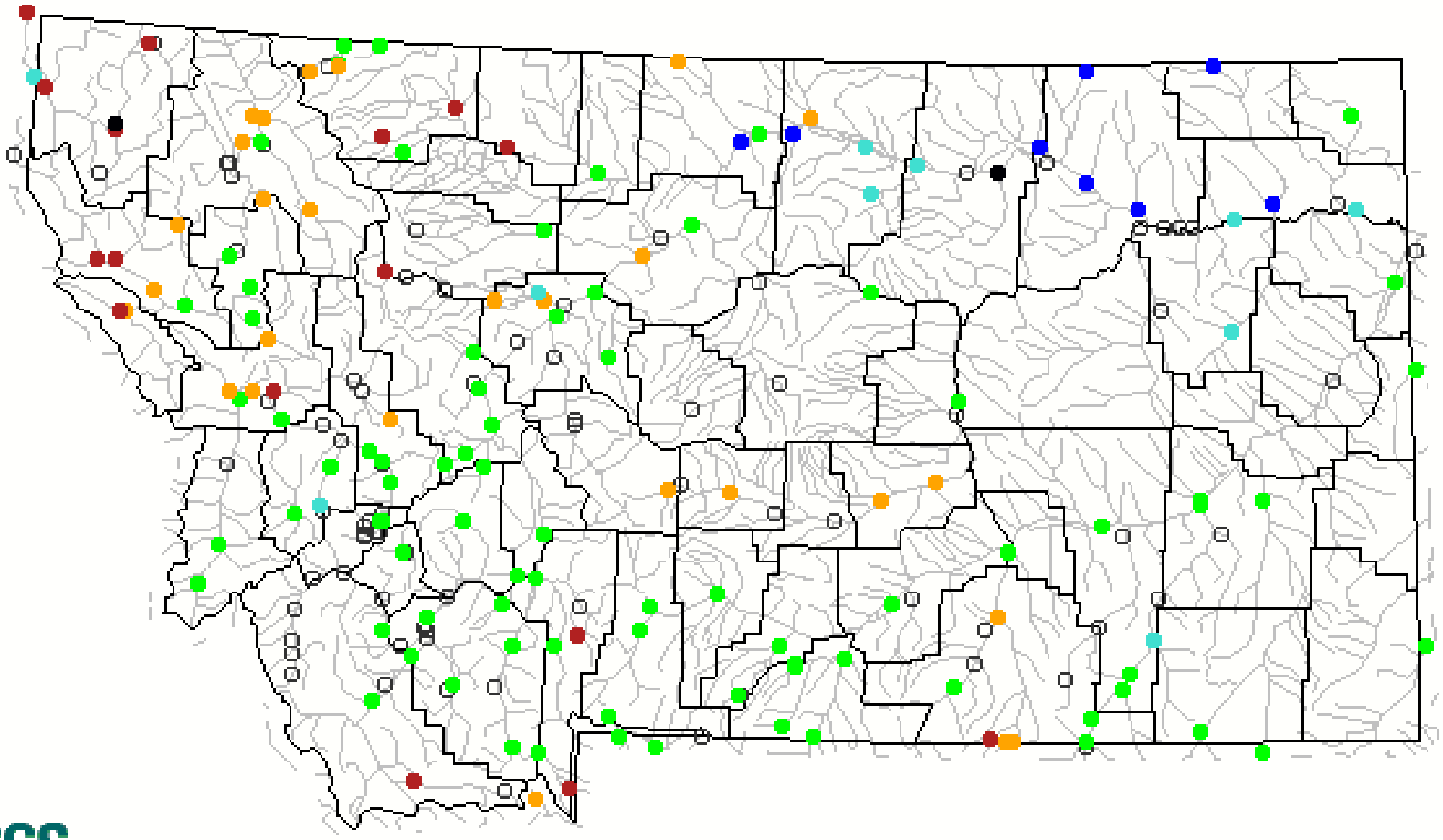
According to the USDA Natural Resources Conservation Service (NRCS) SNOTEL mountain precipitation remote gauging network, the snow water equivalent for sites west of the Continental Divide ranges from a low of near 60% to a high of 165 percent of median for the mid December. East of the Divide, snow water equivalents range from a low of 60 percent along the Rocky Mountain Front to a high of 185 percent in Southwest Montana.

http://mslapps.mt.gov/Geographic_Information/Maps/drought/

USGS Streamflows, May 2016

DAILY STREAMFLOW CONDITIONS

Wednesday, May 18, 2016 09:30ET



USGS

Dry — Normal — Wet

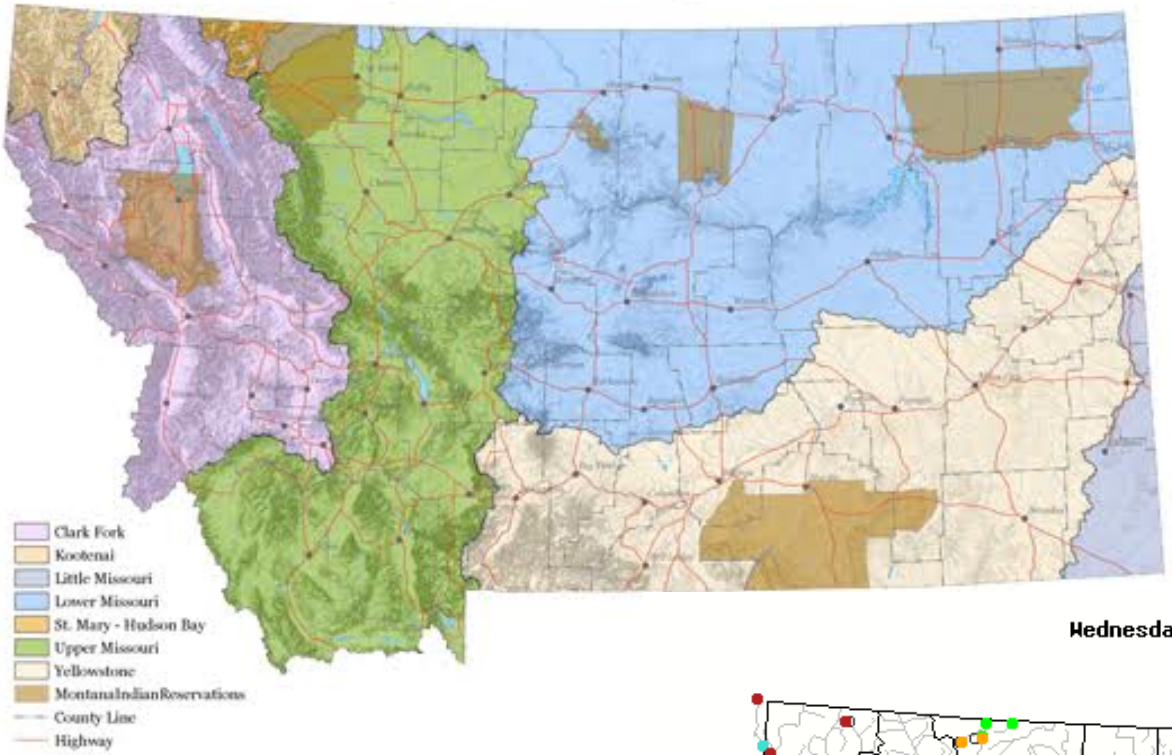
New Maximum Discharge for May 18

06166000 – Beaver Creek below Guston Coulee, near Saco

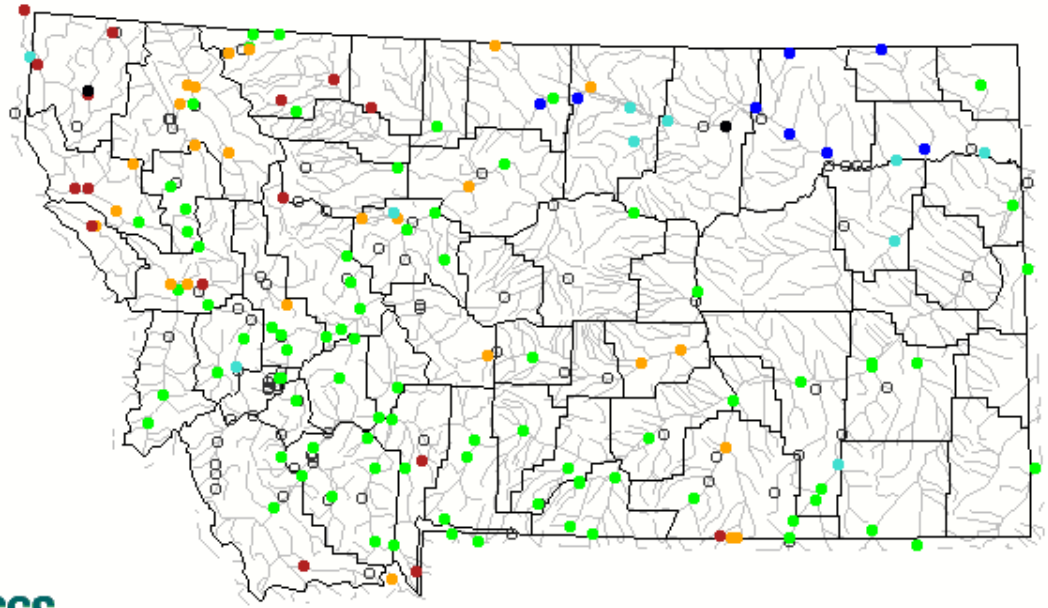
06167500 – Beaver Creek near Hinsdale

12301933 – Kootenai River below Libby Dam, near Libby

2015 Montana Water Supply Initiative
Major Water Planning Basins

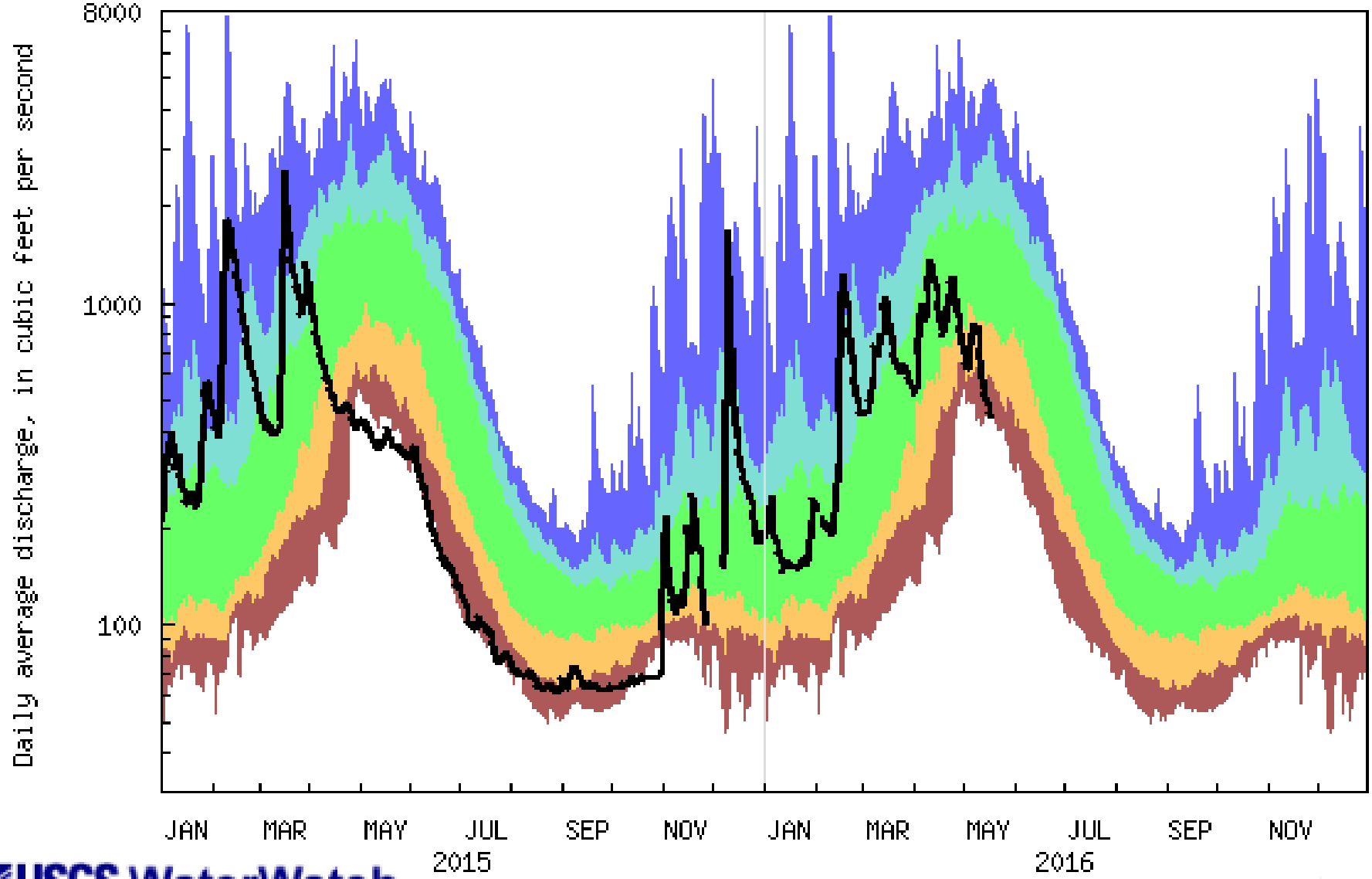


Wednesday, May 18, 2016 10:30ET



USGS

USGS 12302055 Fisher River near Libby MT
(Drainage Area: 842 square miles, Length of Record: 47 years)

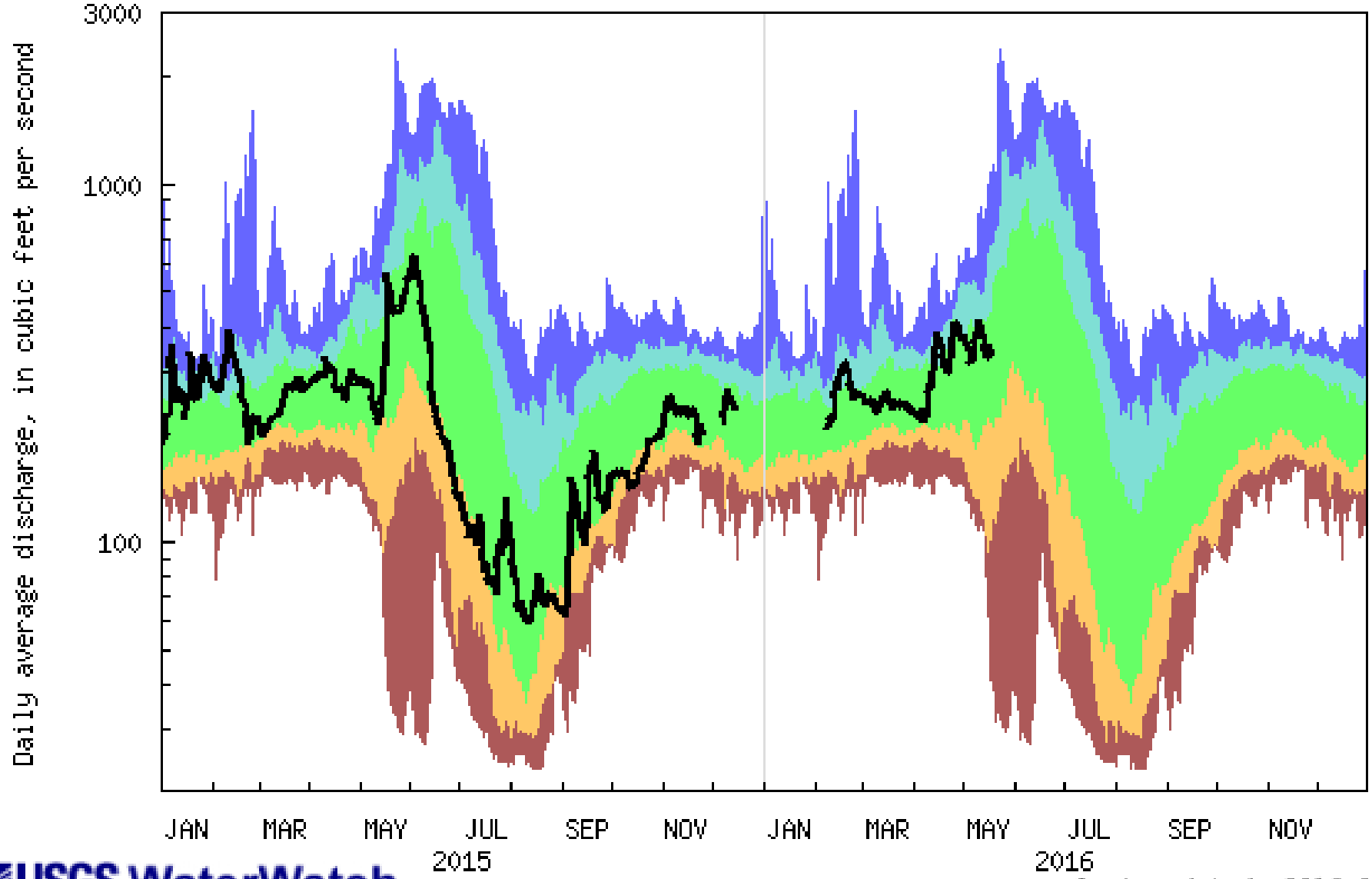


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 12324200 Clark Fork at Deer Lodge MT
(Drainage Area: 1001 square miles, Length of Record: 36 years)

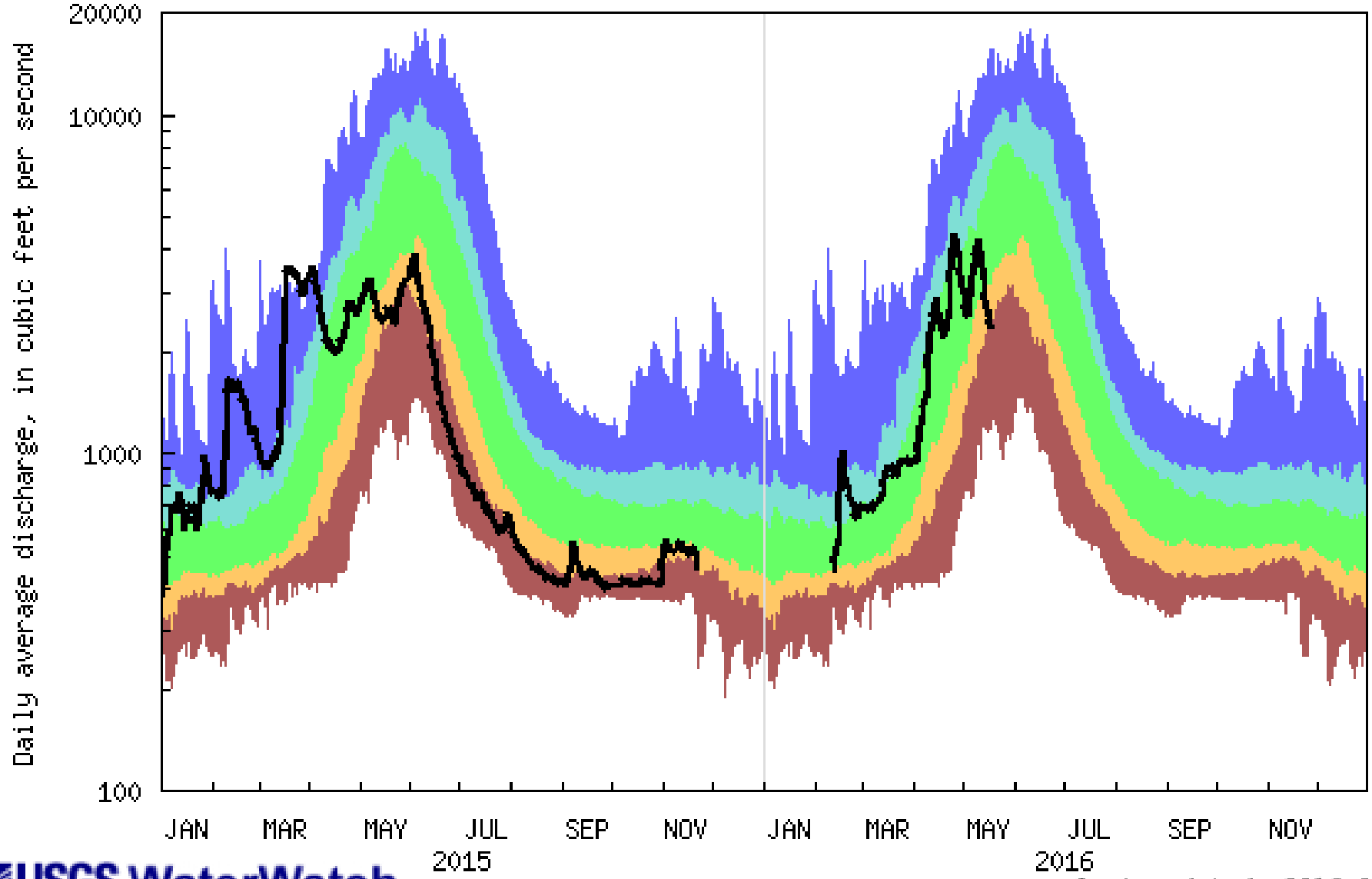


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 12340000 Blackfoot River near Bonner MT
(Drainage Area: 2287 square miles, Length of Record: 116 years)

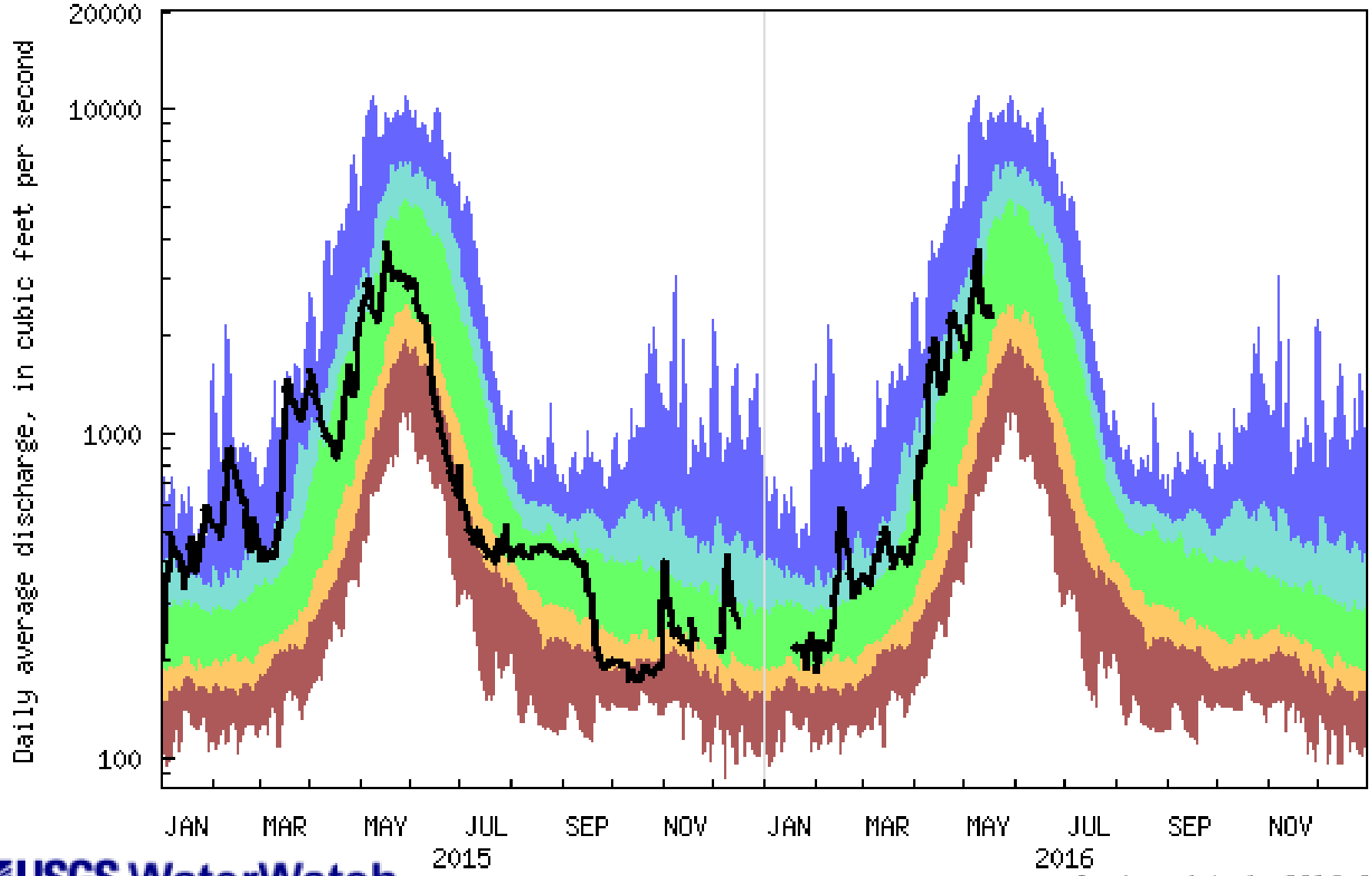


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 12344000 Bitterroot River near Darby MT
(Drainage Area: 1050 square miles, Length of Record: 77 years)

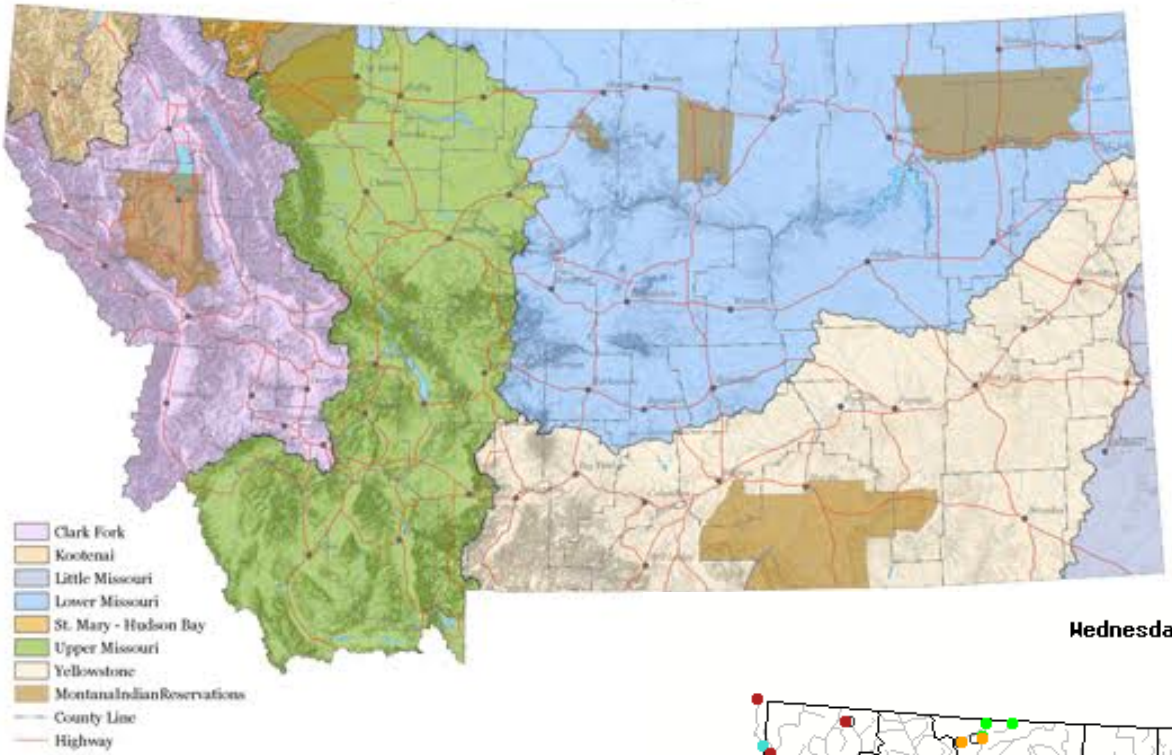


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

2015 Montana Water Supply Initiative
Major Water Planning Basins



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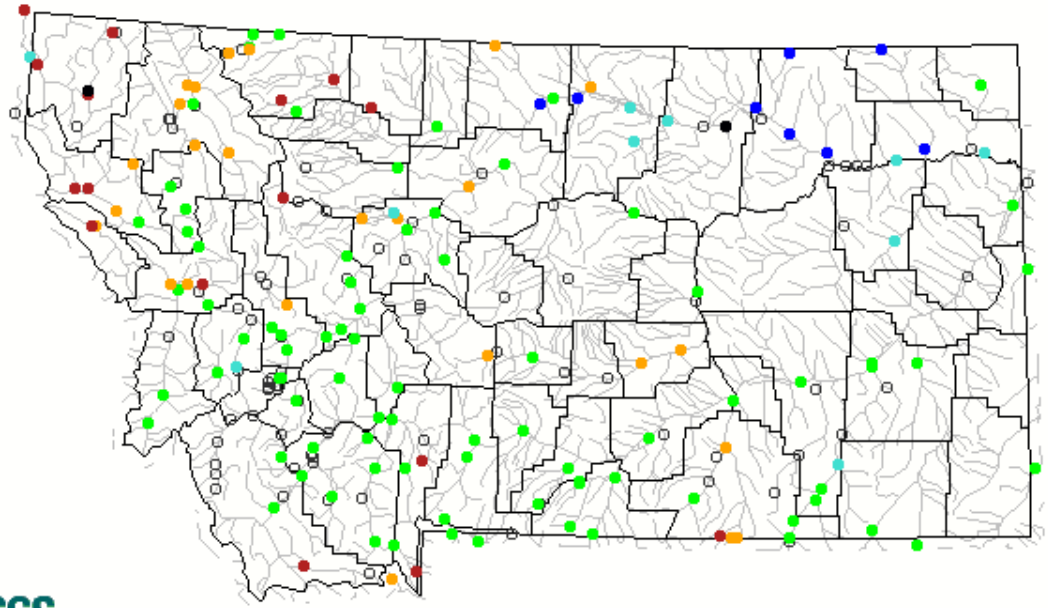
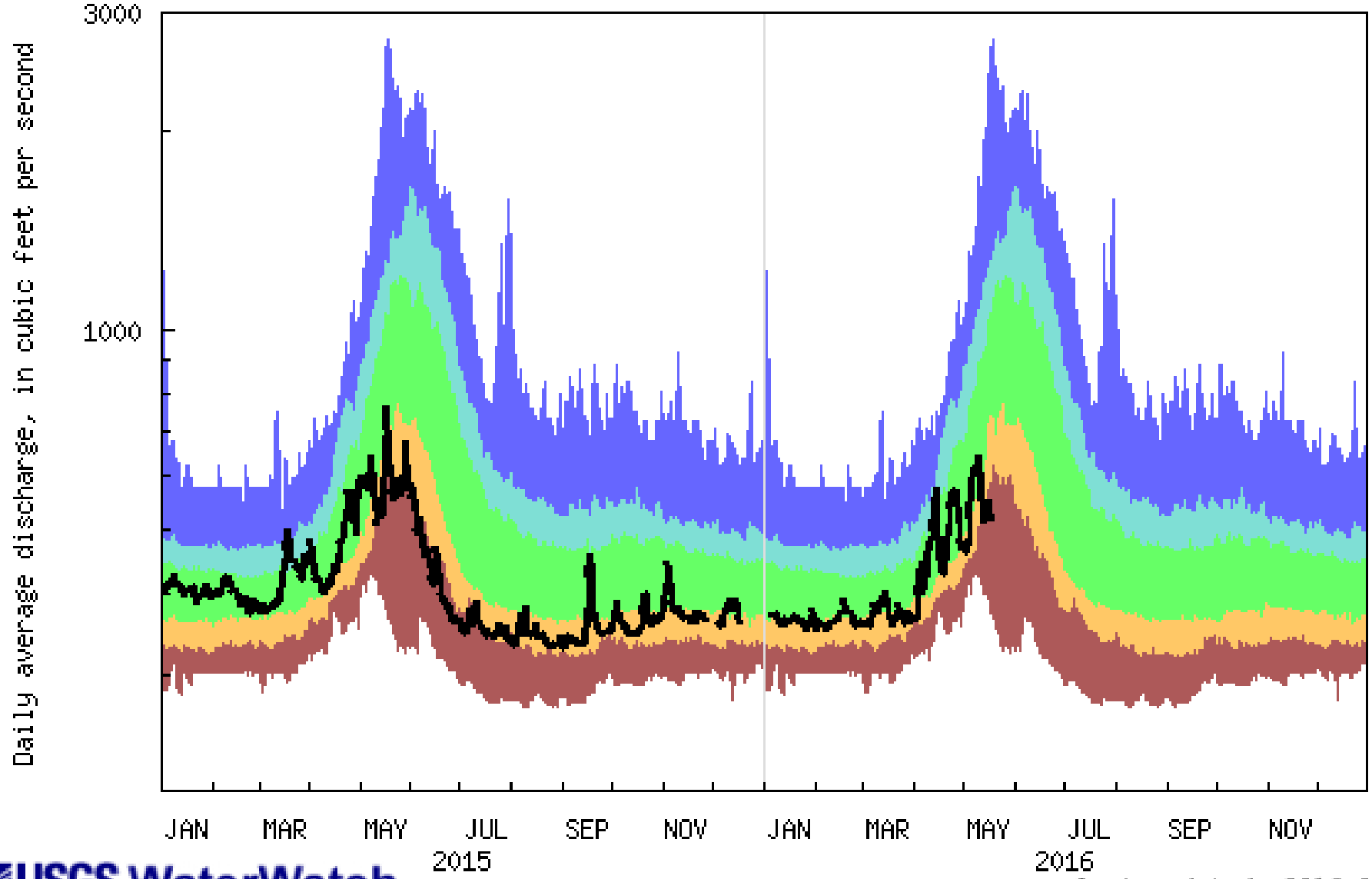


USGS

USGS 06037500 Madison River near West Yellowstone MT
(Drainage Area: 435 square miles, Length of Record: 101 years)

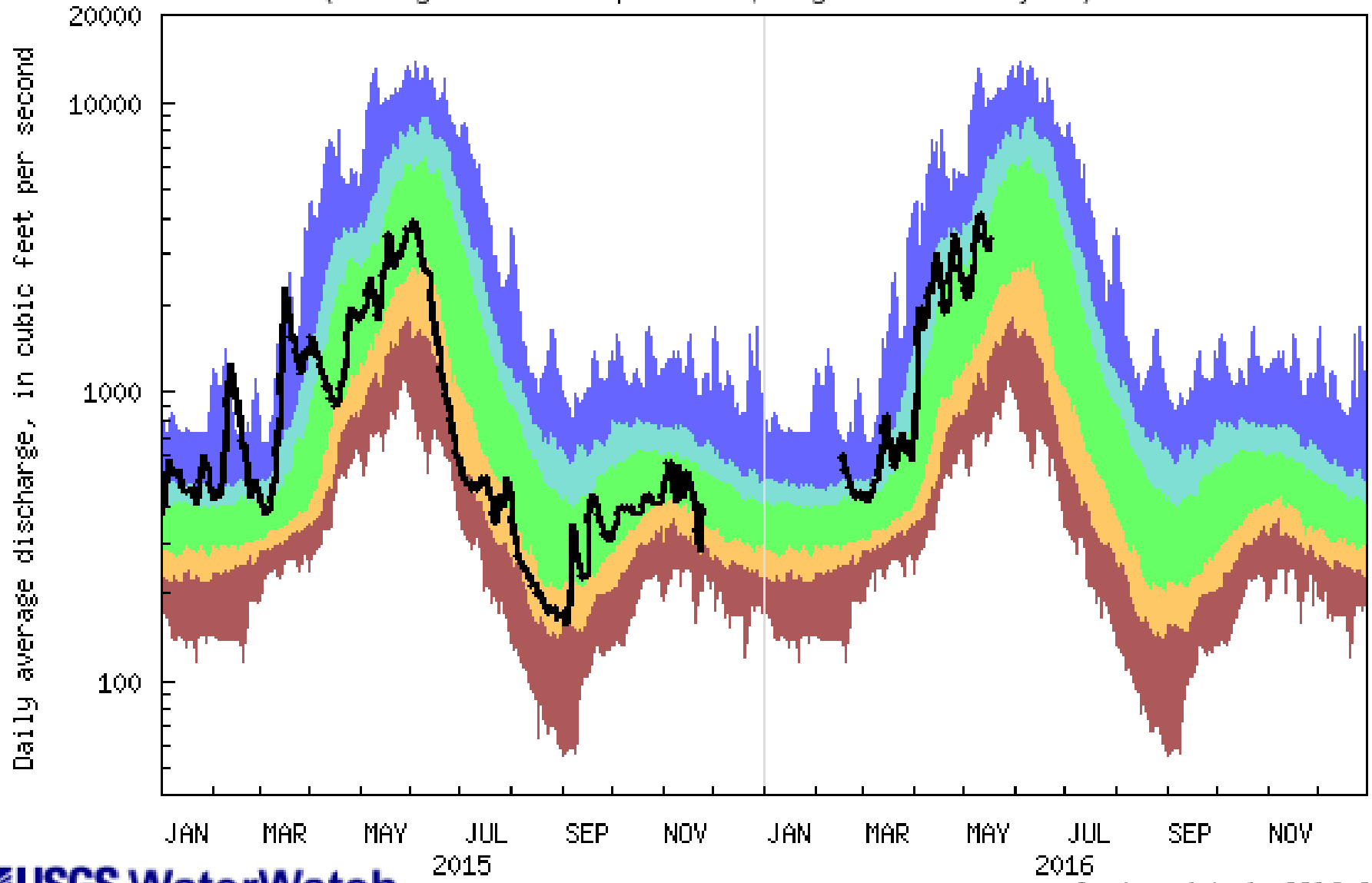


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06025500 Big Hole River near Melrose MT
(Drainage Area: 2472 square miles, Length of Record: 91 years)

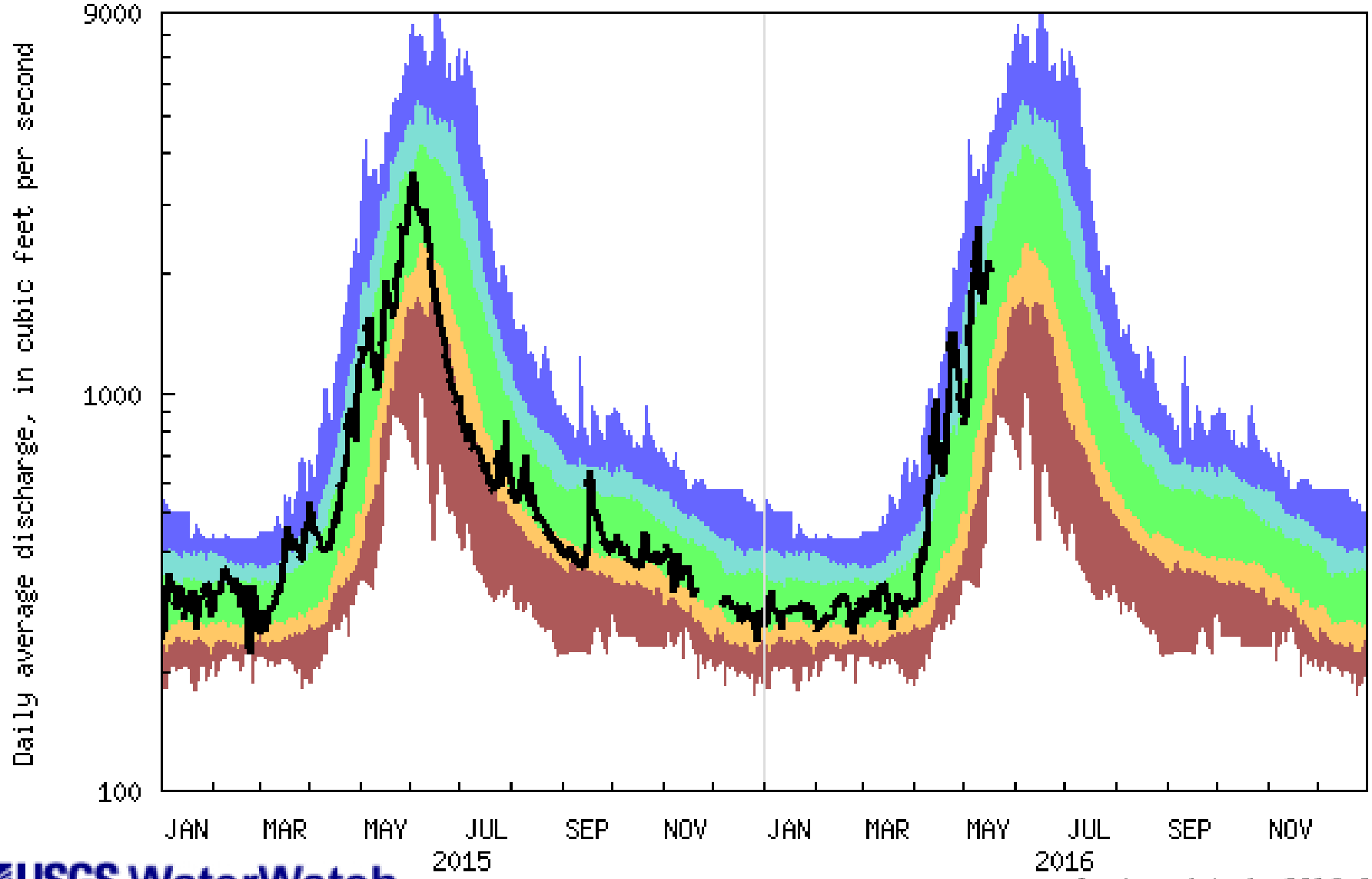


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06043500 Gallatin River near Gallatin Gateway MT
(Drainage Area: 819 square miles, Length of Record: 125 years)

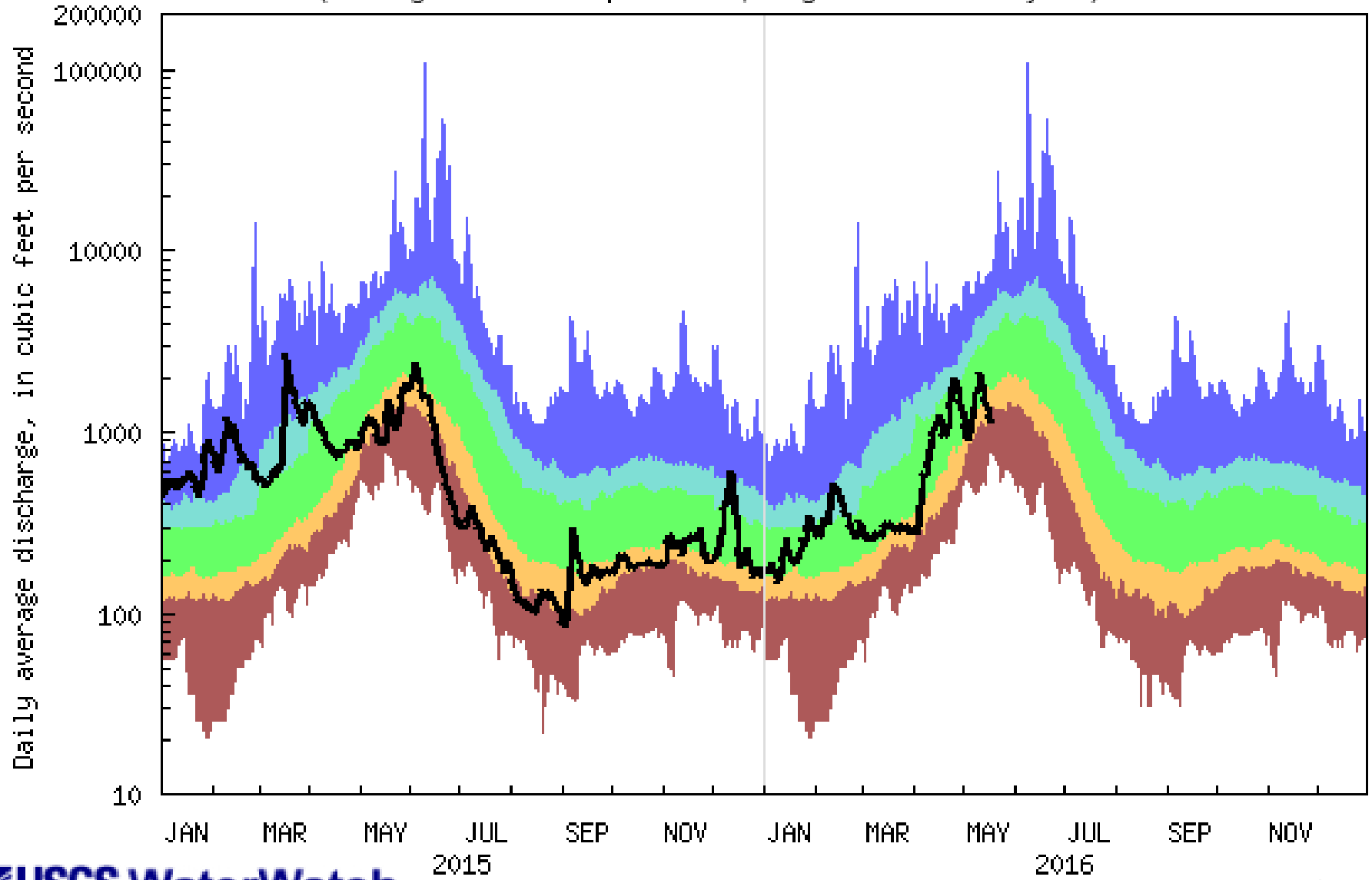


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06099500 Marias River near Shelby MT
(Drainage Area: 2716 square miles, Length of Record: 112 years)

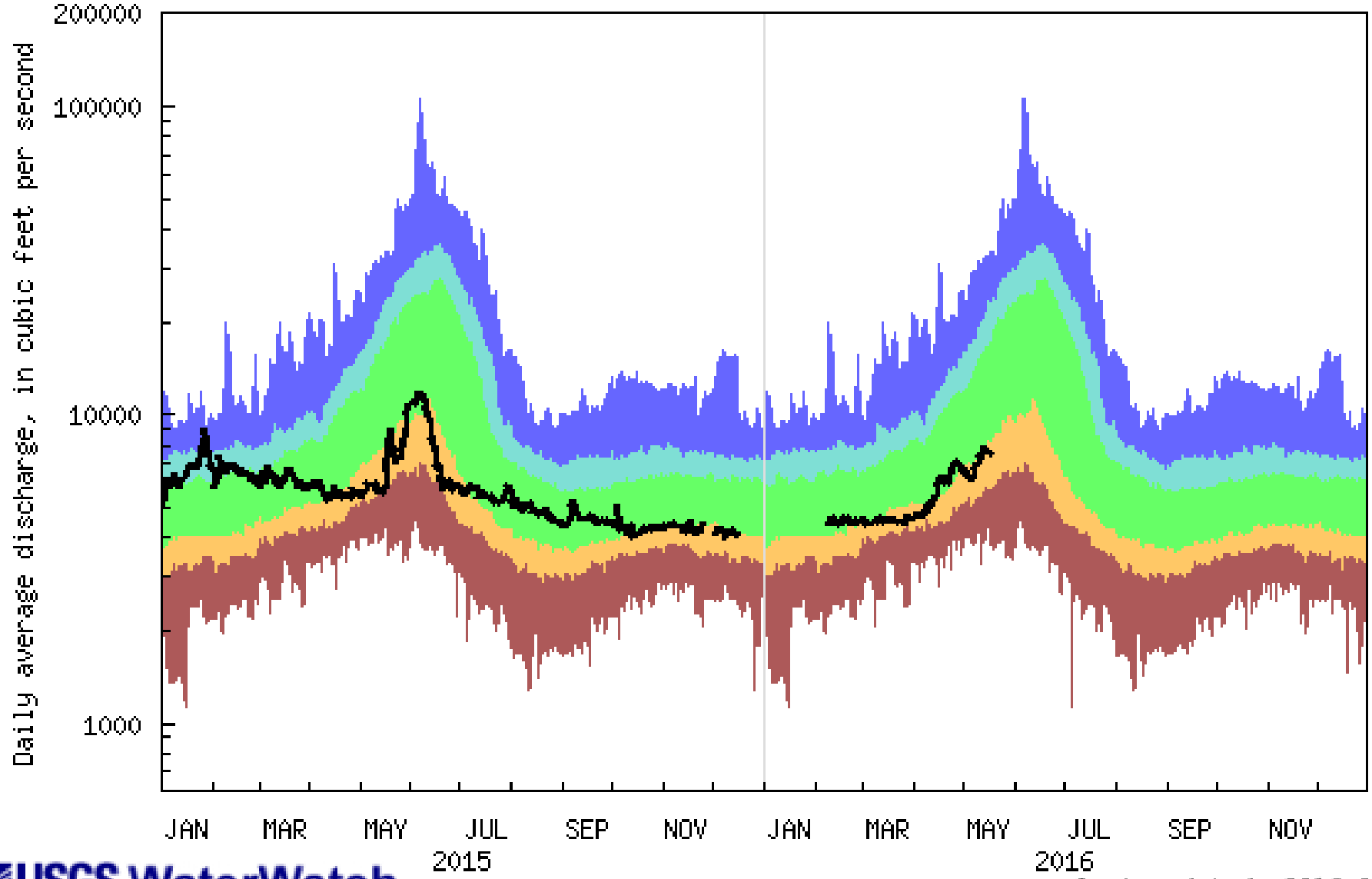


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06090800 Missouri River at Fort Benton MT
(Drainage Area: 24297 square miles, Length of Record: 124 years)

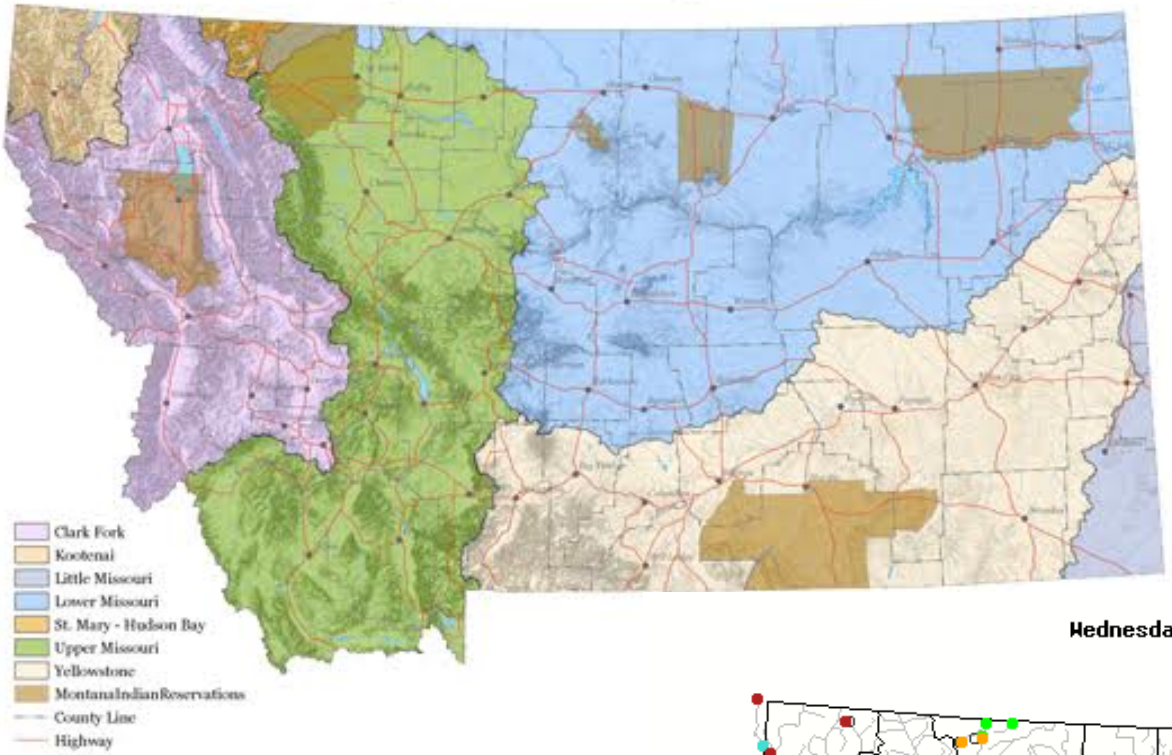


USGS WaterWatch

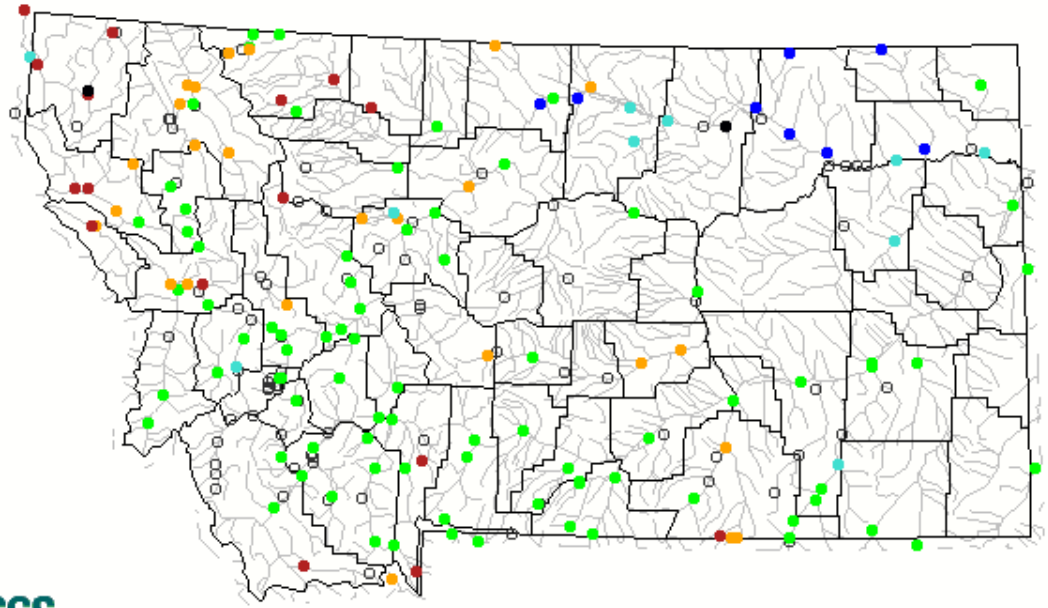
Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

2015 Montana Water Supply Initiative
Major Water Planning Basins

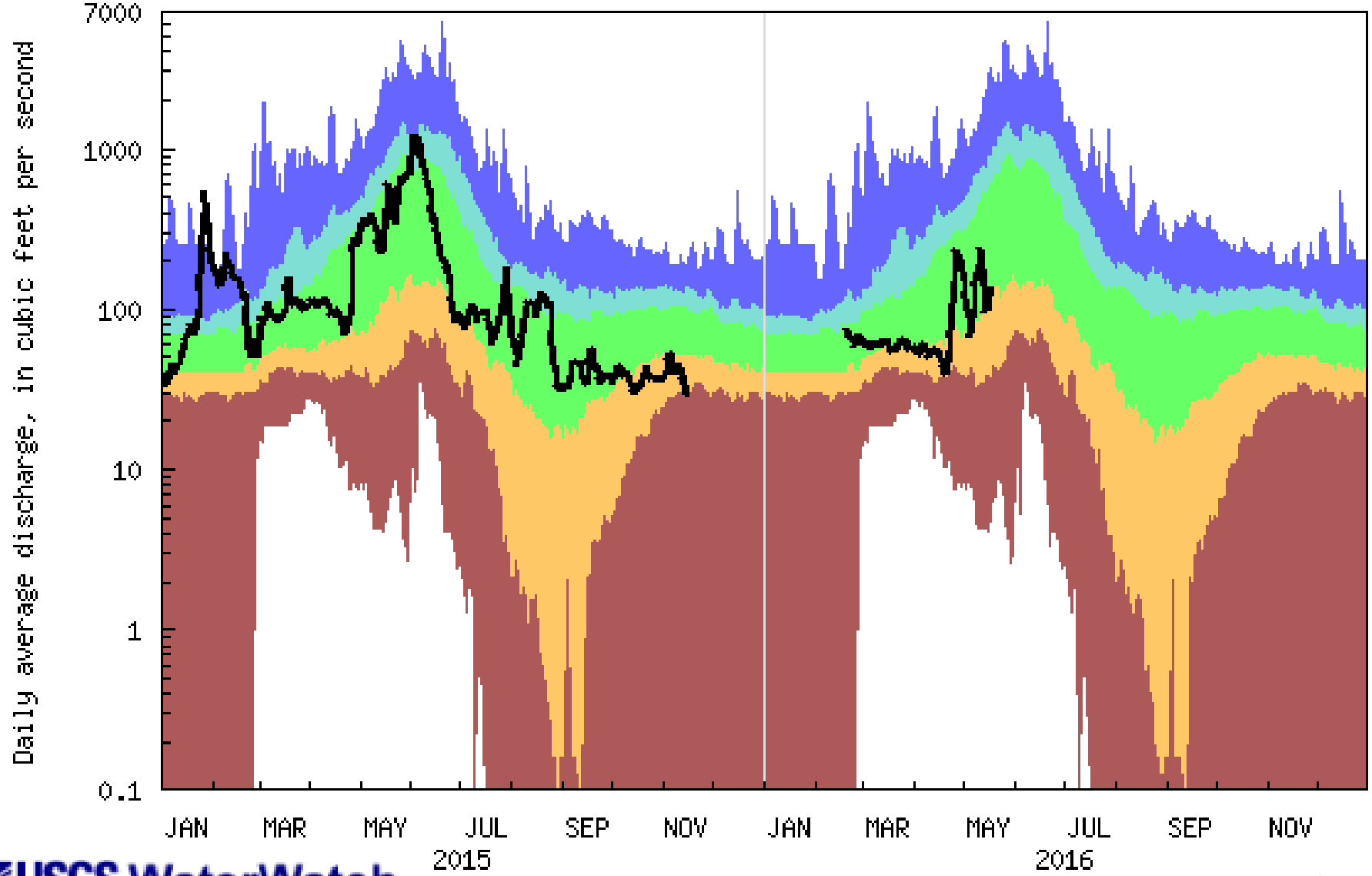


Wednesday, May 18, 2016 10:30ET



USGS

USGS 06120500 Musselshell River at Harlowton MT
(Drainage Area: 1108 square miles, Length of Record: 107 years)

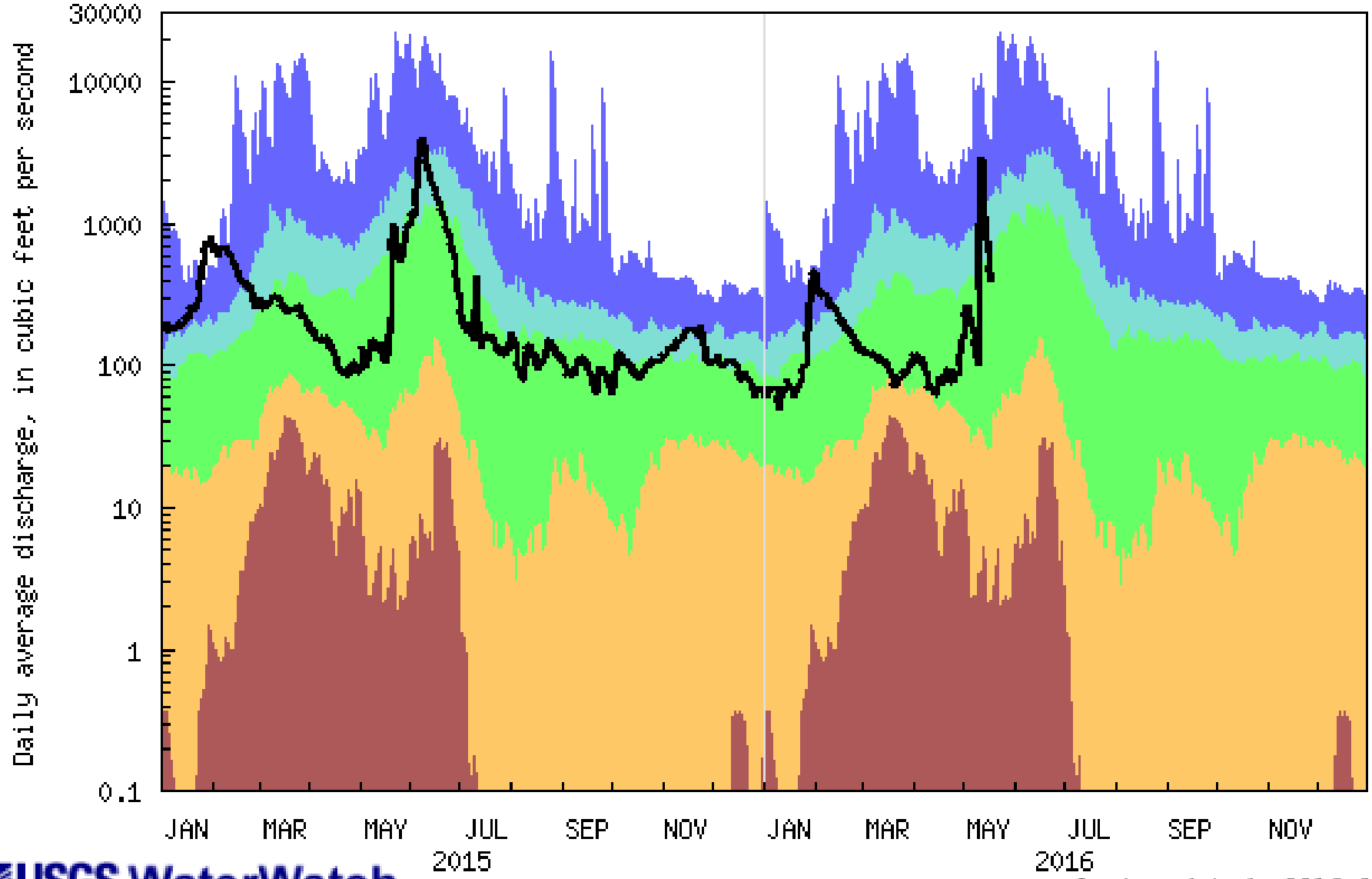


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06130500 Musselshell River at Mosby MT
(Drainage Area: 7784 square miles, Length of Record: 84 years)

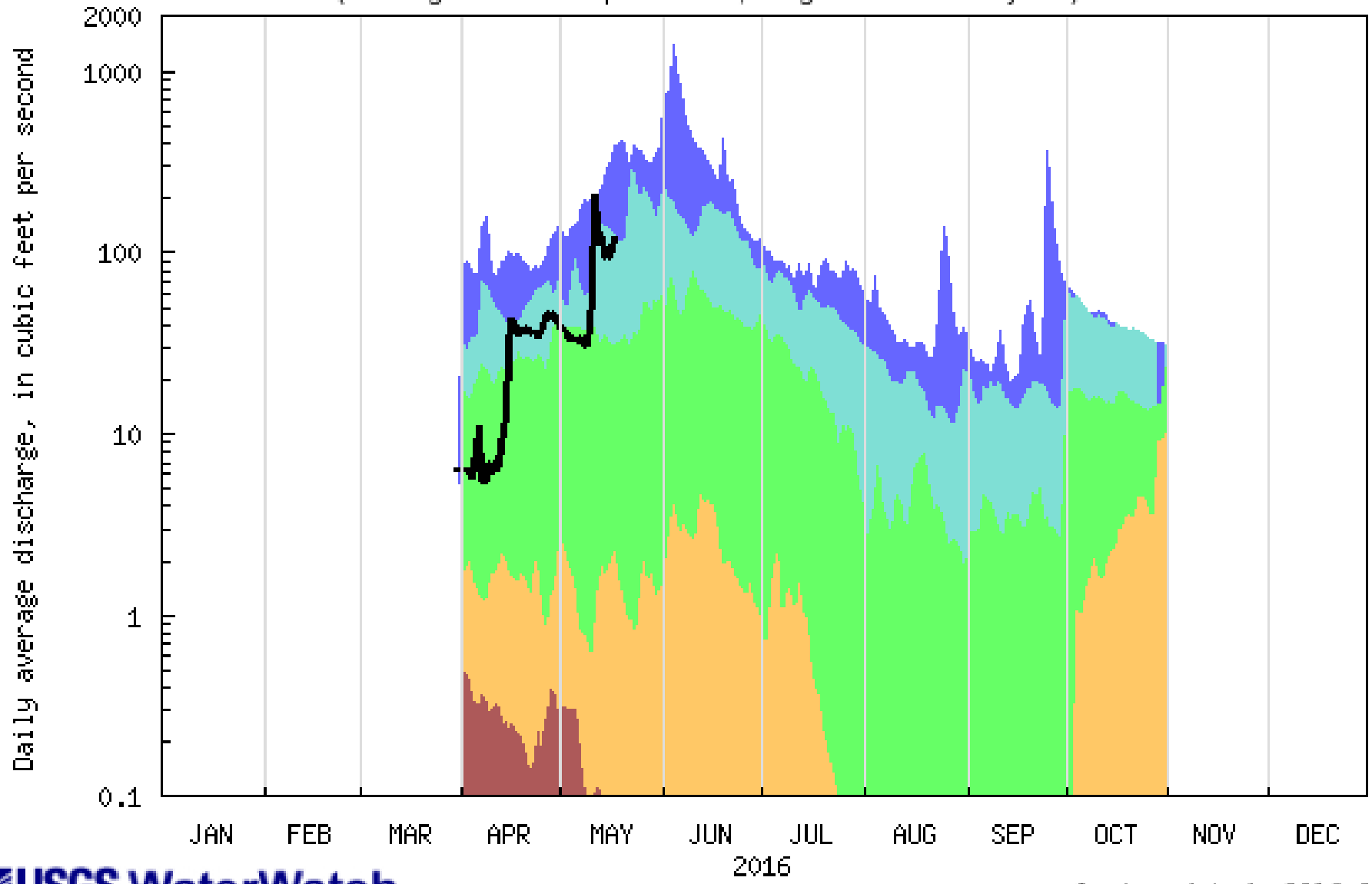


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06142400 Clear Creek near Chinook MT
(Drainage Area: 135 square miles, Length of Record: 30 years)

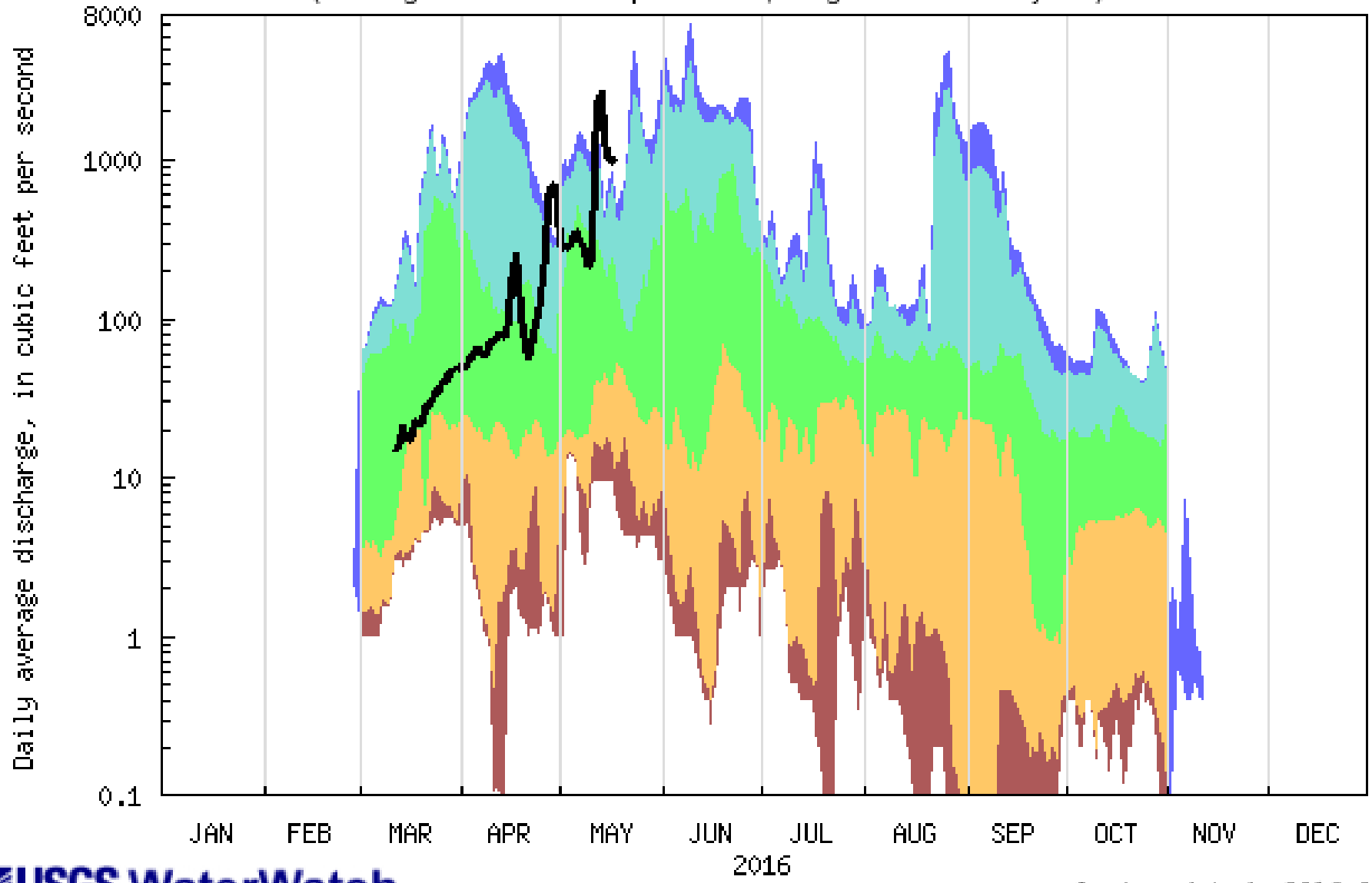


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06167500 Beaver Creek near Hinsdale MT
(Drainage Area: 1804.89 square miles, Length of Record: 96 years)

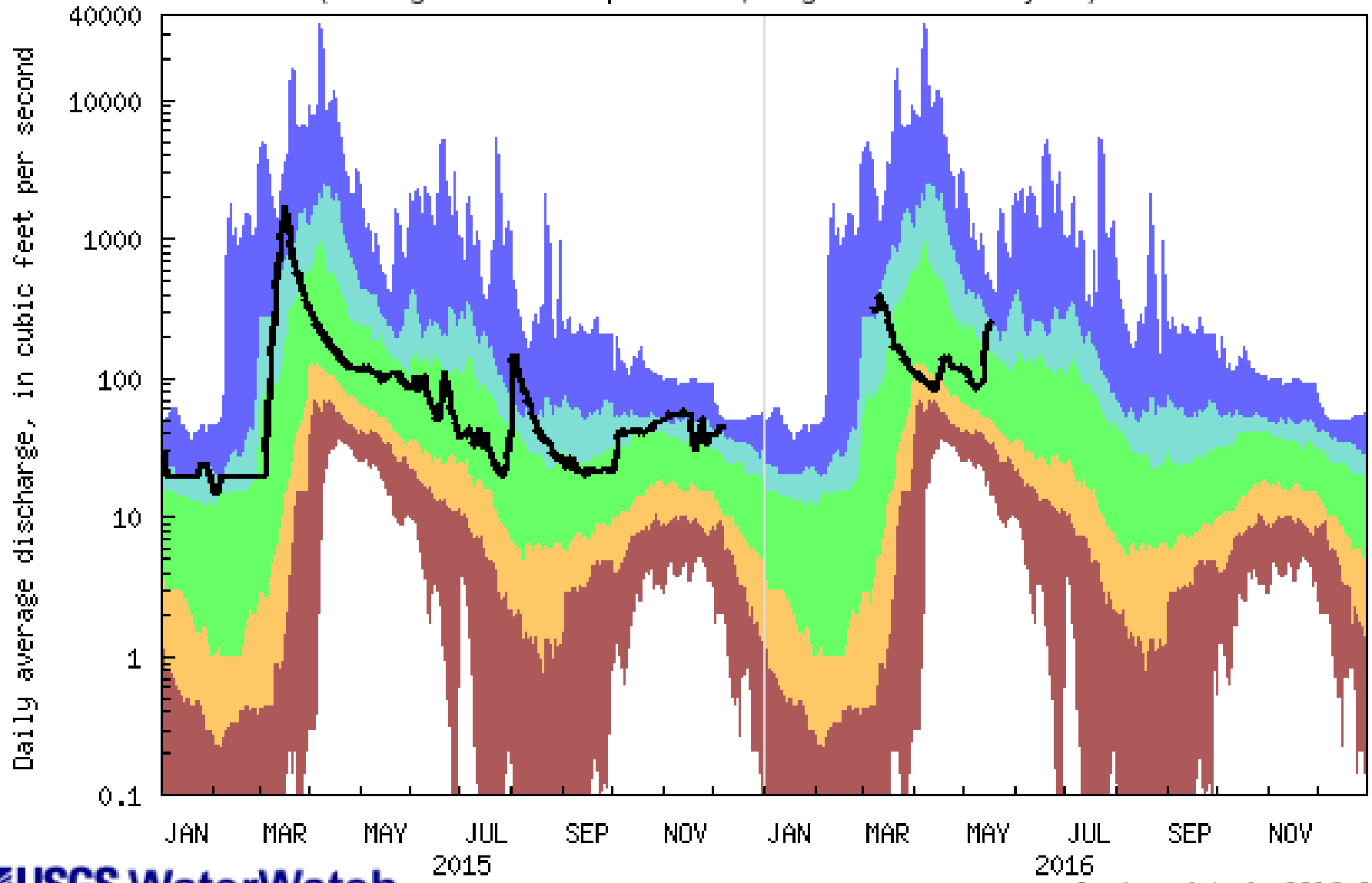


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06181000 Poplar River near Poplar MT
(Drainage Area: 3140 square miles, Length of Record: 105 years)

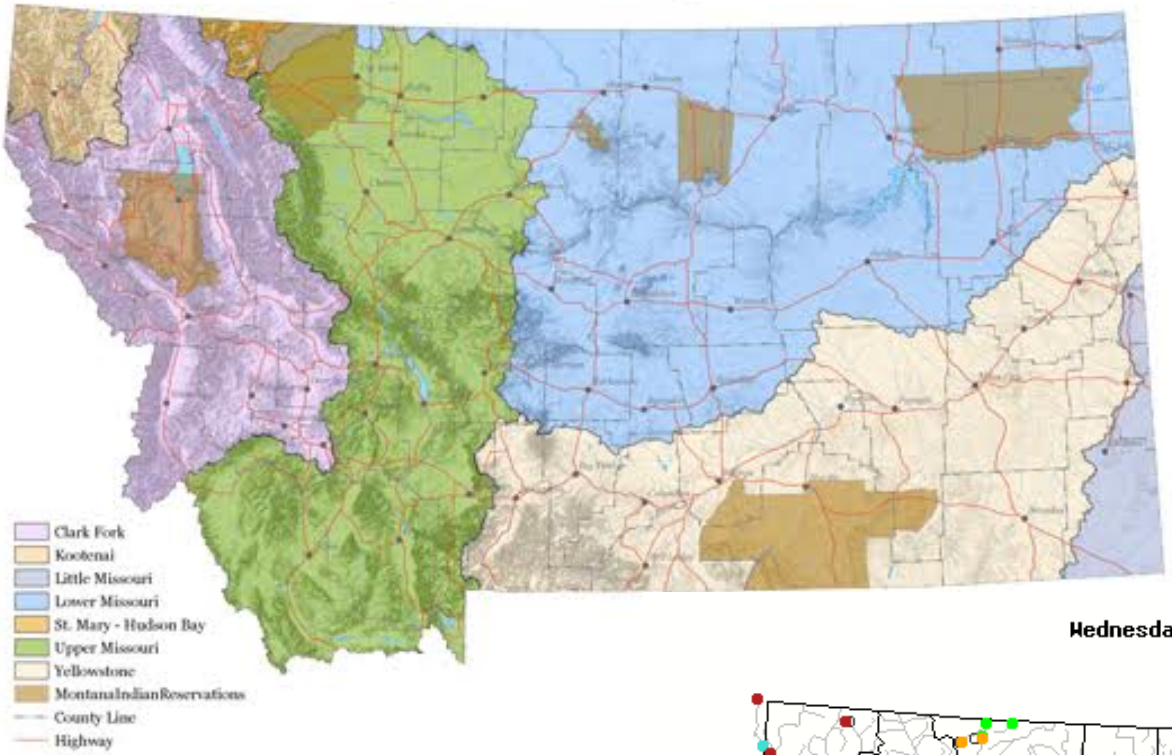


USGS WaterWatch

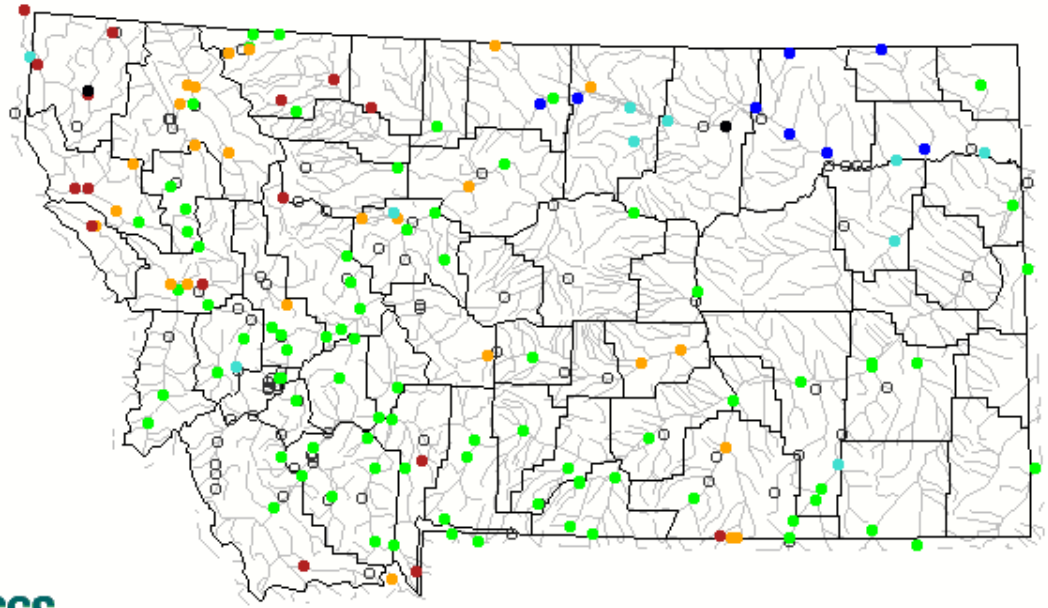
Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

2015 Montana Water Supply Initiative
Major Water Planning Basins

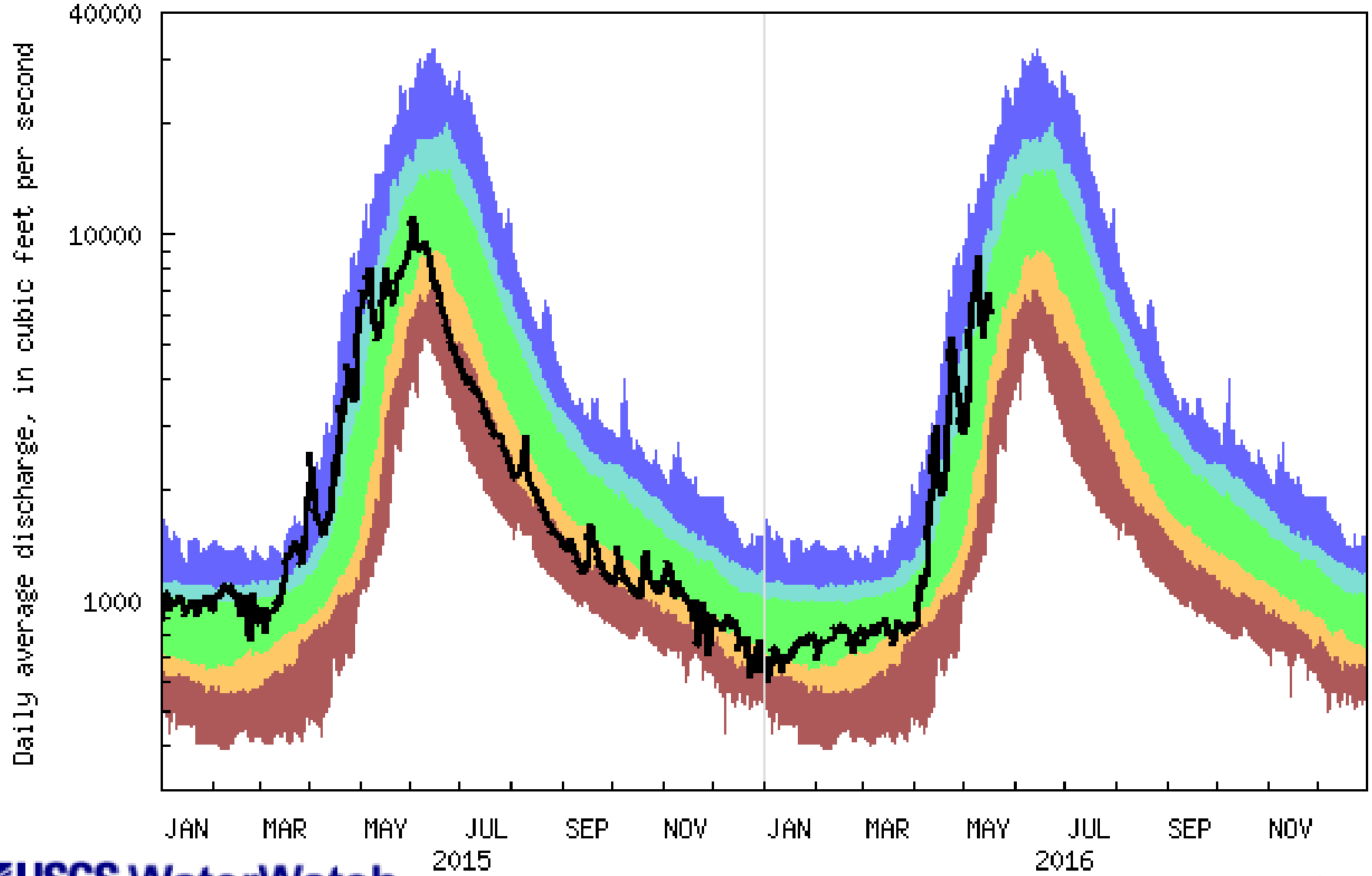


Wednesday, May 18, 2016 10:30ET



USGS

USGS 06191500 Yellowstone River at Corwin Springs MT
(Drainage Area: 2616 square miles, Length of Record: 125 years)

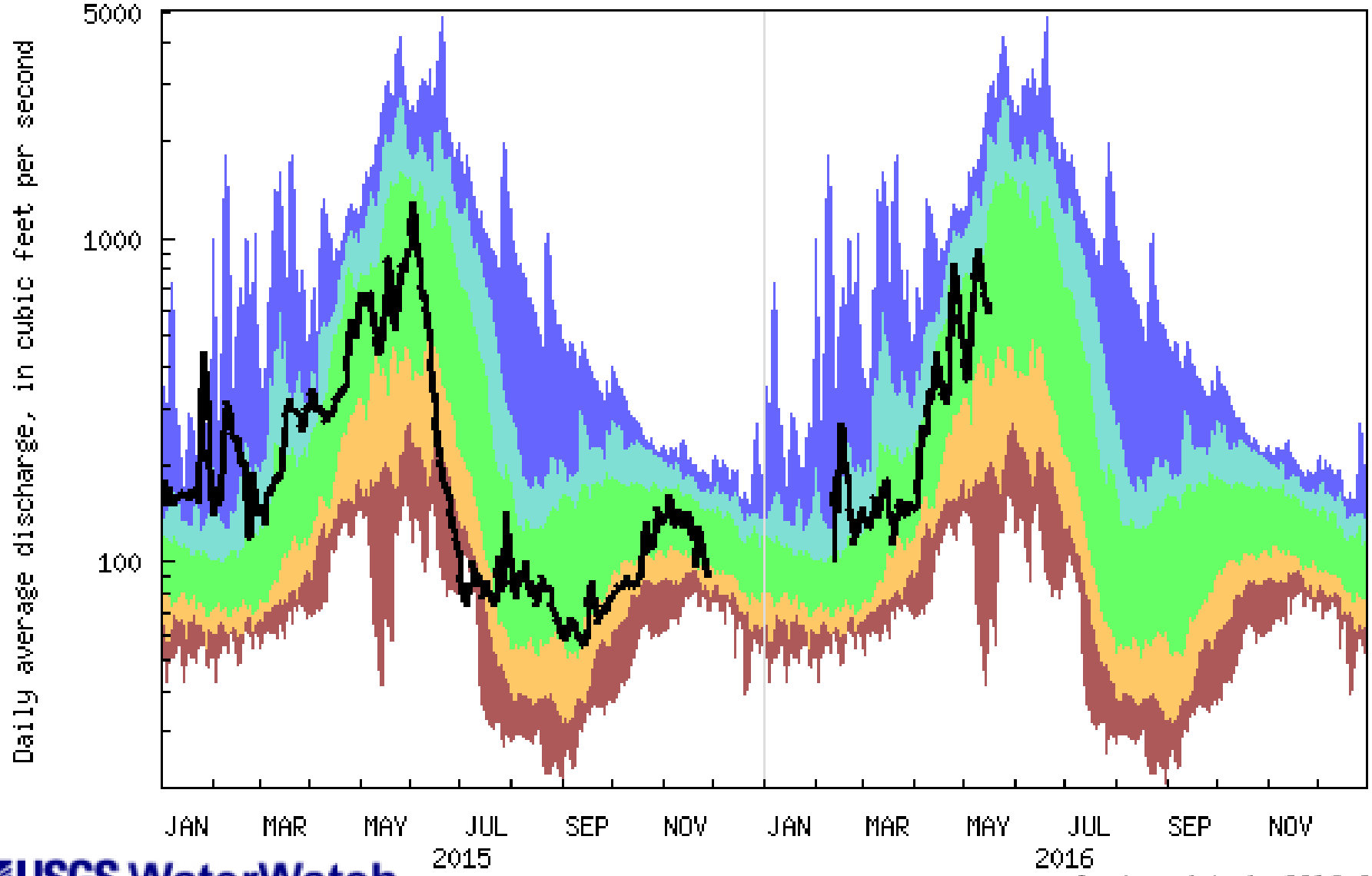


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06195600 Shields River nr Livingston MT
(Drainage Area: 846 square miles, Length of Record: 36 years)

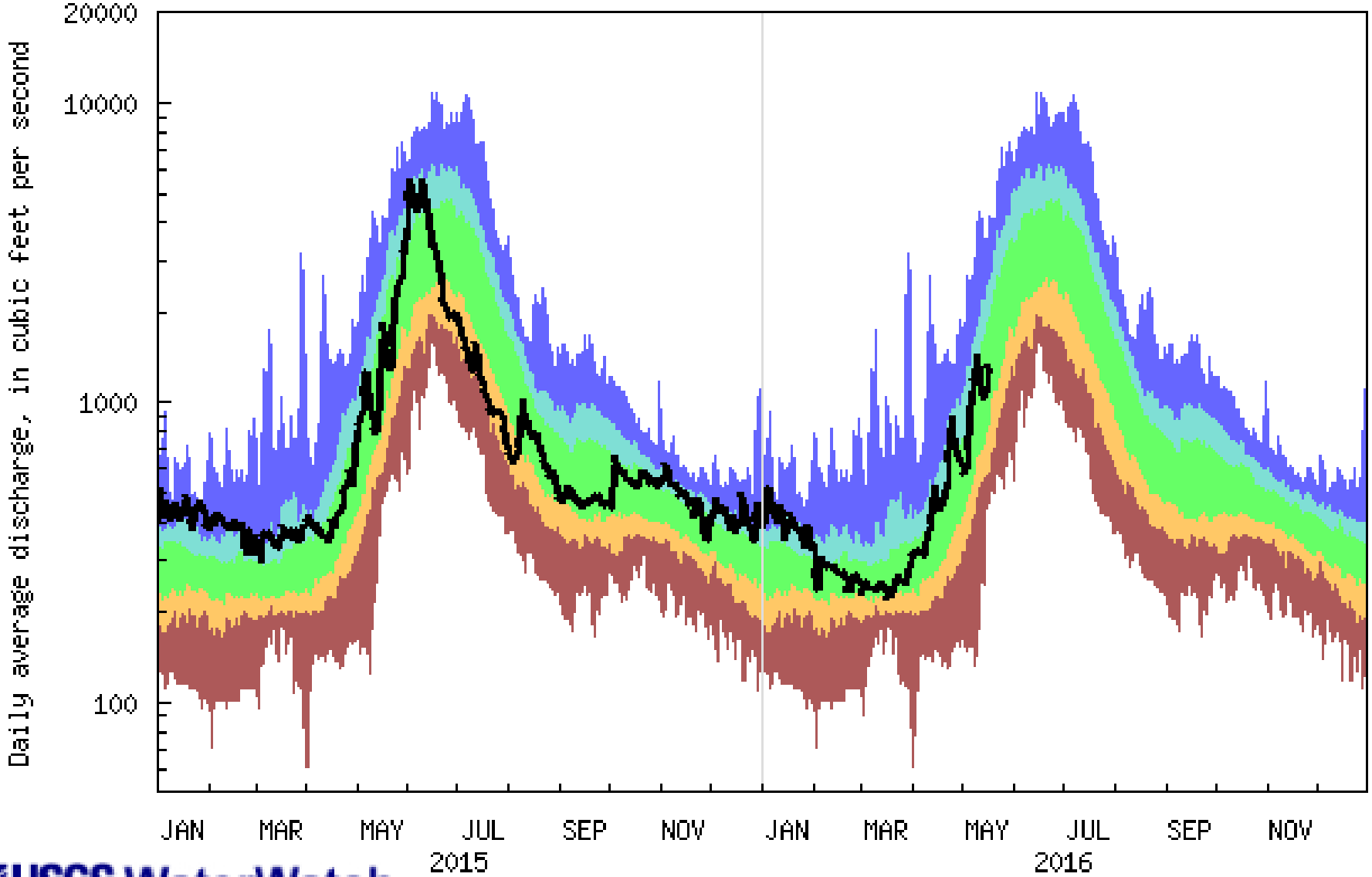


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06205000 Stillwater River near Absarokee MT
(Drainage Area: 976 square miles, Length of Record: 79 years)

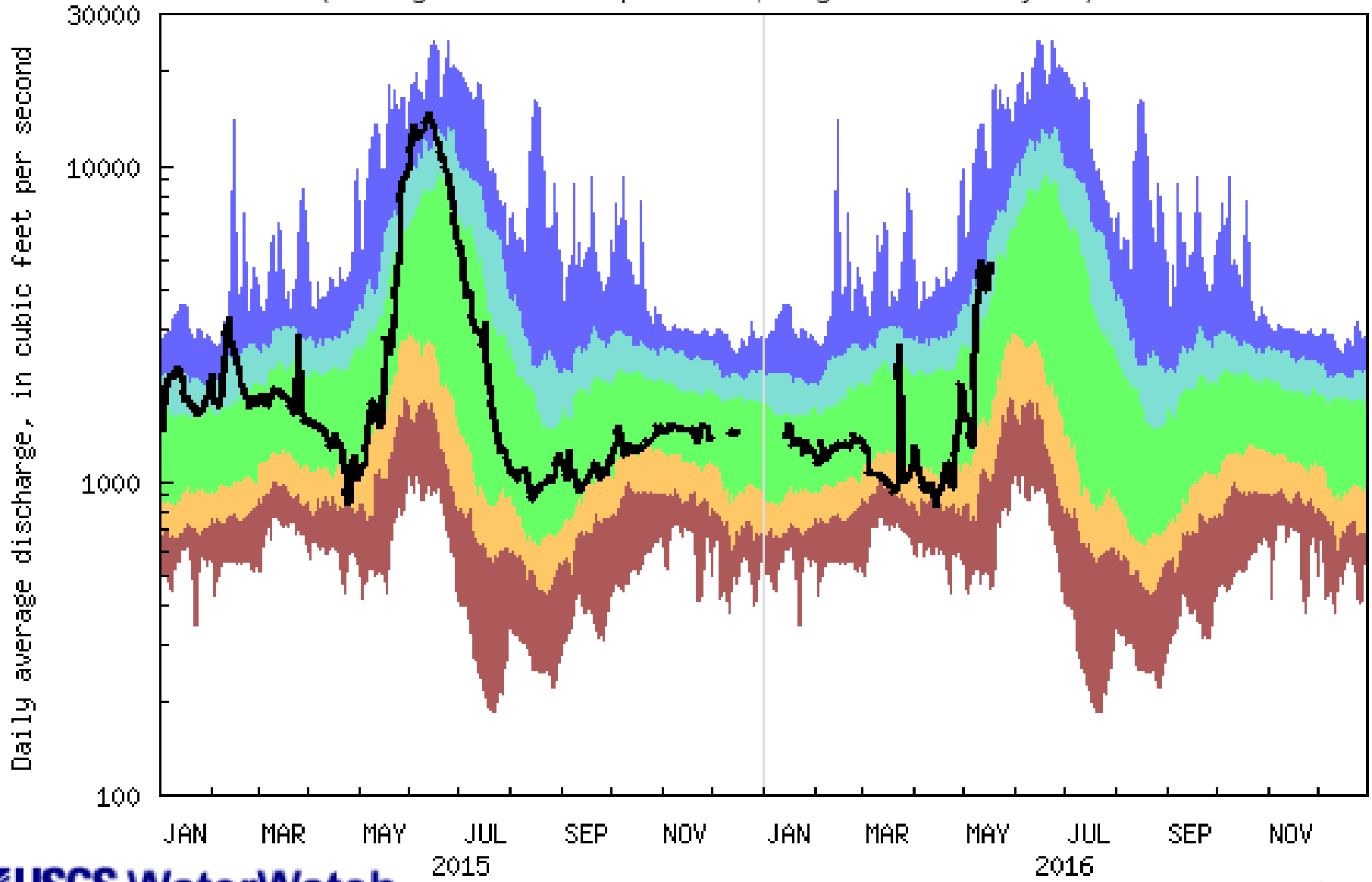


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06279500 BIGHORN RIVER AT KANE, WY
(Drainage Area: 15762 square miles, Length of Record: 85 years)

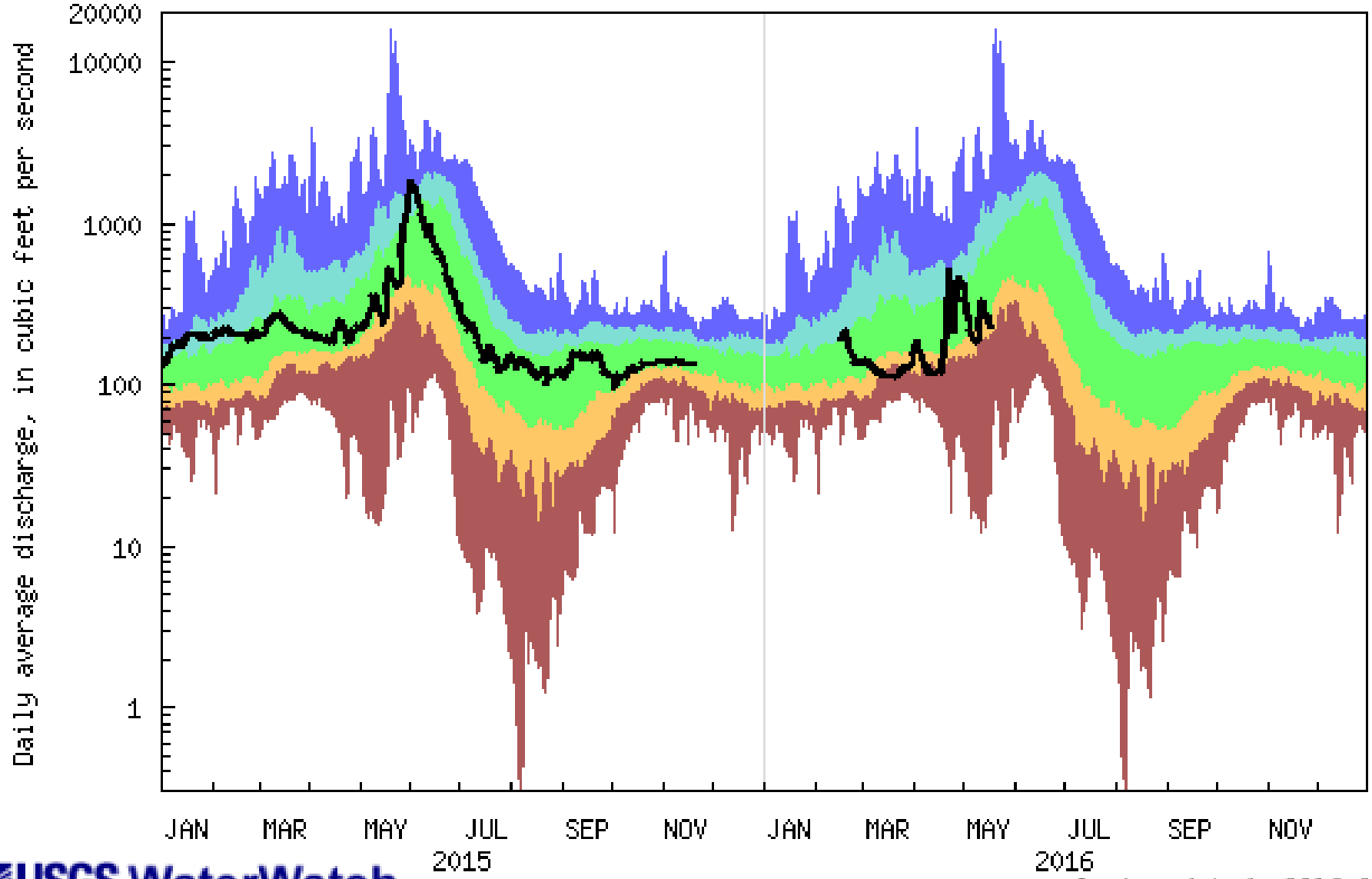


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06294000 Little Bighorn River near Hardin MT
(Drainage Area: 1294 square miles, Length of Record: 61 years)

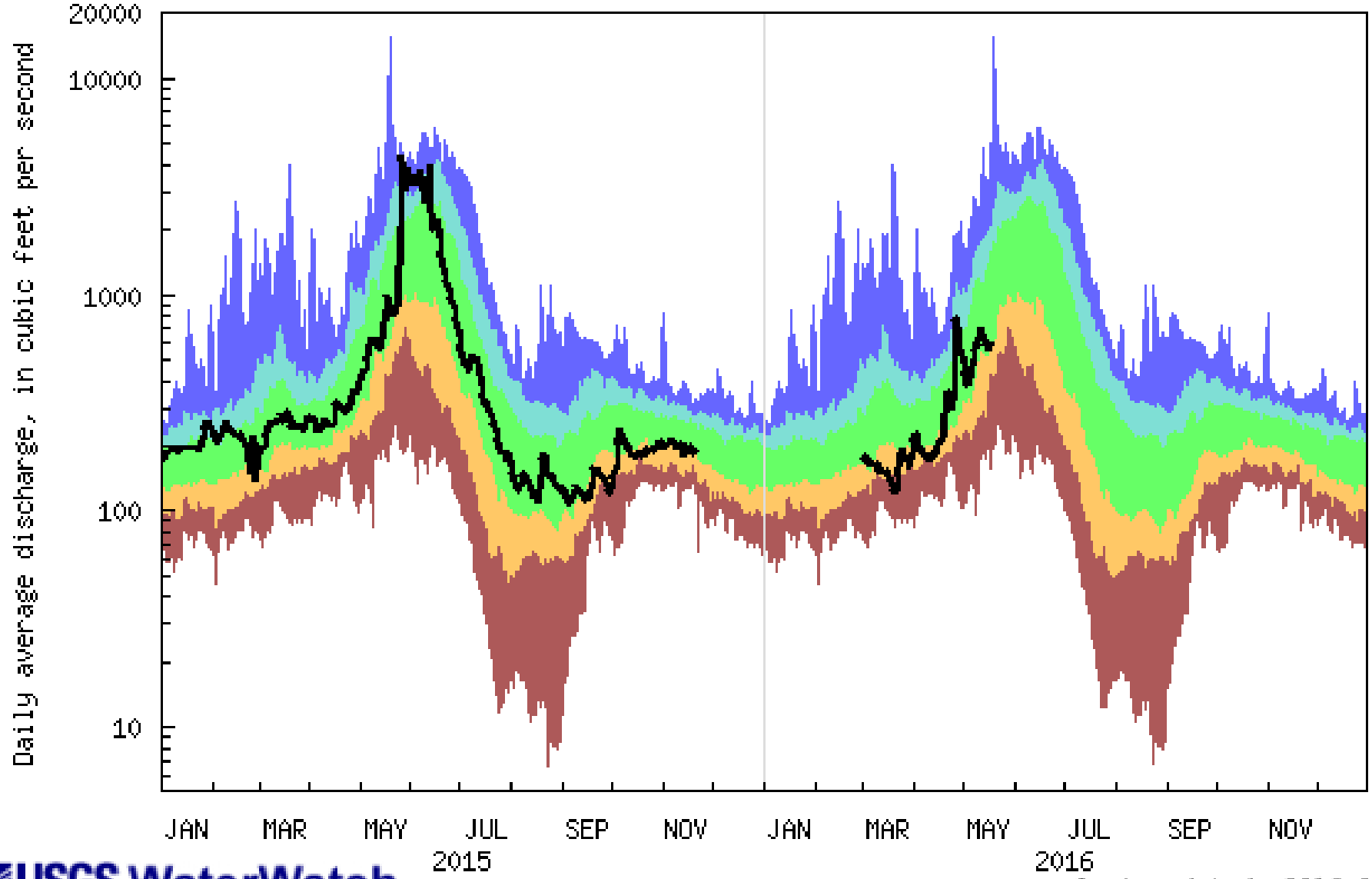


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06306300 Tongue River at State Line nr Decker MT
(Drainage Area: 1451 square miles, Length of Record: 54 years)

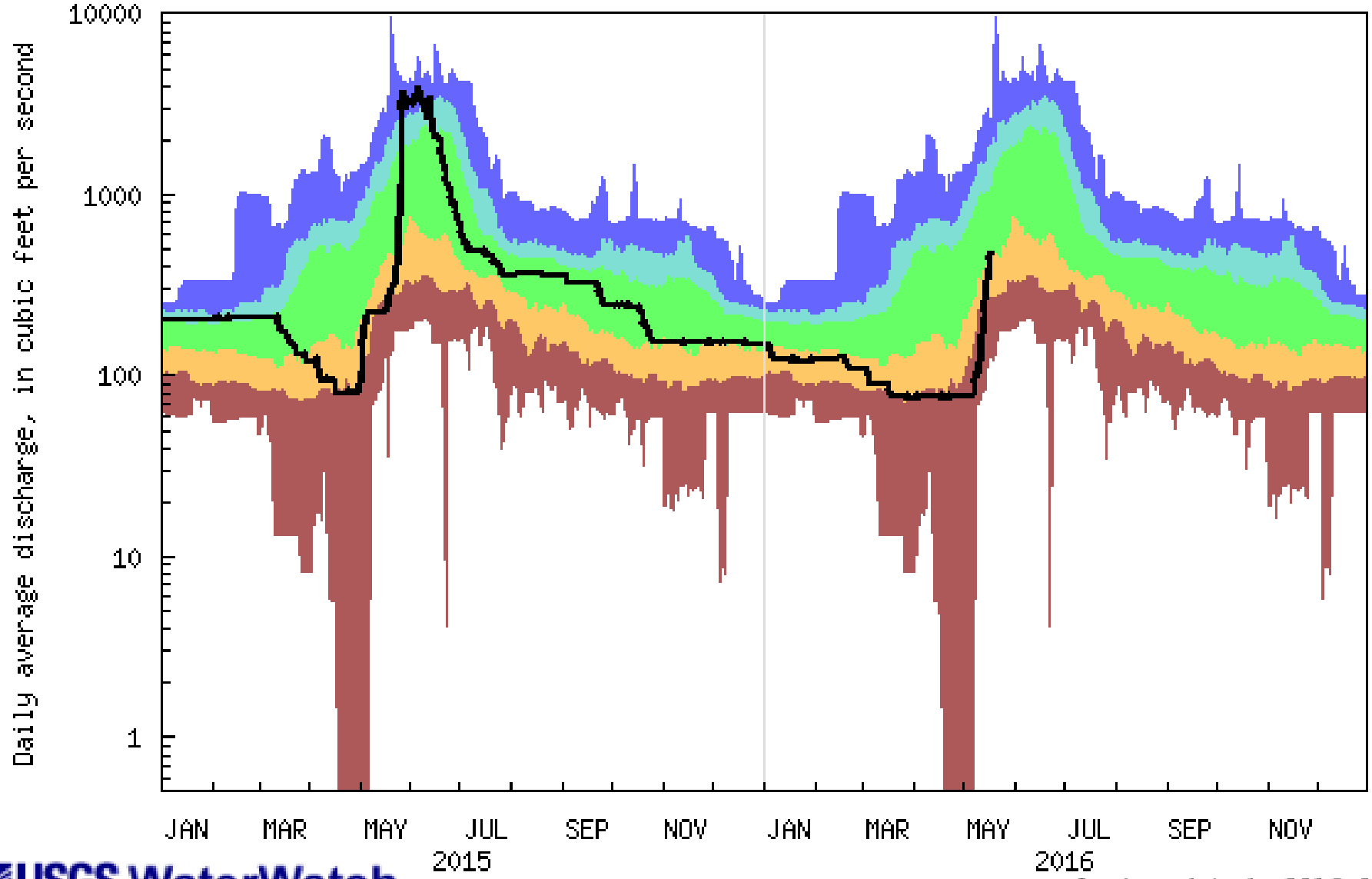


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06307500 Tongue River at Tongue R Dam nr Decker MT
(Drainage Area: 1783 square miles, Length of Record: 75 years)

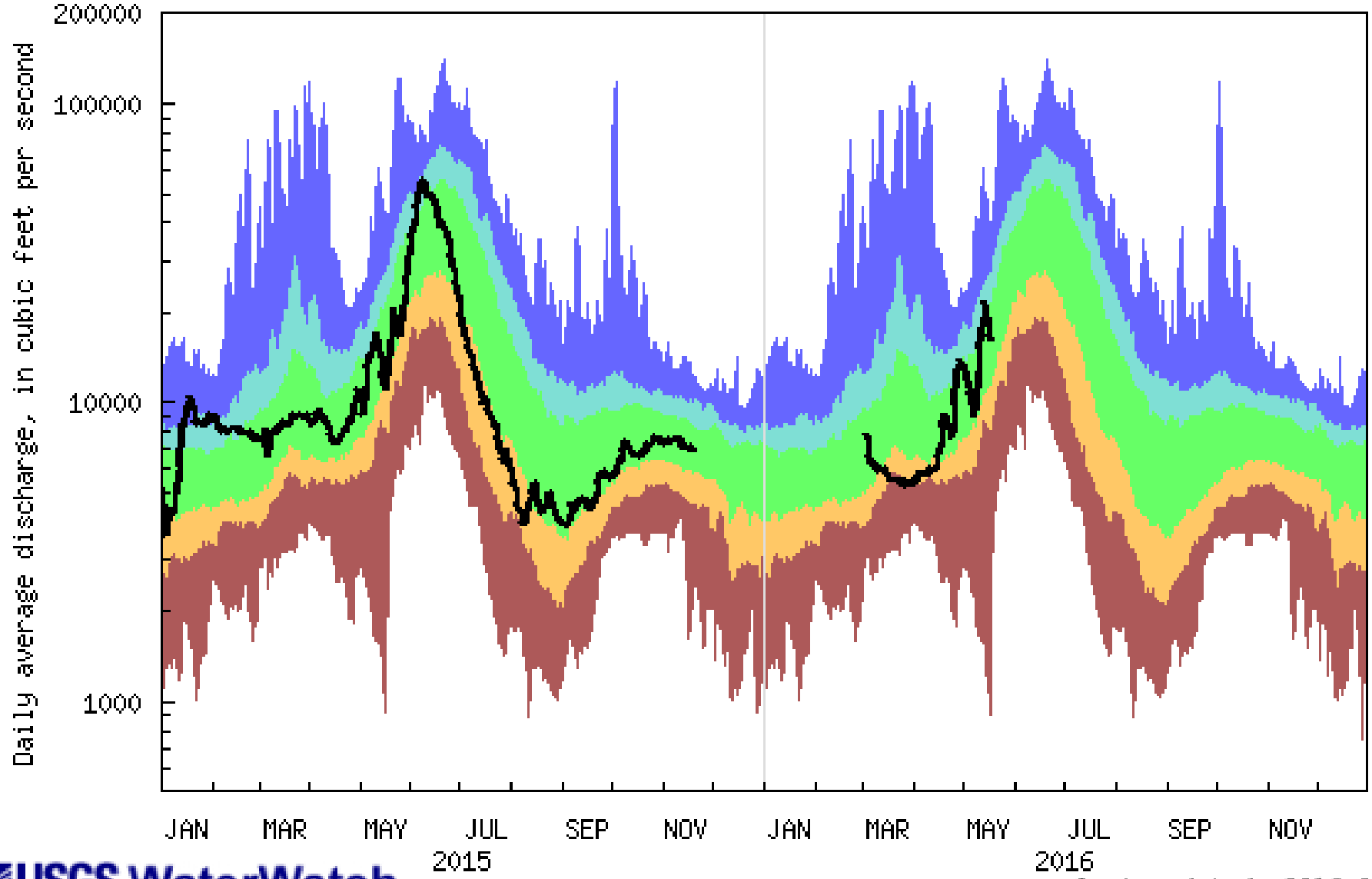


USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS 06329500 Yellowstone River near Sidney MT
(Drainage Area: 69099 square miles, Length of Record: 104 years)



USGS WaterWatch

Last updated: 2016-05-18

Explanation - Percentile classes					
lowest-10th percentile	10-24	25-75	76-90	90th percentile -highest	Flow
Much below normal	Below normal	Normal	Above normal	Much above normal	

USGS Home Page: http://usgs.gov

NwisWeb: http://water.usgs.gov/mt/nwis
Access to streamflow (realtime and historical), water quality, and ground water information.

Wyoming-Montana WSC Home Page: http://wy-mt.water.usgs.gov/

Montana Current Streamflow Conditions
http://waterdata.usgs.gov/mt/nwis/current/

RECLAMATION

Managing Water in the West

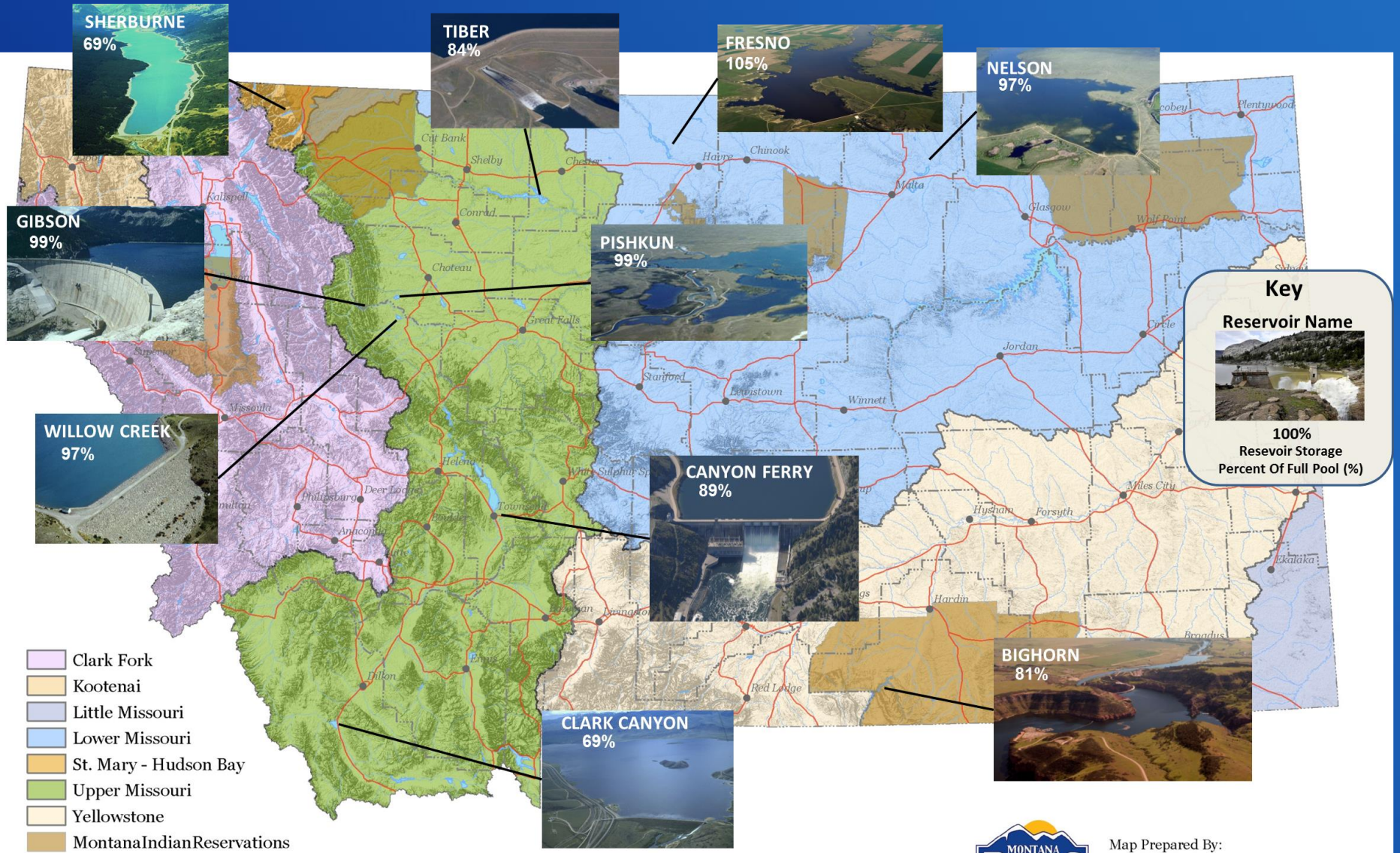
River and Reservoir

Status Briefing

RESERVOIR AND RIVER OPERATIONS

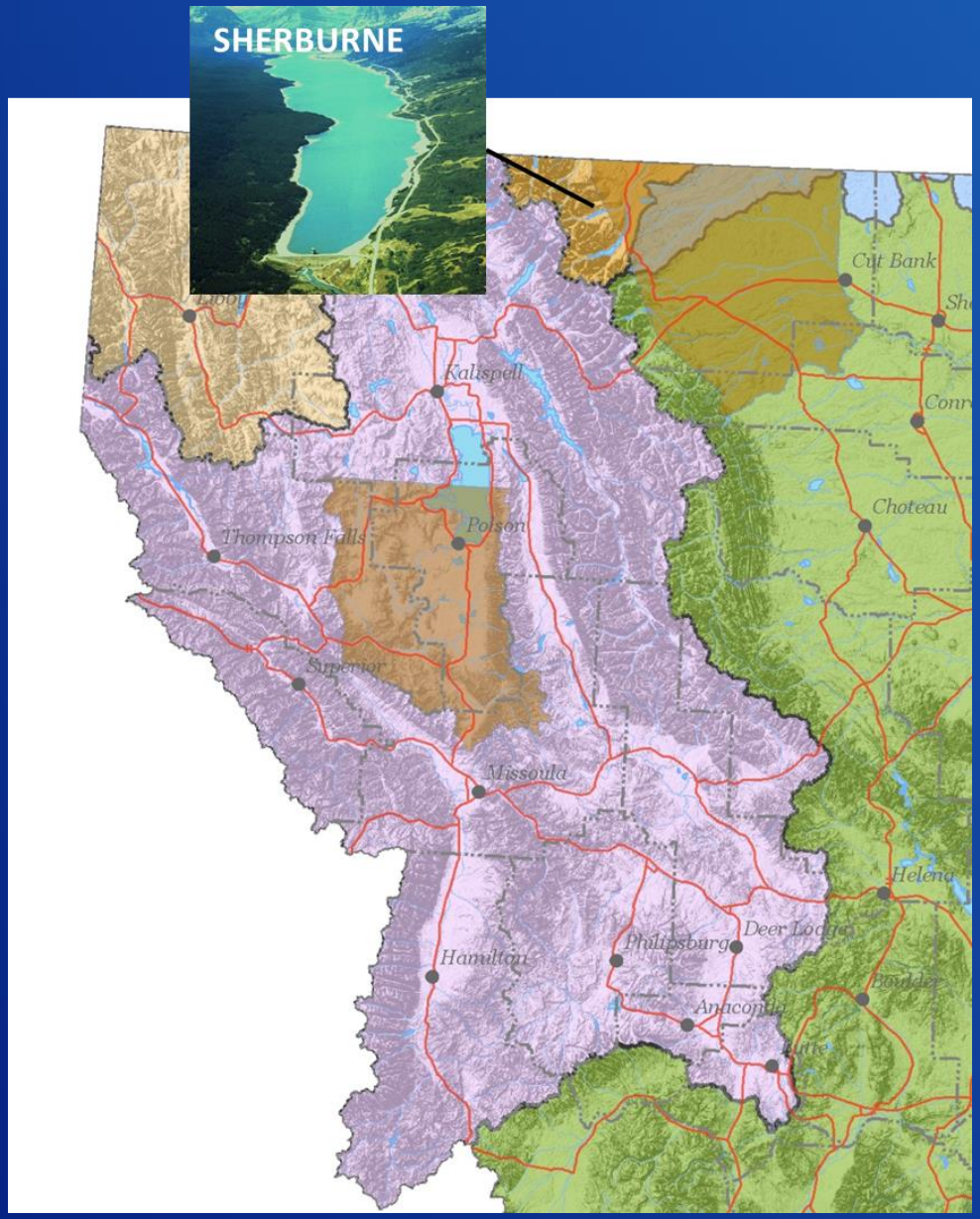
Montana Area Office
Billings
May 19, 2016

U.S. Department of the Interior
Bureau of Reclamation



Reclamation: Montana Area Office
Reservoir Storage Status : May 16, 2016

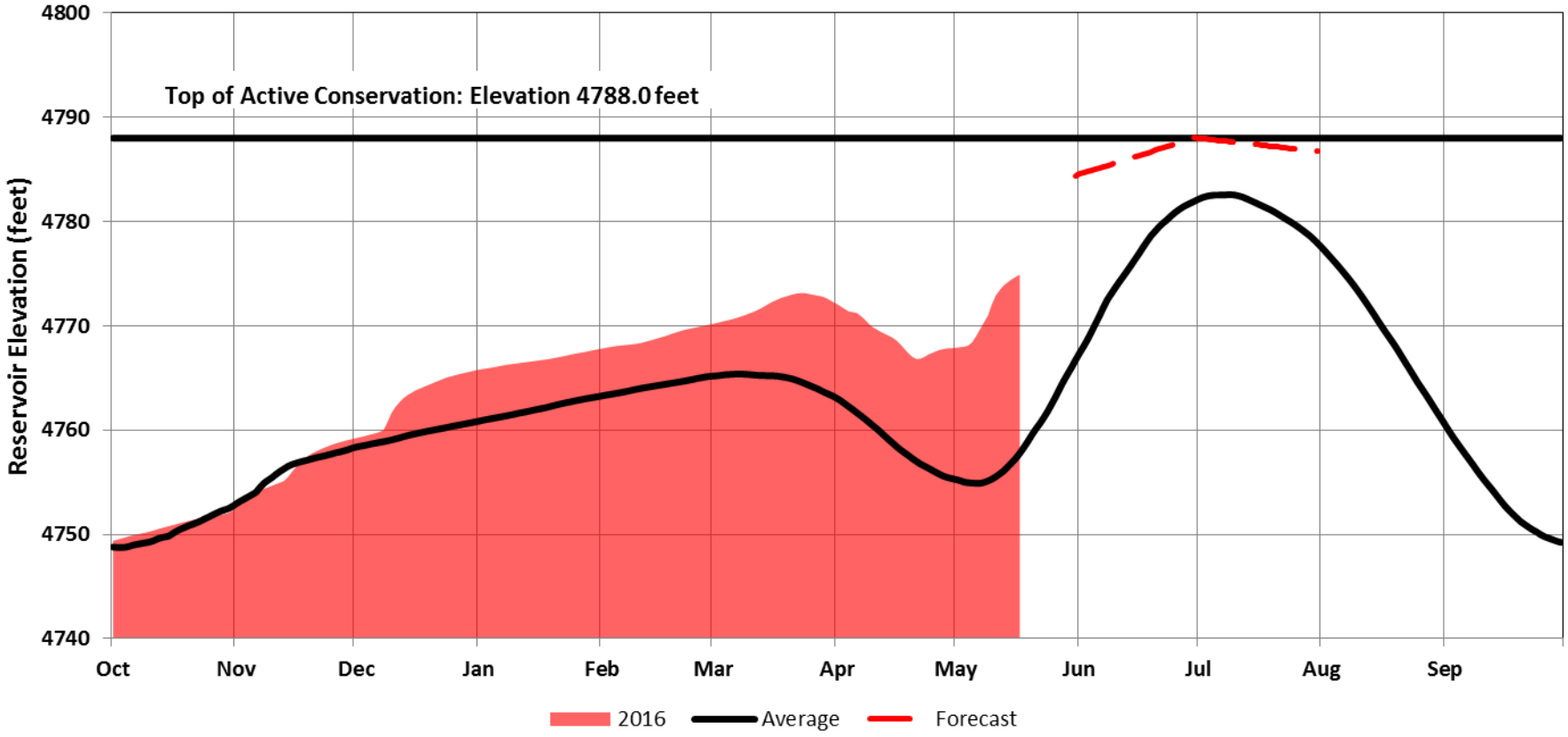
RECLAMATION

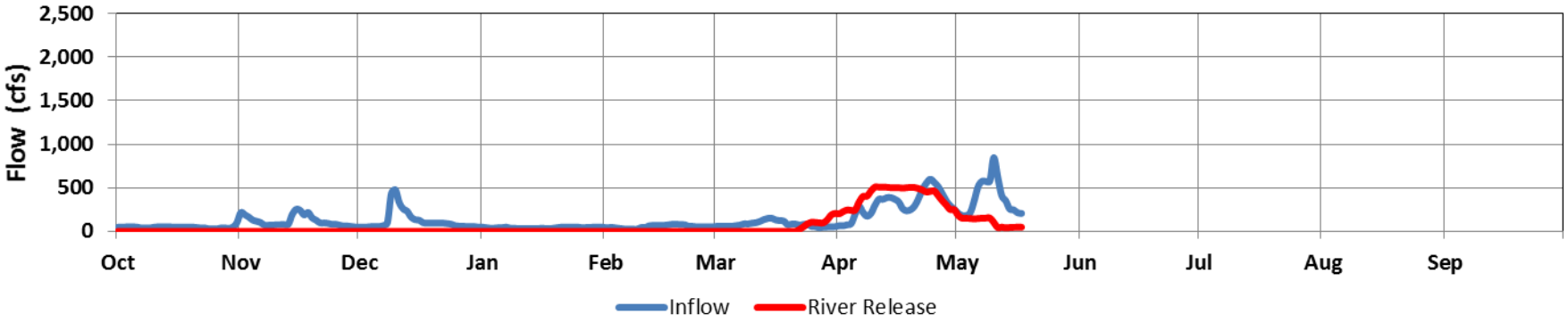


Clark Fork Kootienai St. Mary Basins

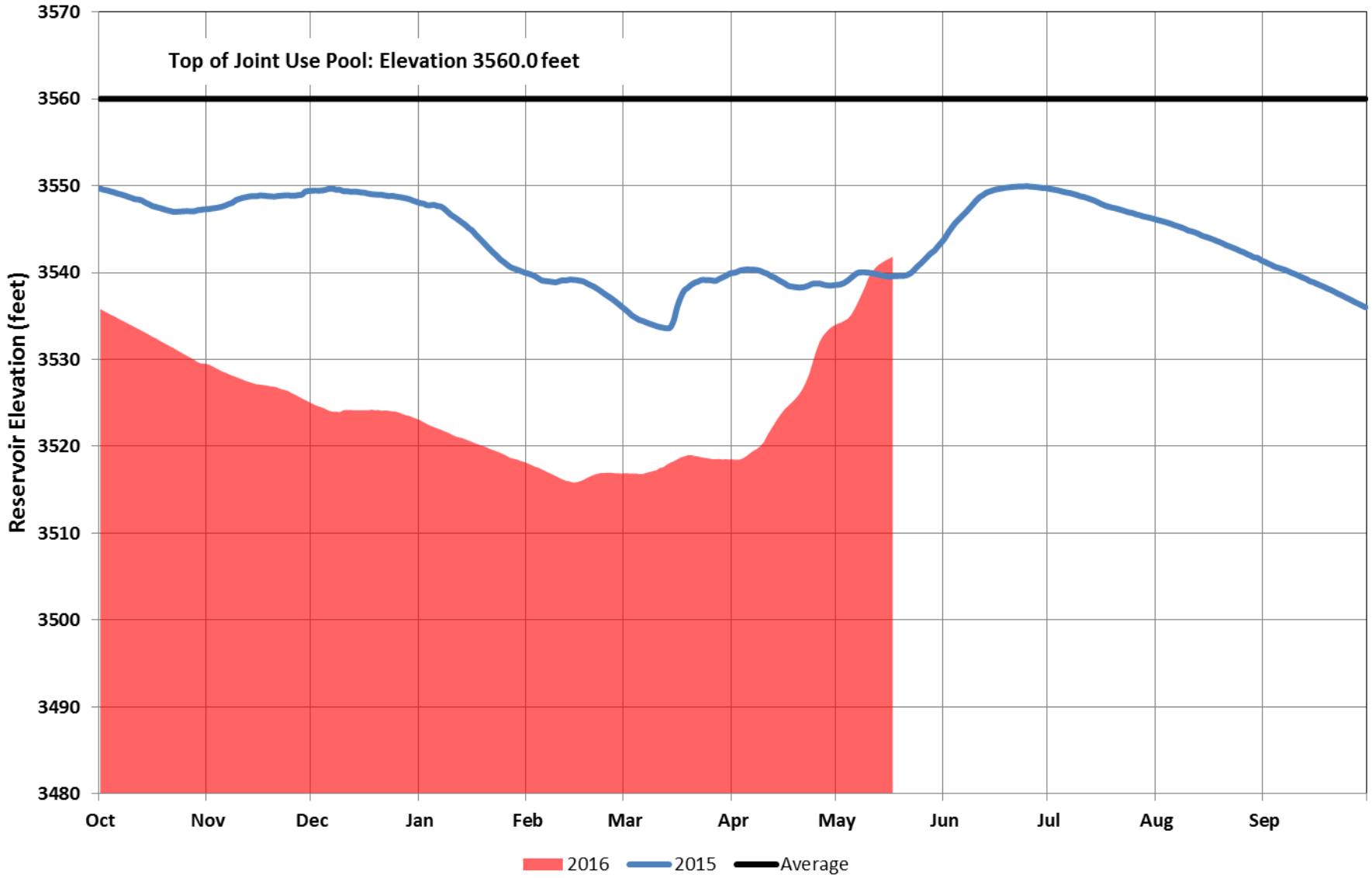
RECLAMATION

Lake Sherburne Operations

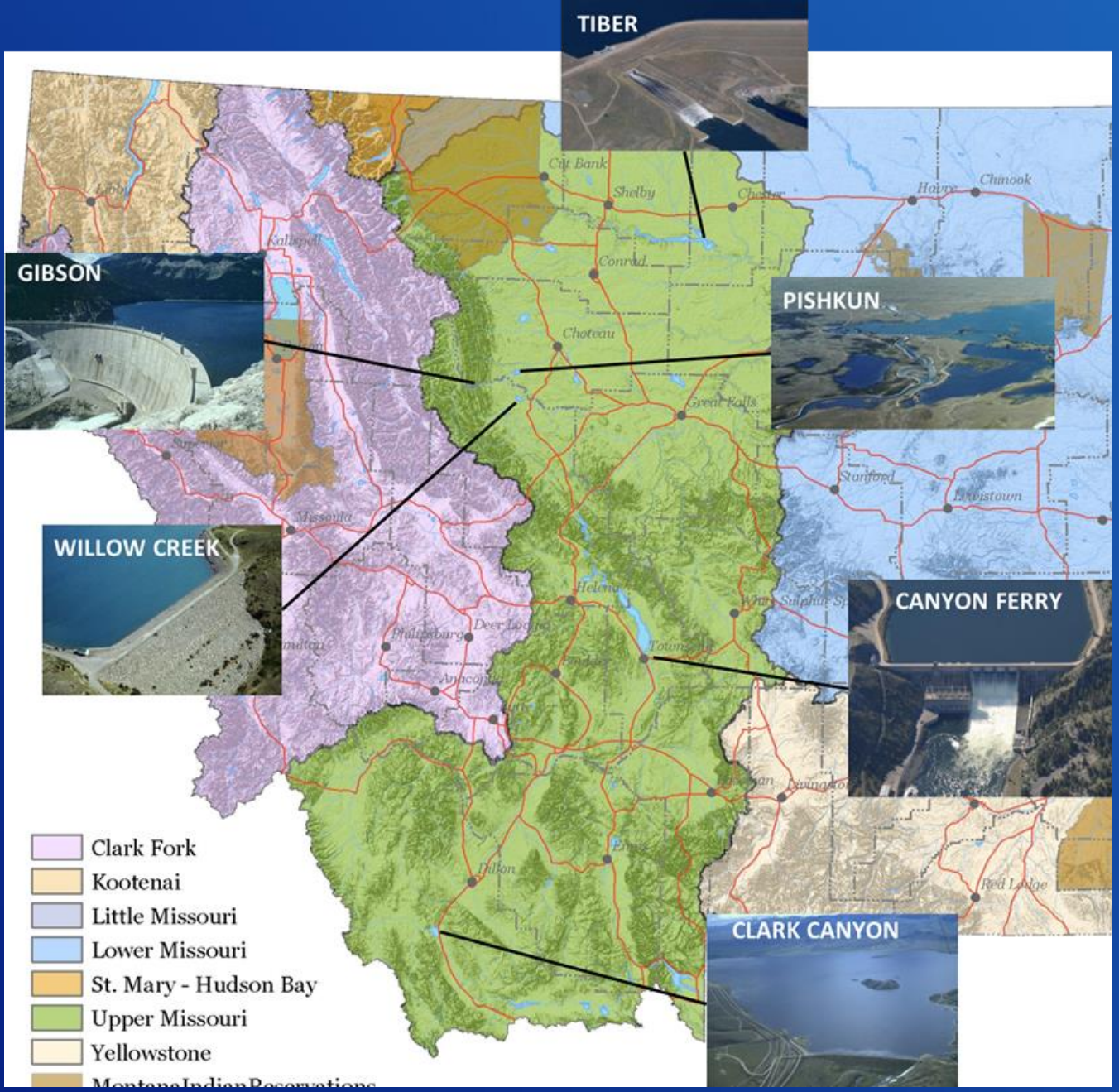




Hungry Horse Reservoir Operations



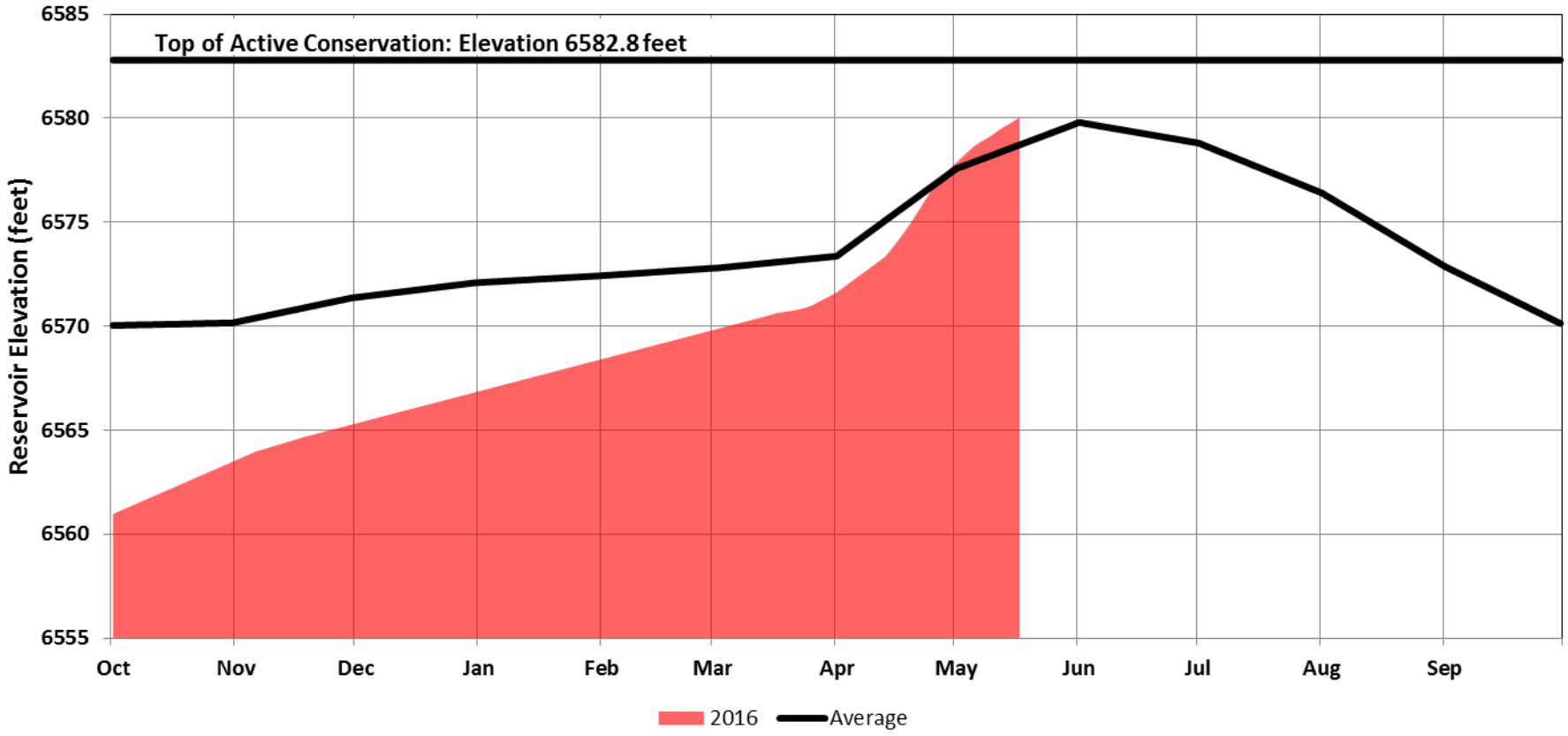
RECLAMATION

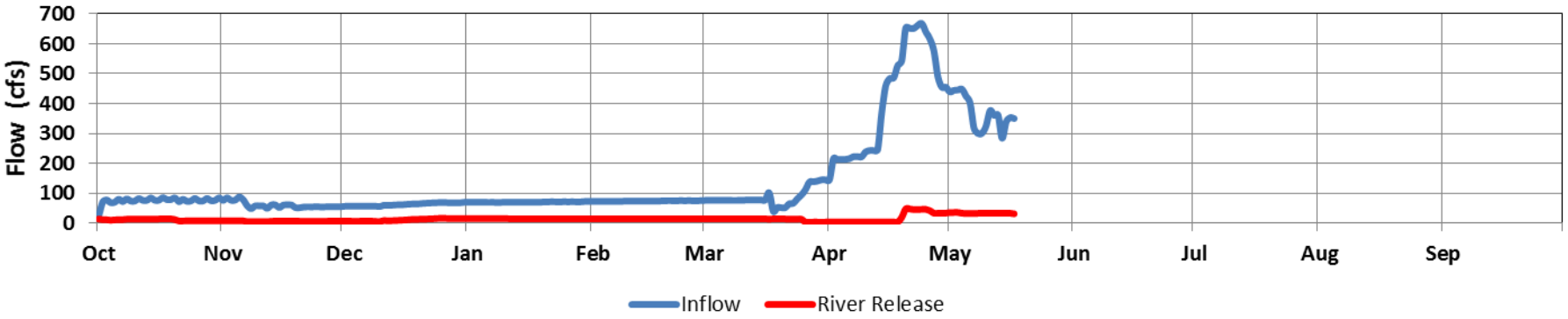


Upper Missouri Basin

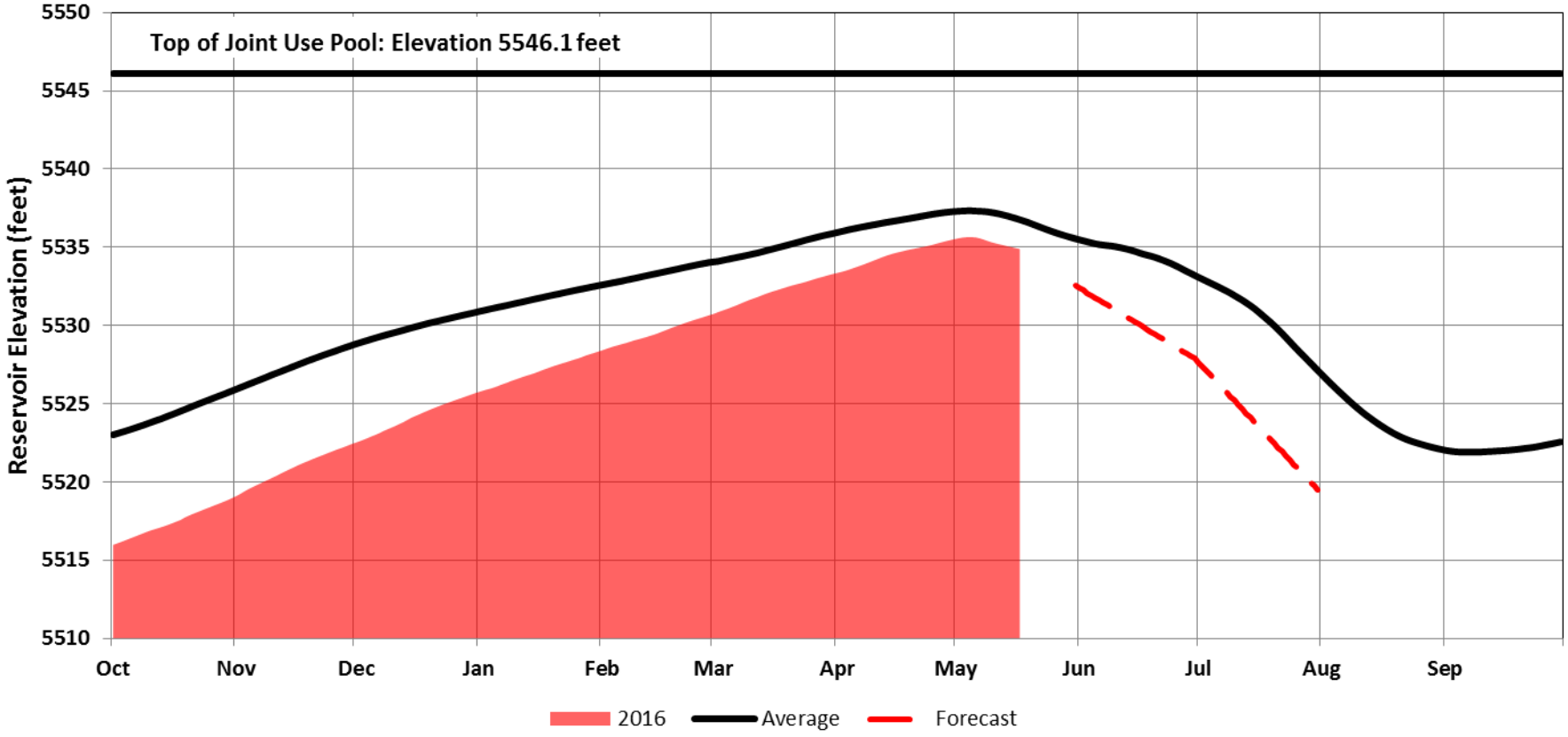
RECLAMATION

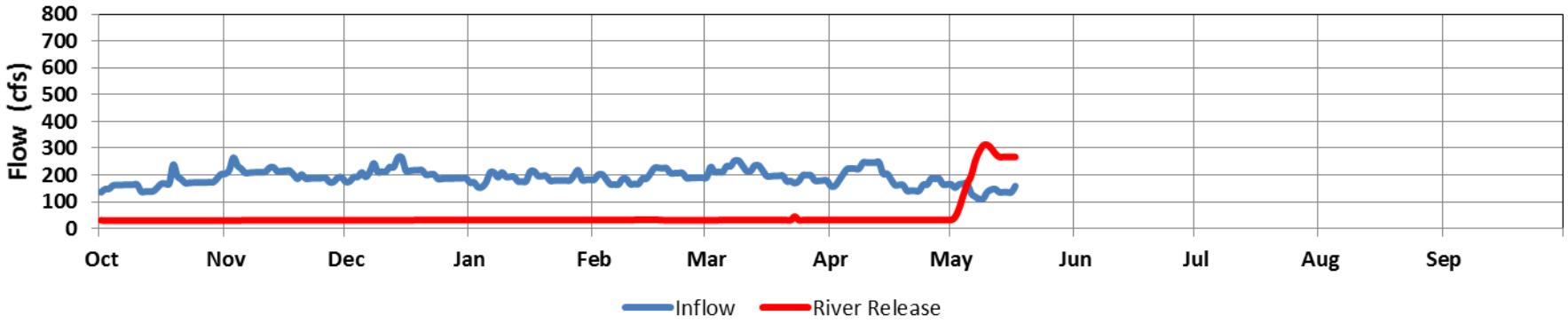
Lima Reservoir Operations



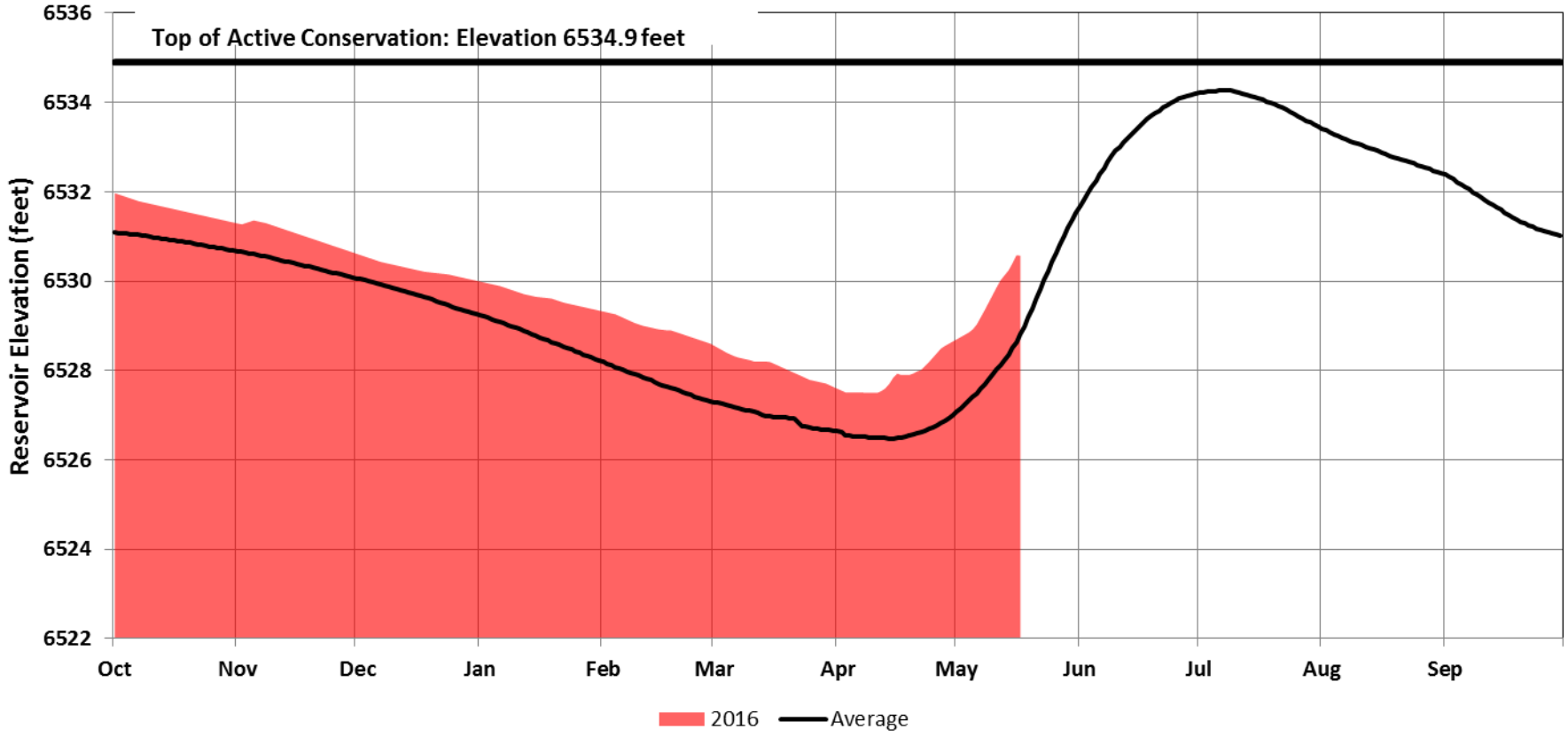


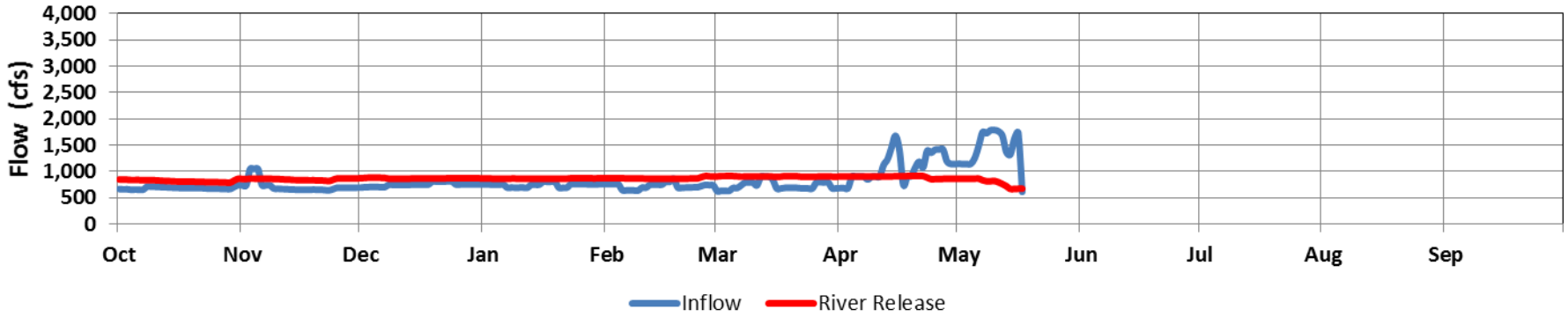
Clark Canyon Reservoir Operations



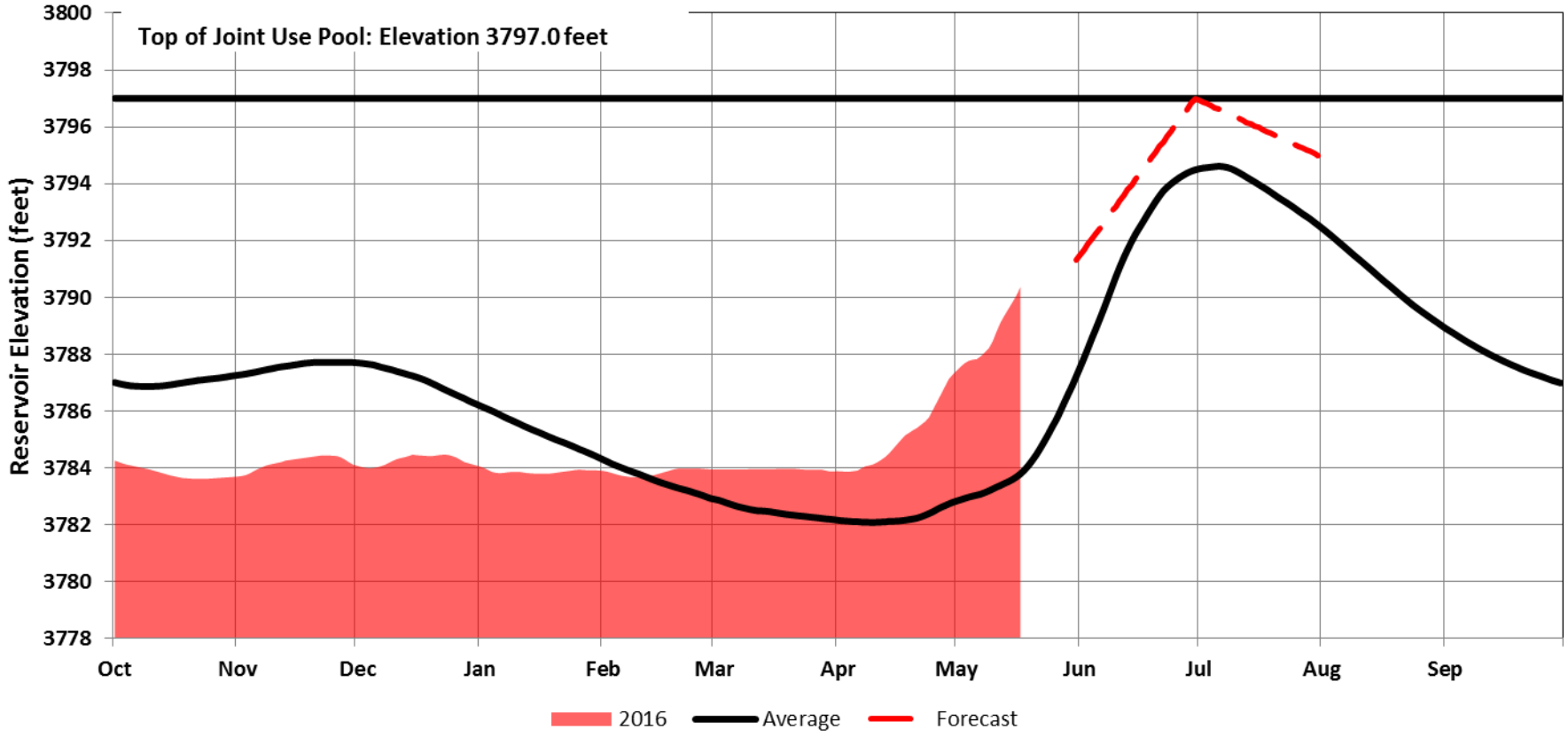


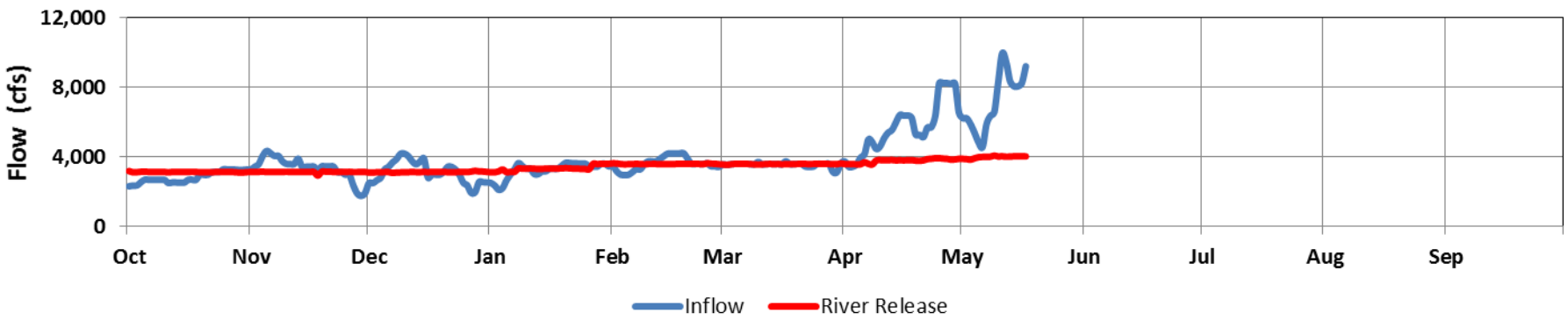
Hebgen Reservoir Operations



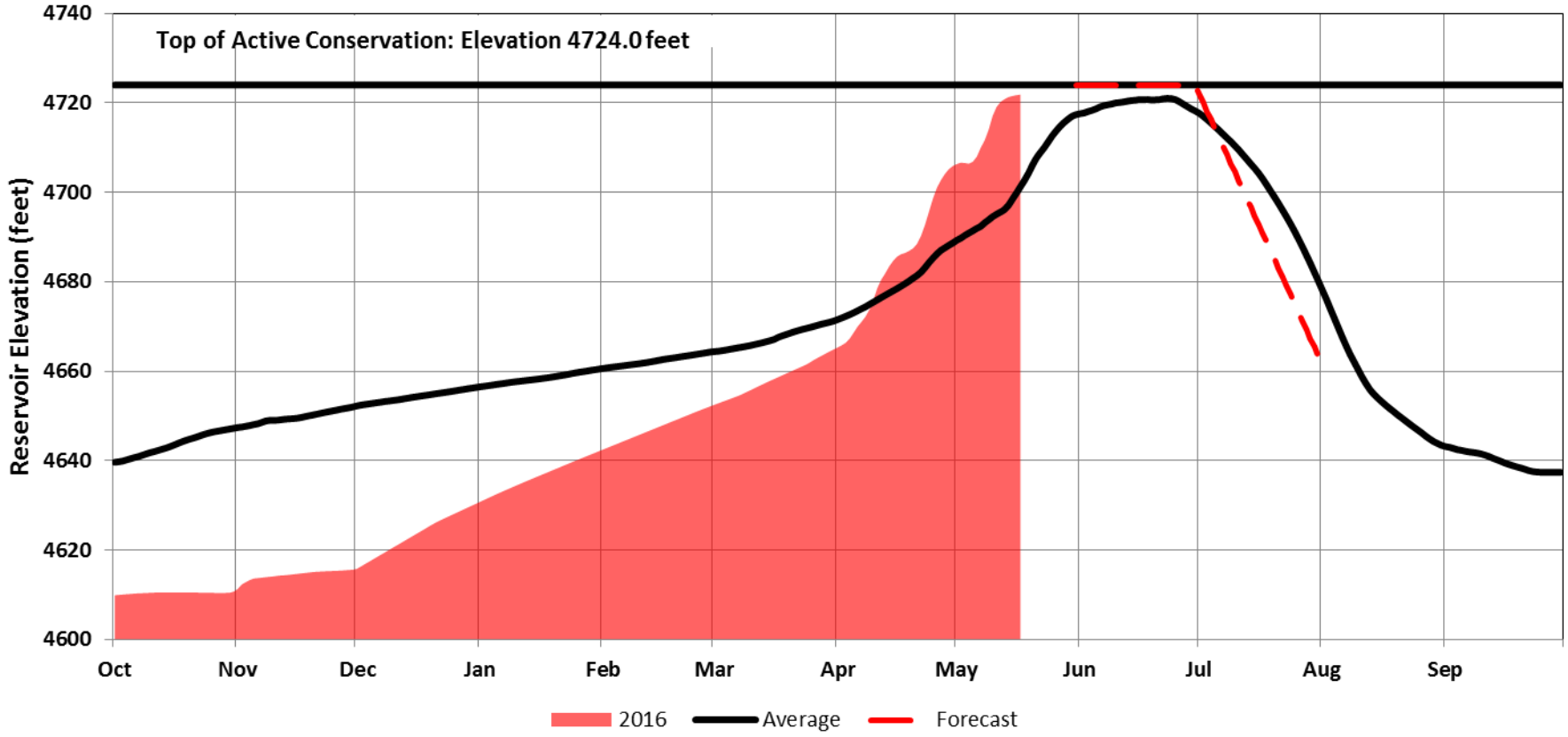


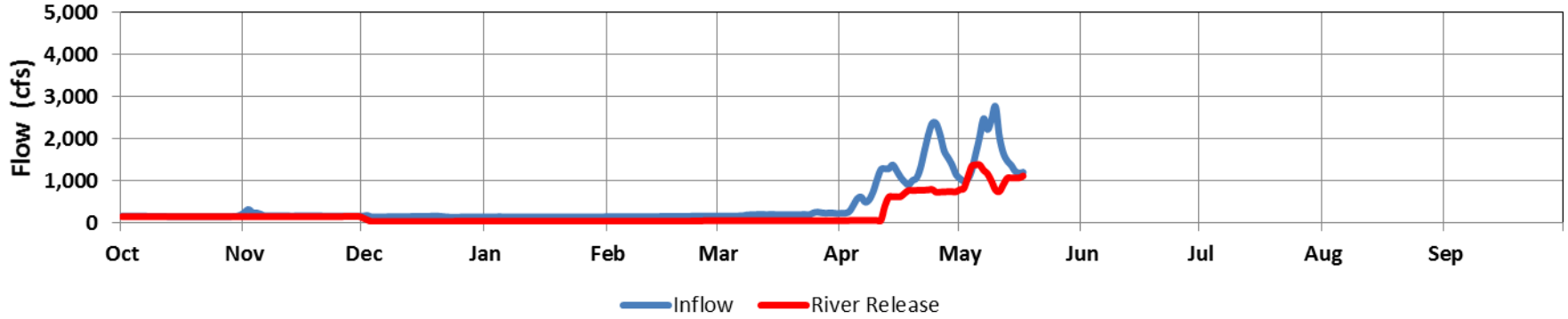
Canyon Ferry Reservoir Operations



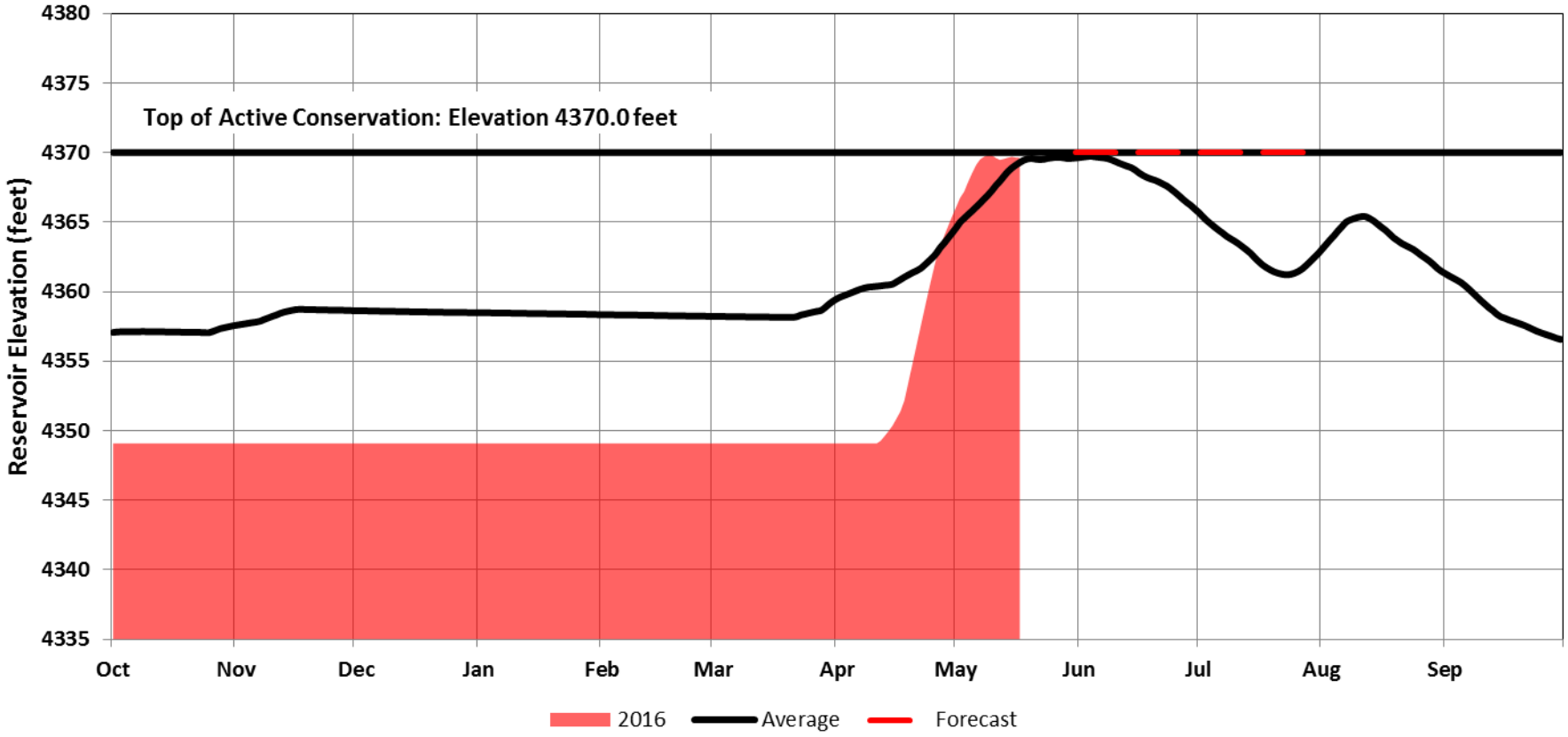


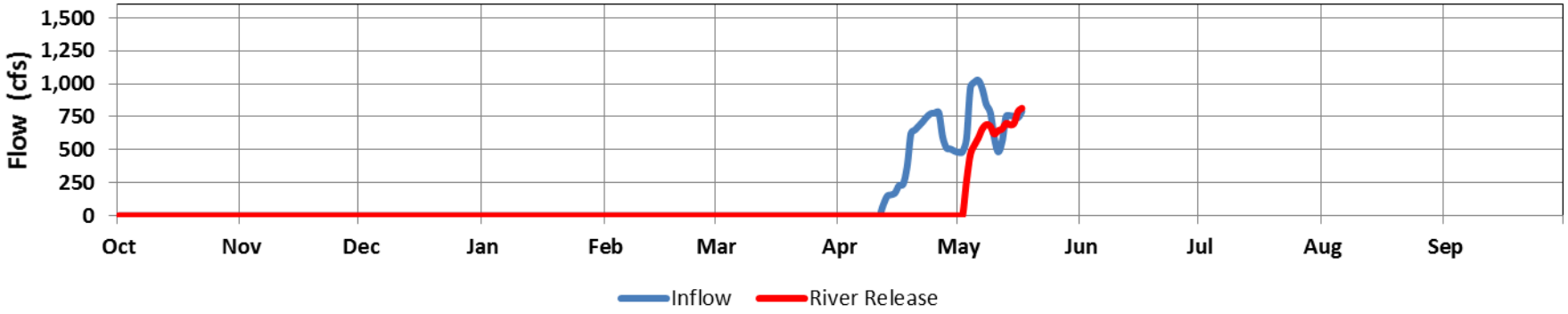
Gibson Reservoir Operations



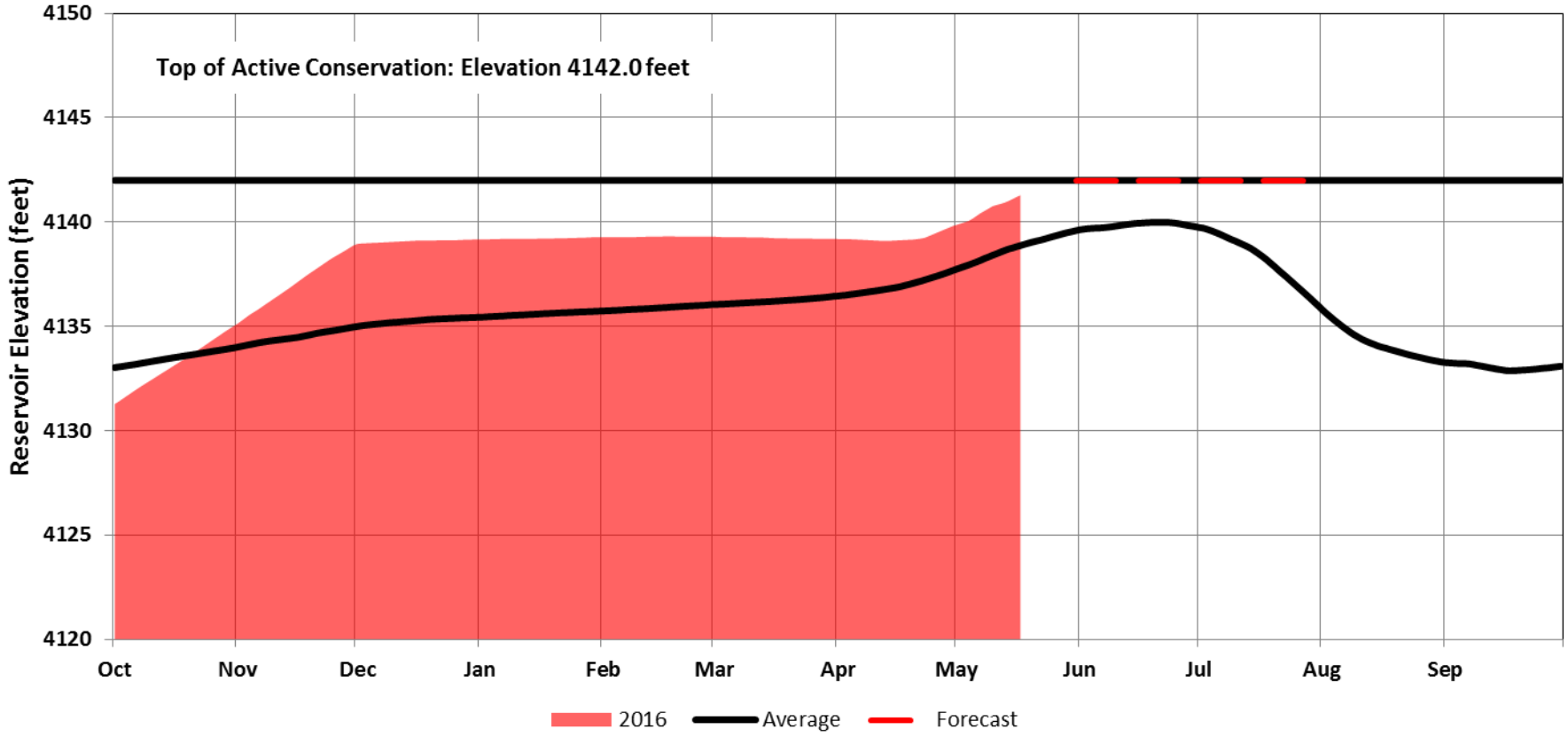


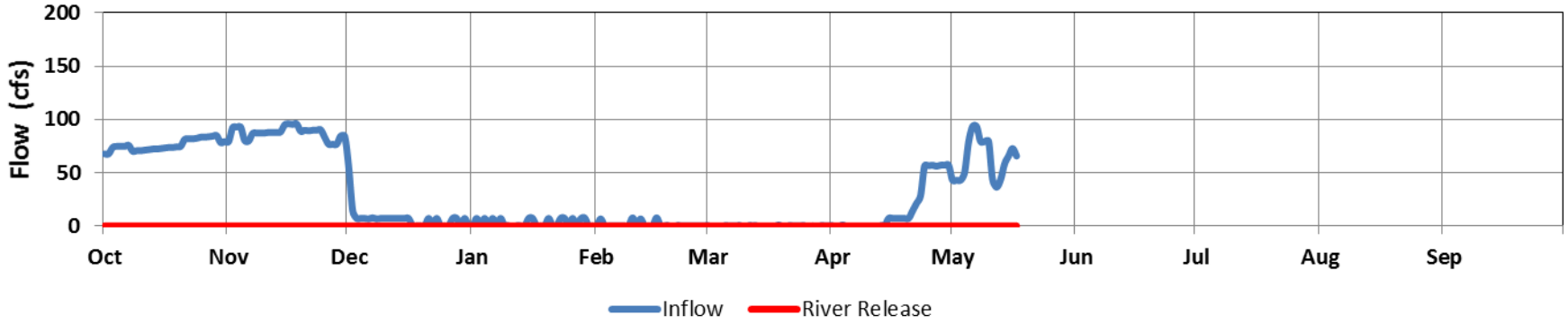
Pishkun Reservoir Operations



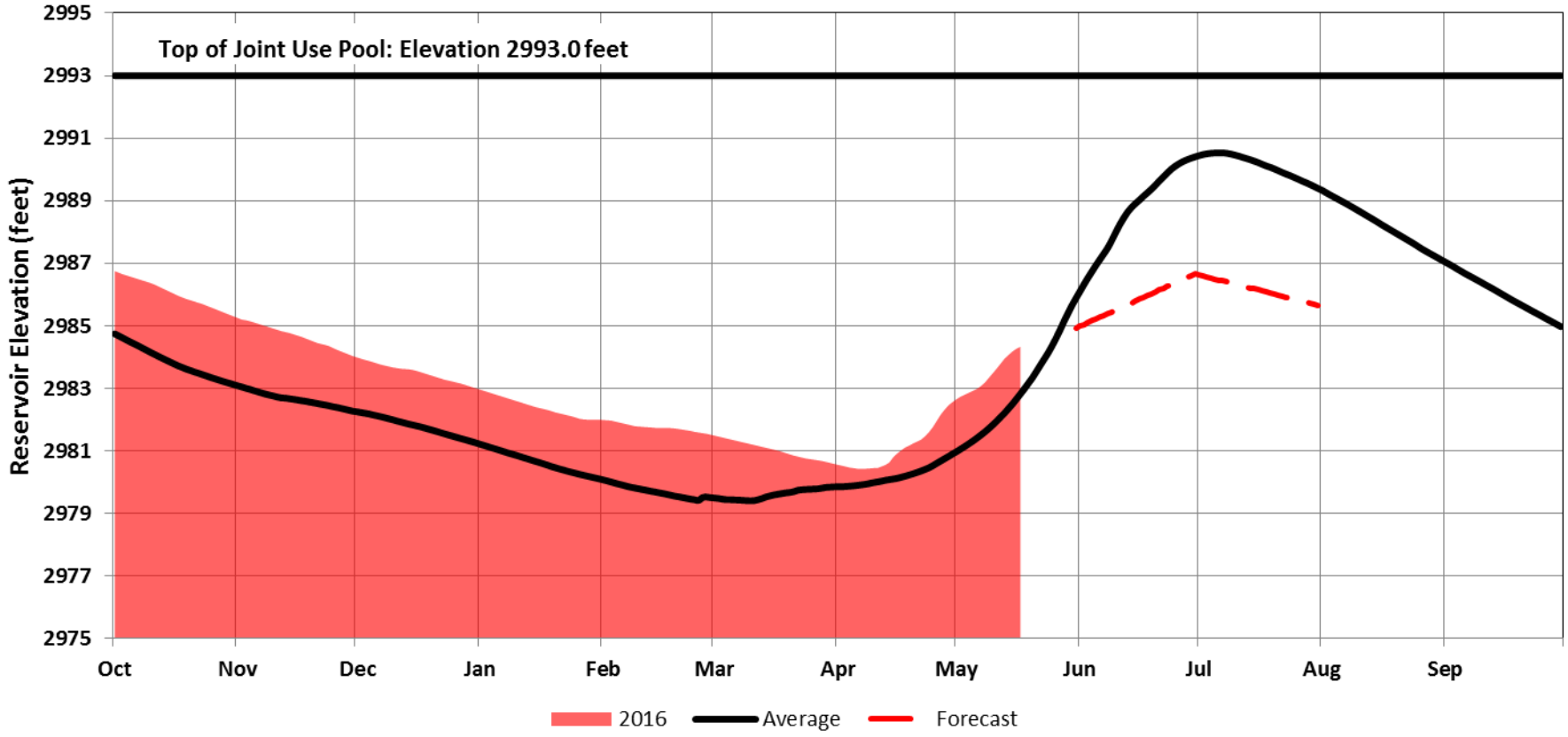


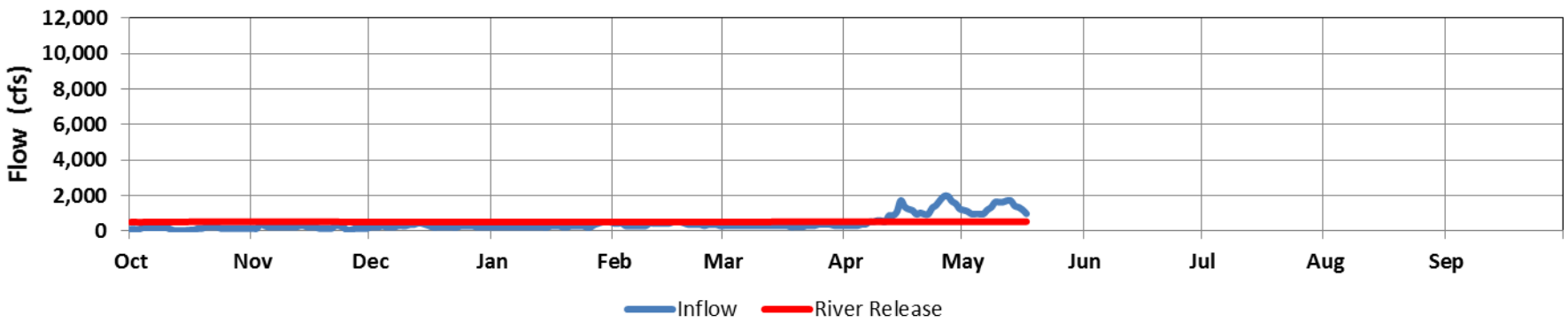
Willow Creek Reservoir Operations



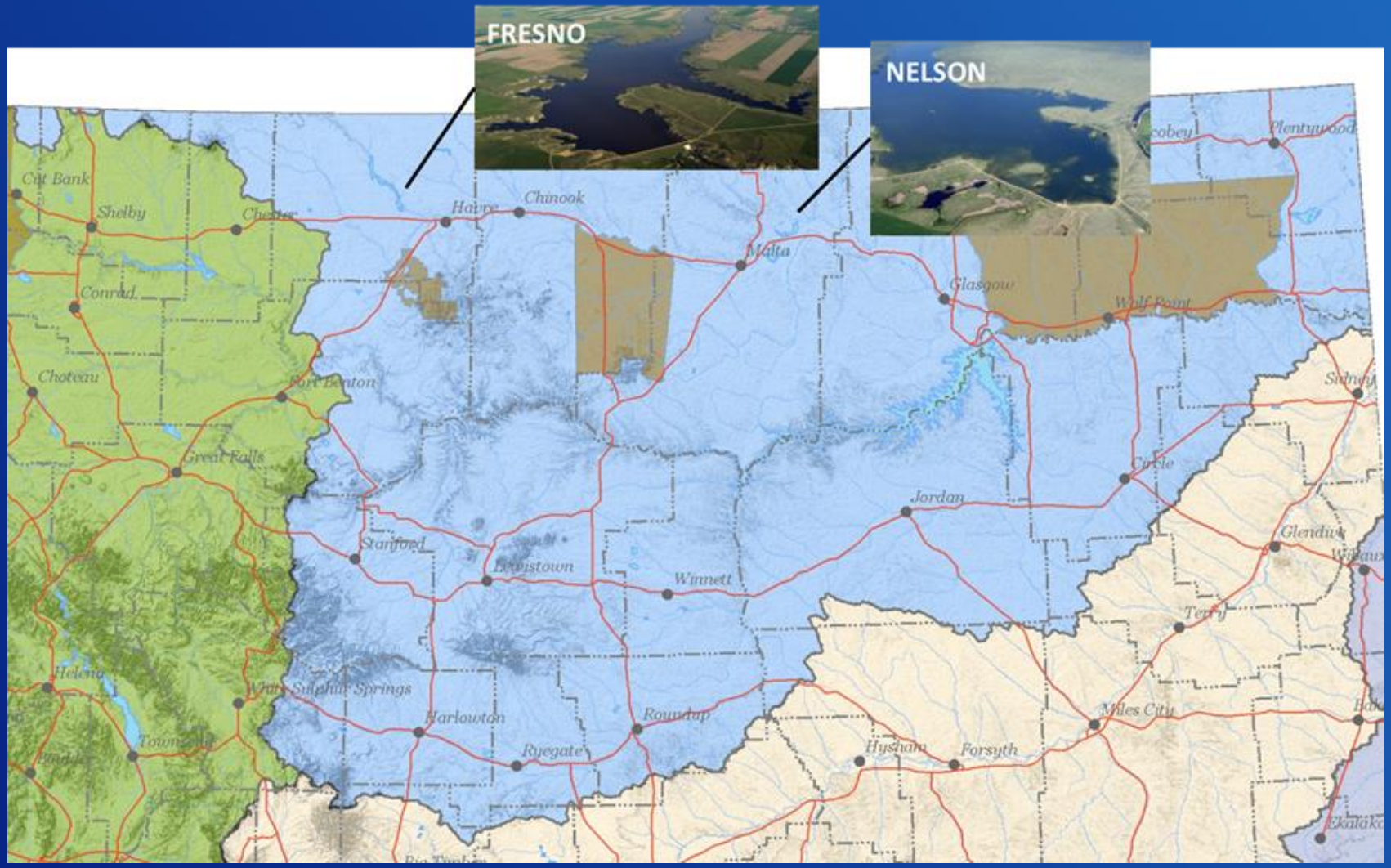


Lake Elwell (Tiber Dam) Operations



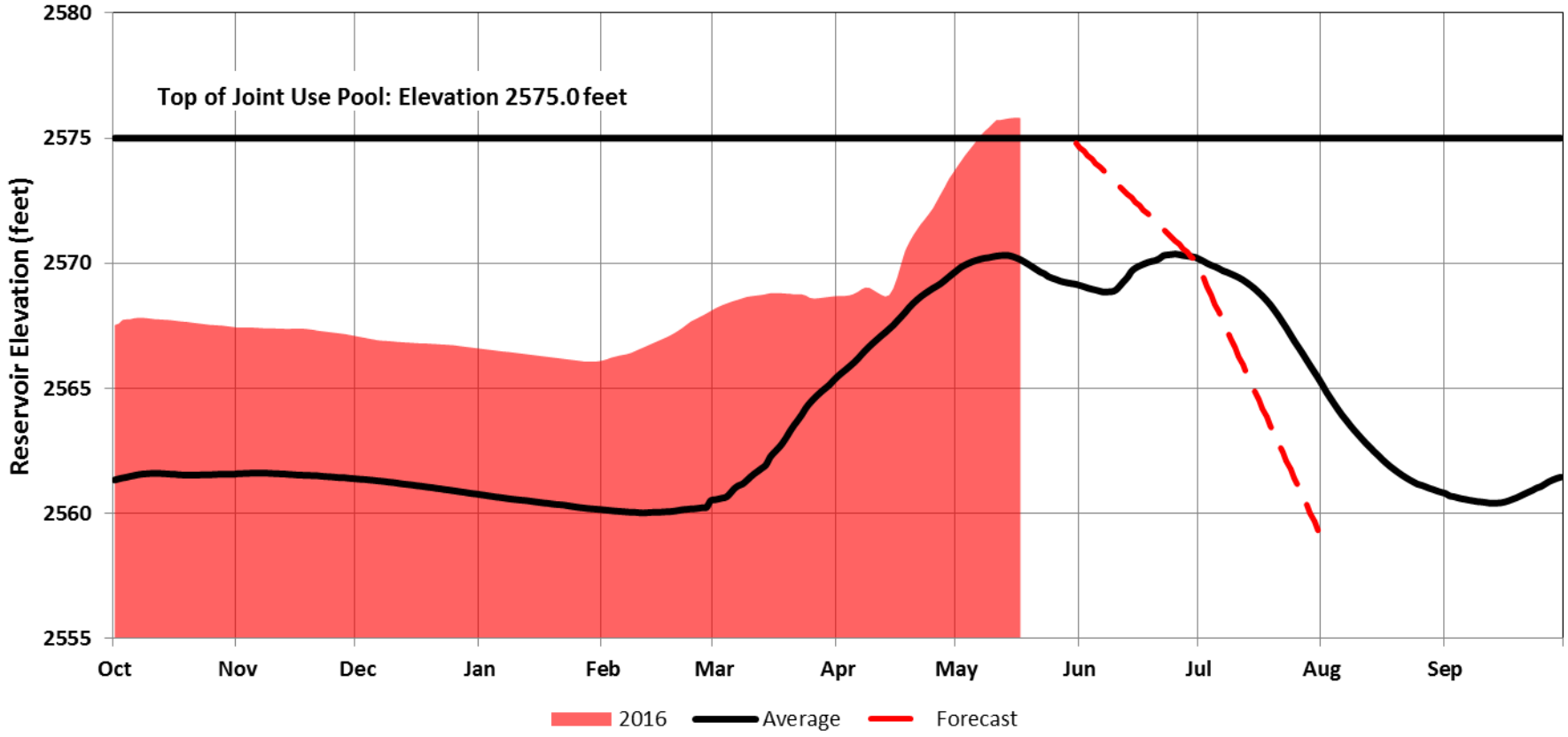


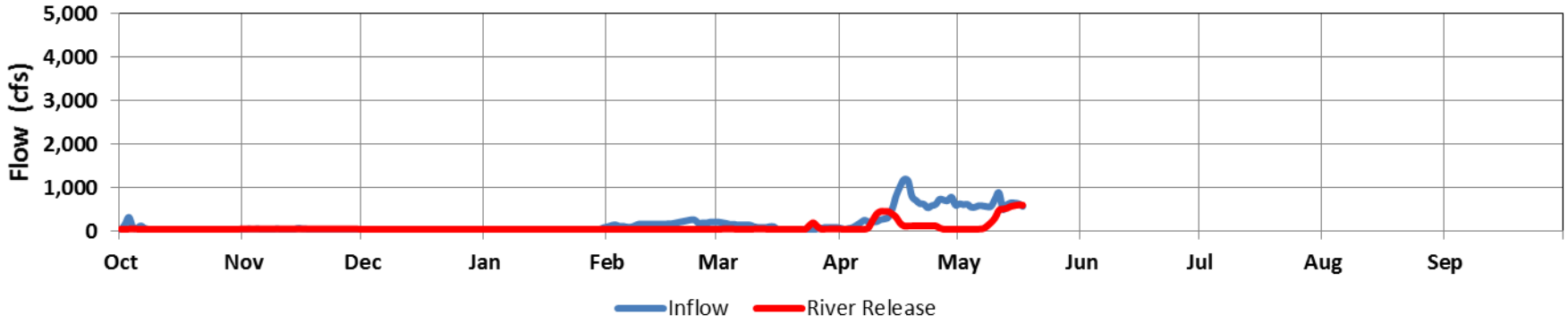
Lower Missouri Basin



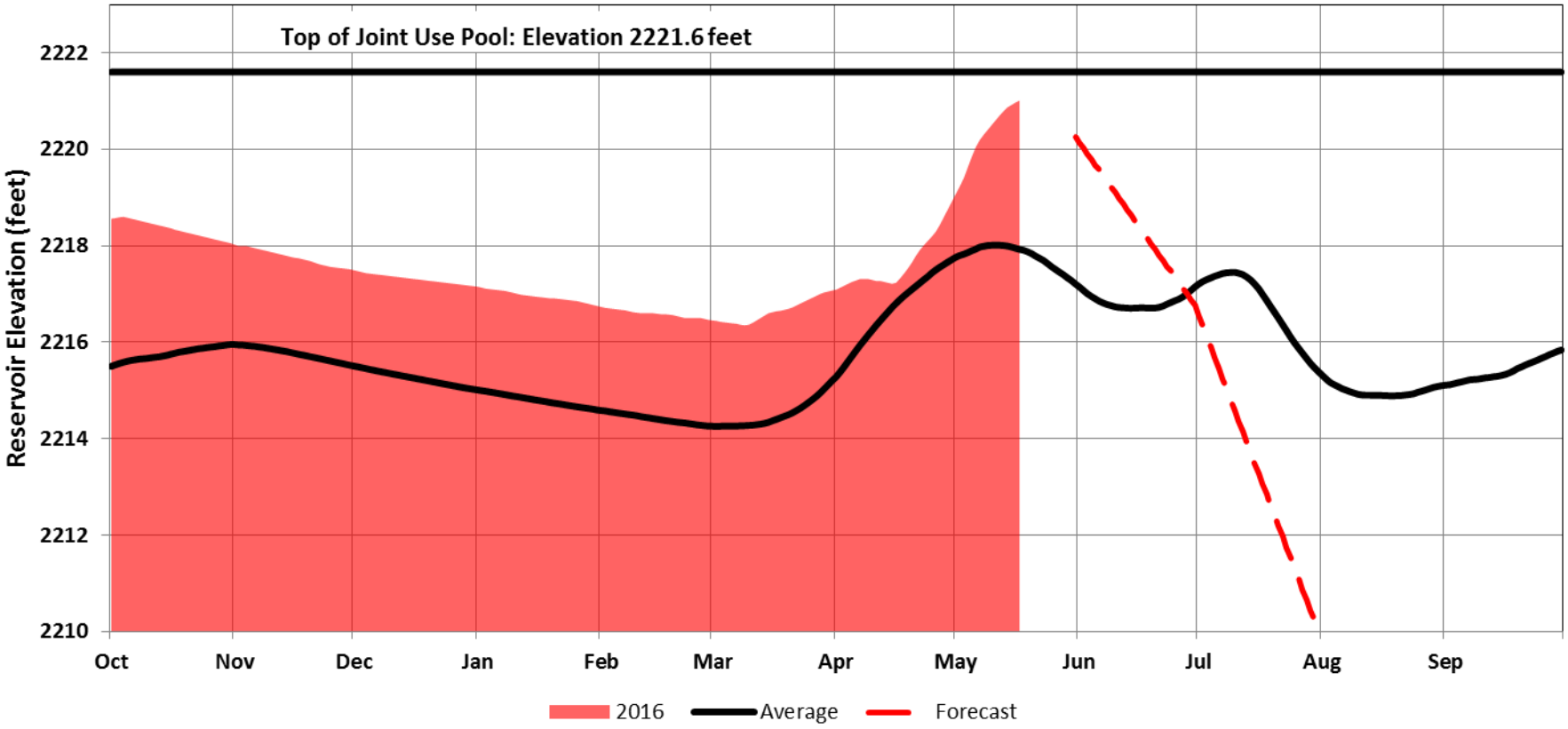
RECLAMATION

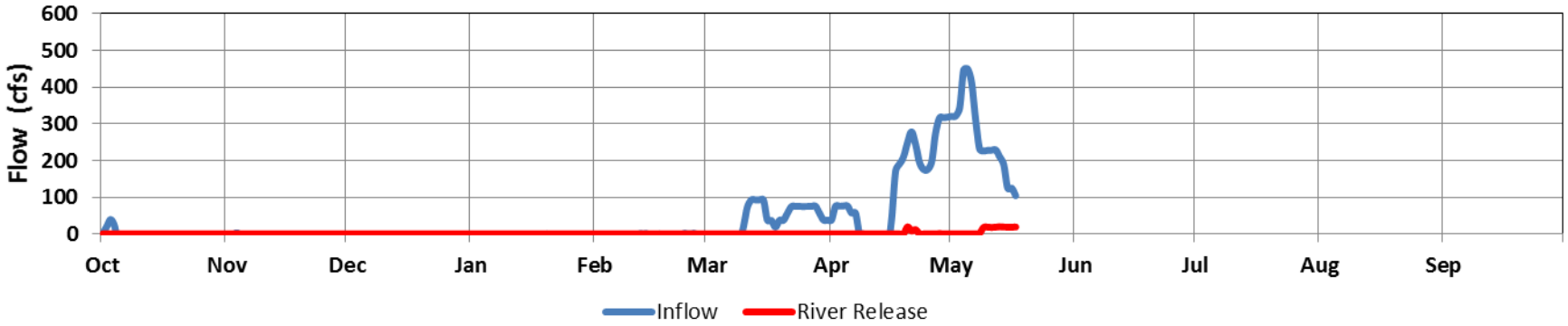
Fresno Reservoir Operations





Nelson Reservoir Operations

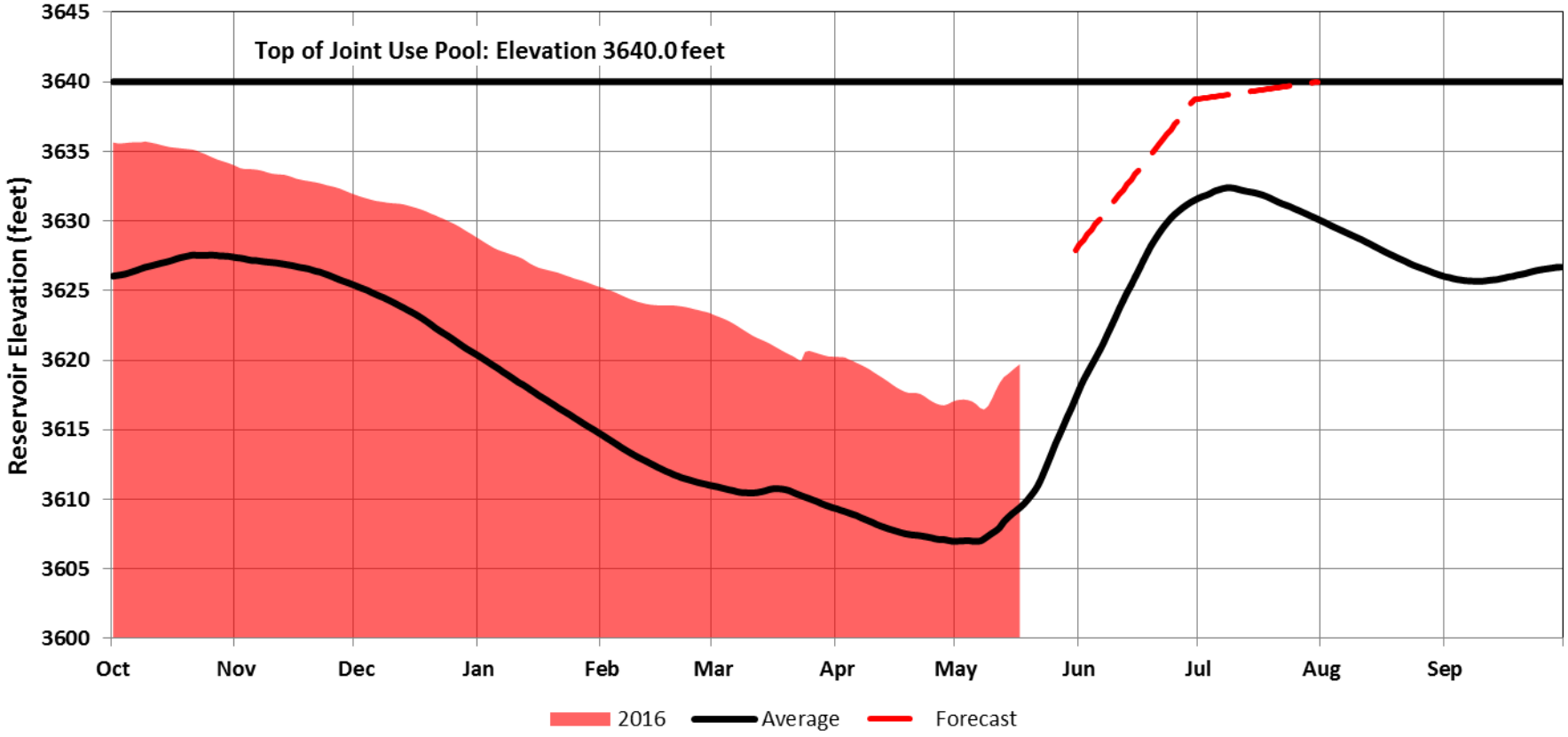


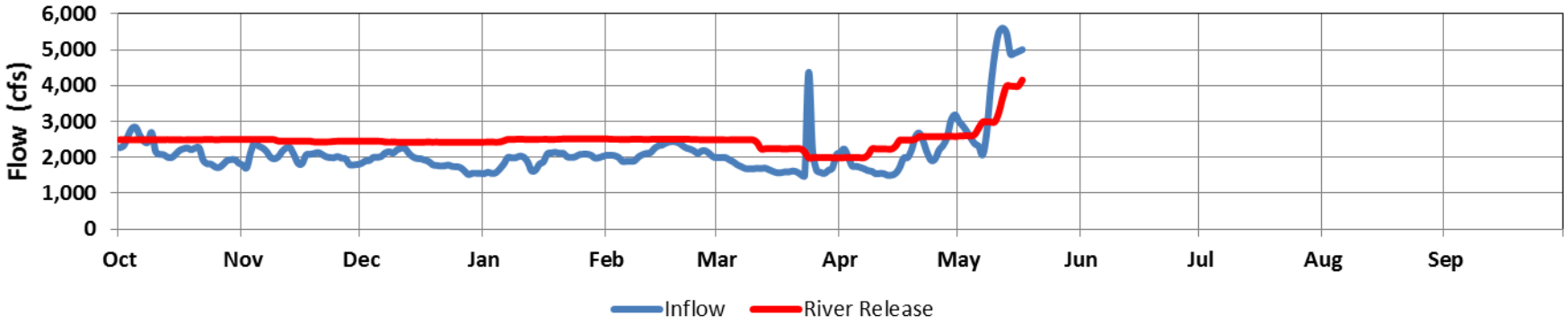


Yellowstone Basin

RECLAMATION

Bighorn Lake (Yellowtail Dam) Operations





Summary of Conditions

- **Reduced Irrigation Allotments**
  - East Bench & Clark Canyon Company
  - Greenfield Irrigation District
  - Milk River Project
- **Fishery Flows - Above Targets**
  - Bighorn River
  - Missouri River below Canyon Ferry
- **Reservoirs Not Anticipated To Fill**
  - Clark Canyon
  - Tiber

RECLAMATION

Reclamation's Internet Website

http://www.usbr.gov/gp/hydromet/

- near real-time data available through the HYDROMET data system
- summaries and plots of historical data
- annual reservoir operating plan publication
- monthly water supply reports
- project data
- snow plots
- links to related internet sites

RECLAMATION

Montana
Drought & Water Supply Advisory Committee

May 19, 2016

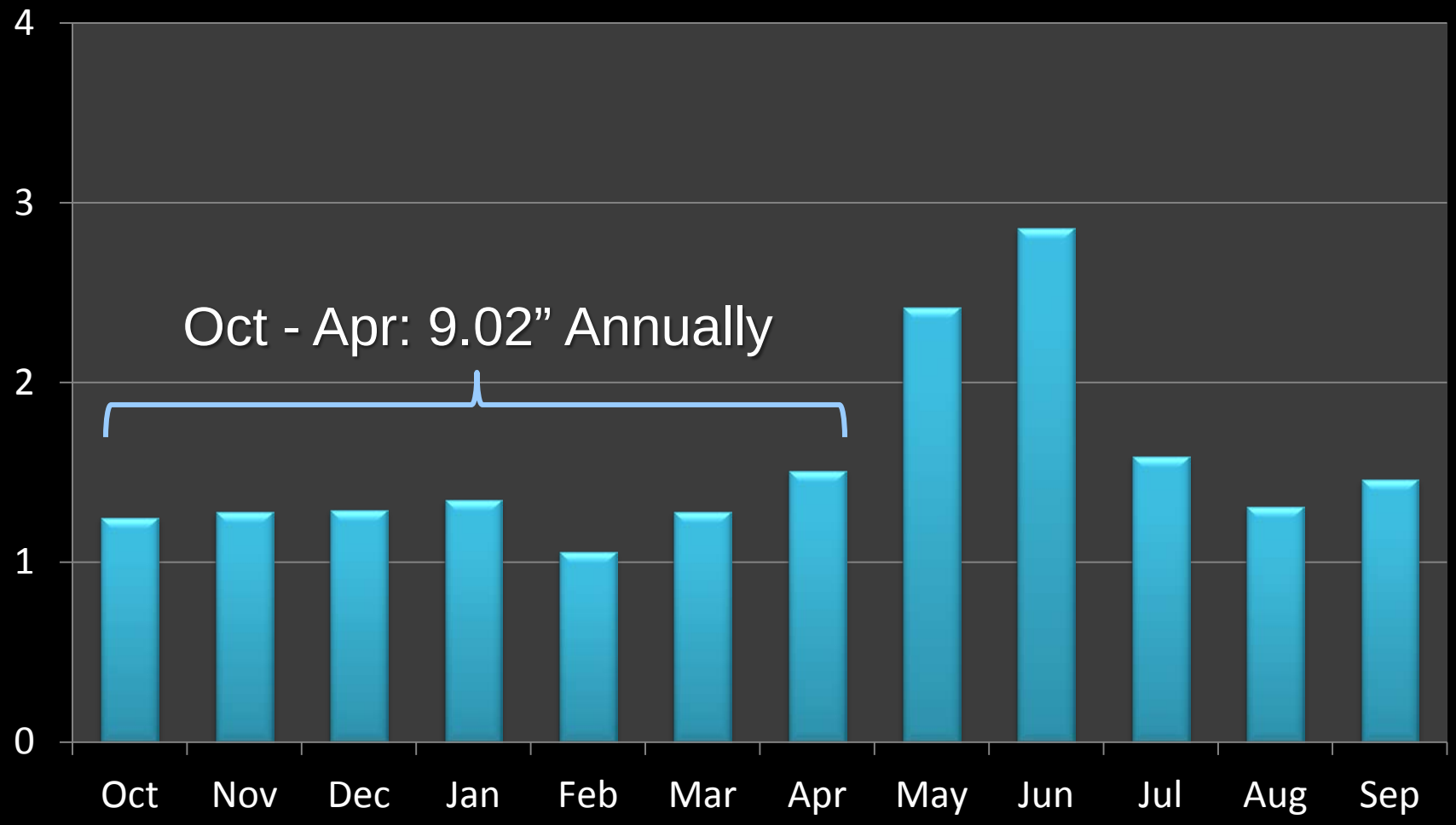
National Weather Service

Donald Britton – Meteorologist-in-Charge NWS Great Falls

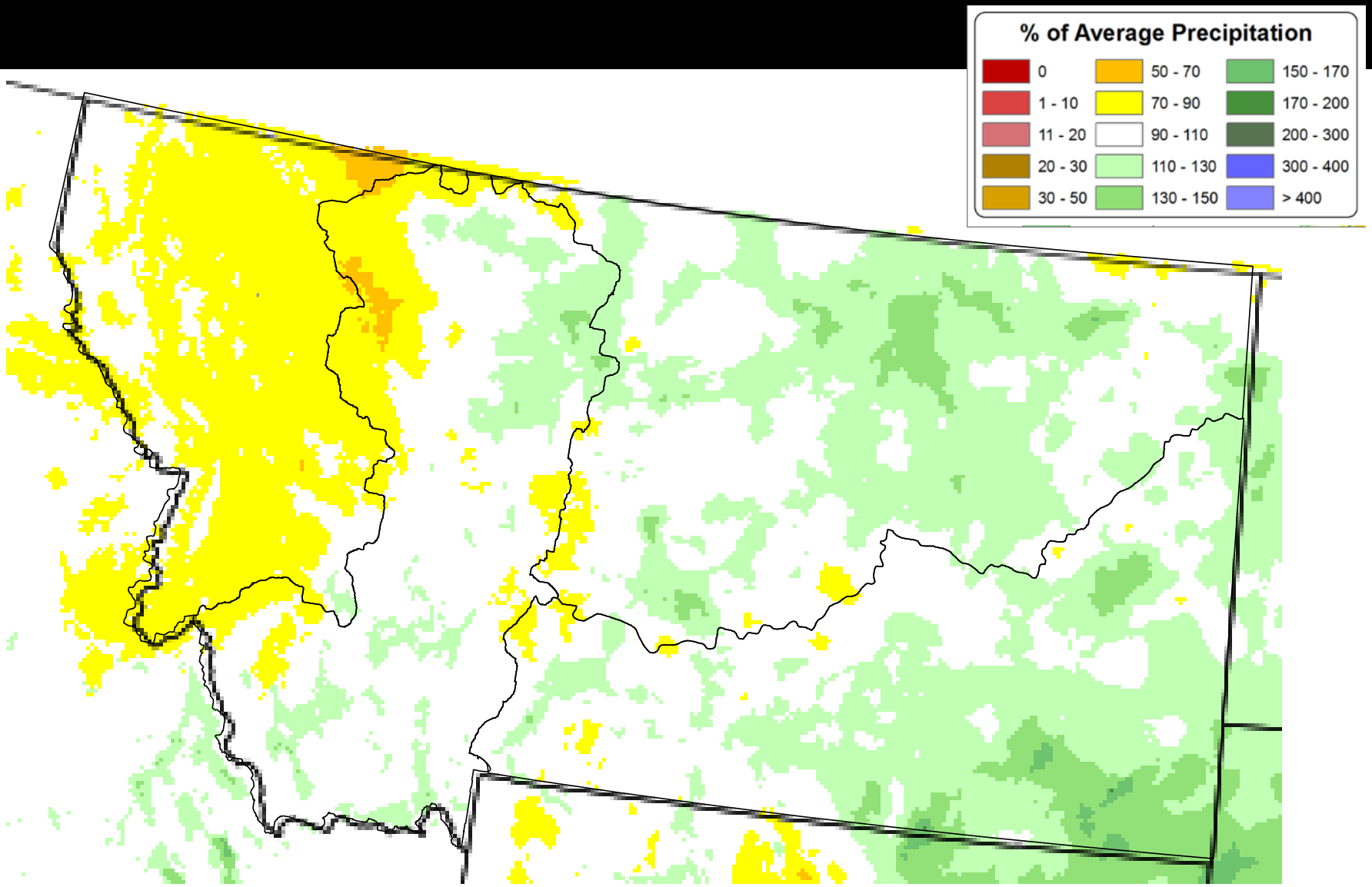
OVERVIEW

Statewide Average Precipitation

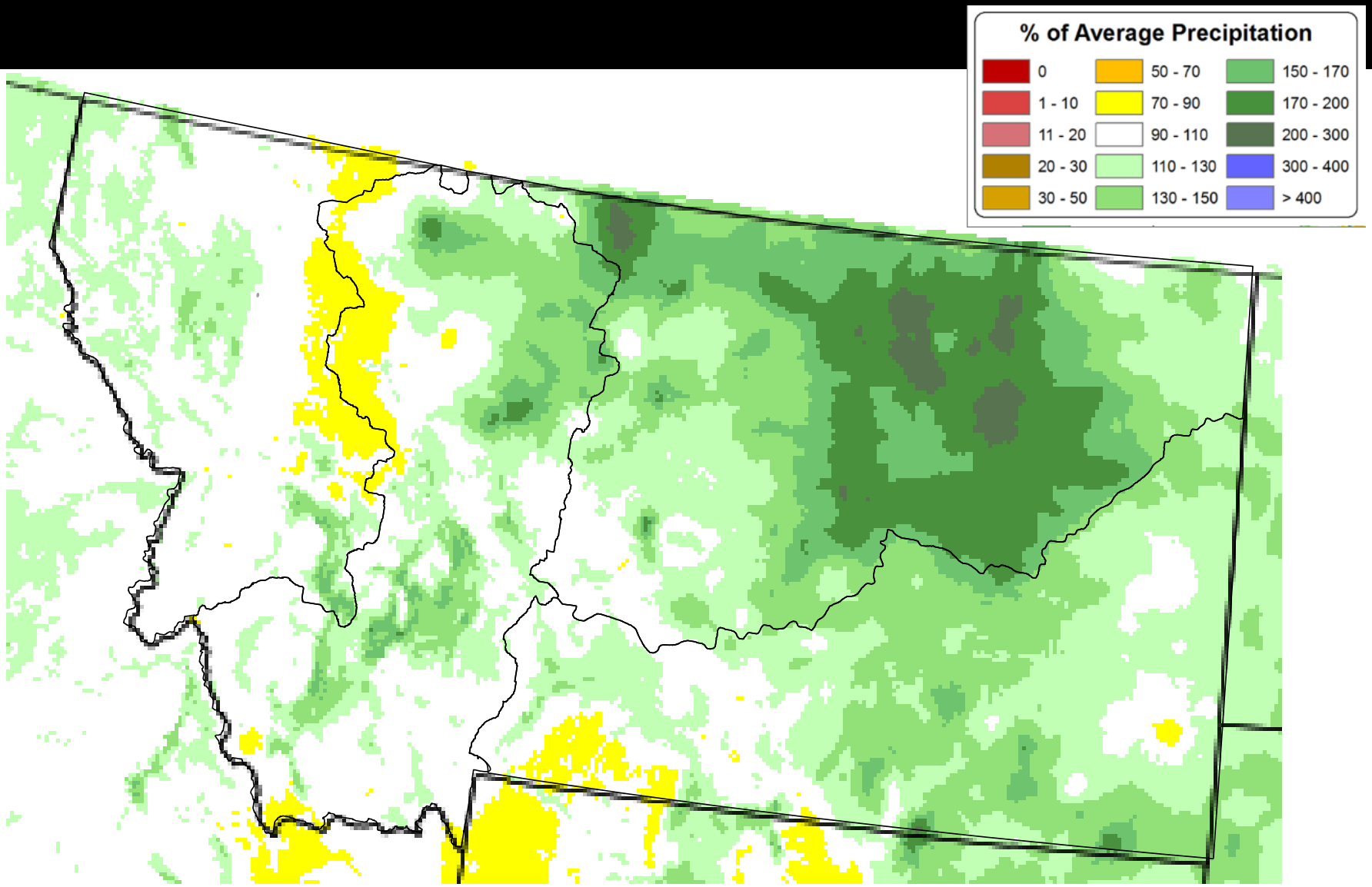
18.66” Annually



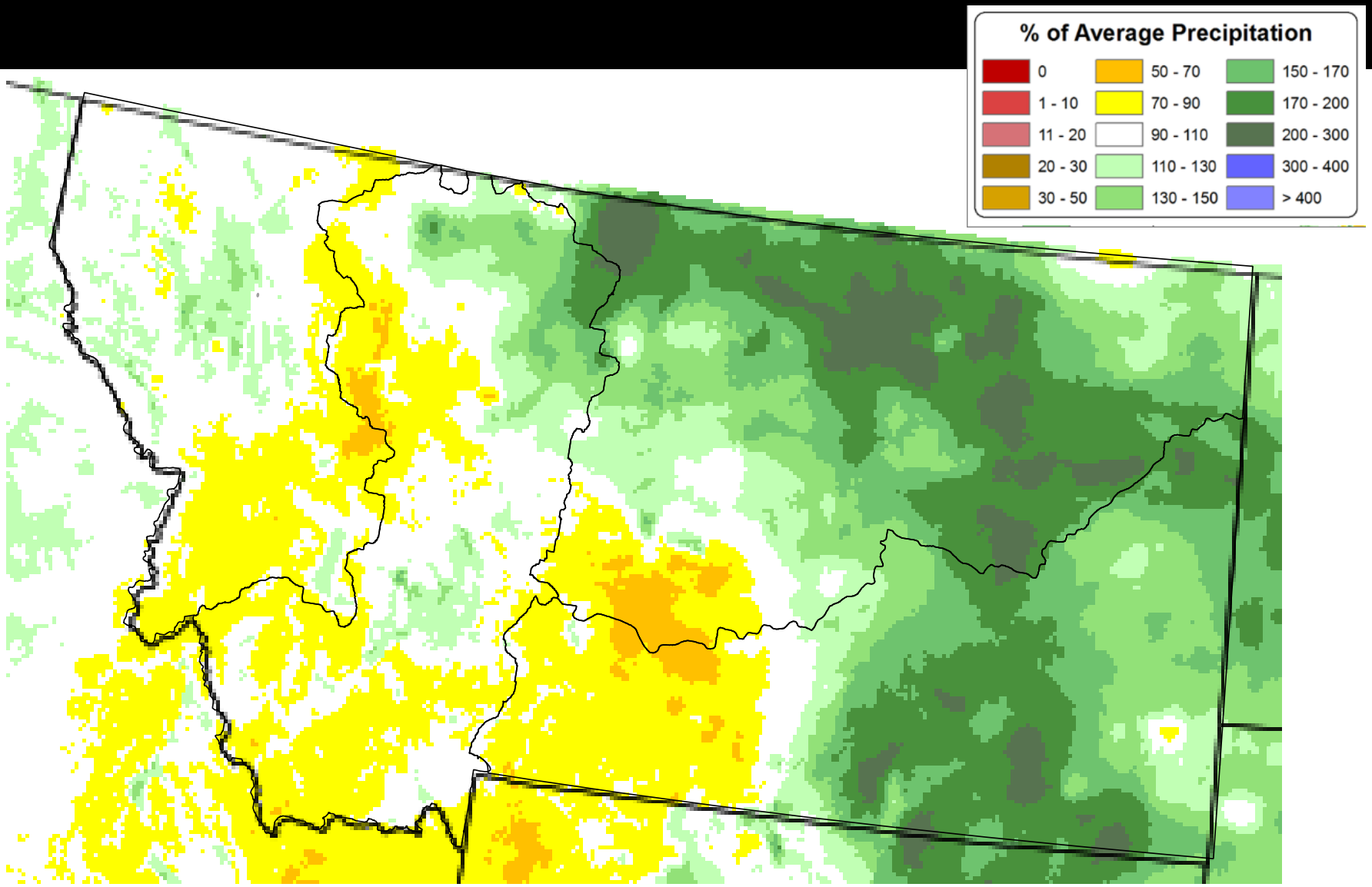
Precipitation Anomaly May 15–Apr 16



Precipitation Anomaly Oct 15-Apr 16



Precipitation Anomaly Jan - Apr



Montana: May 2015 – Apr 2016

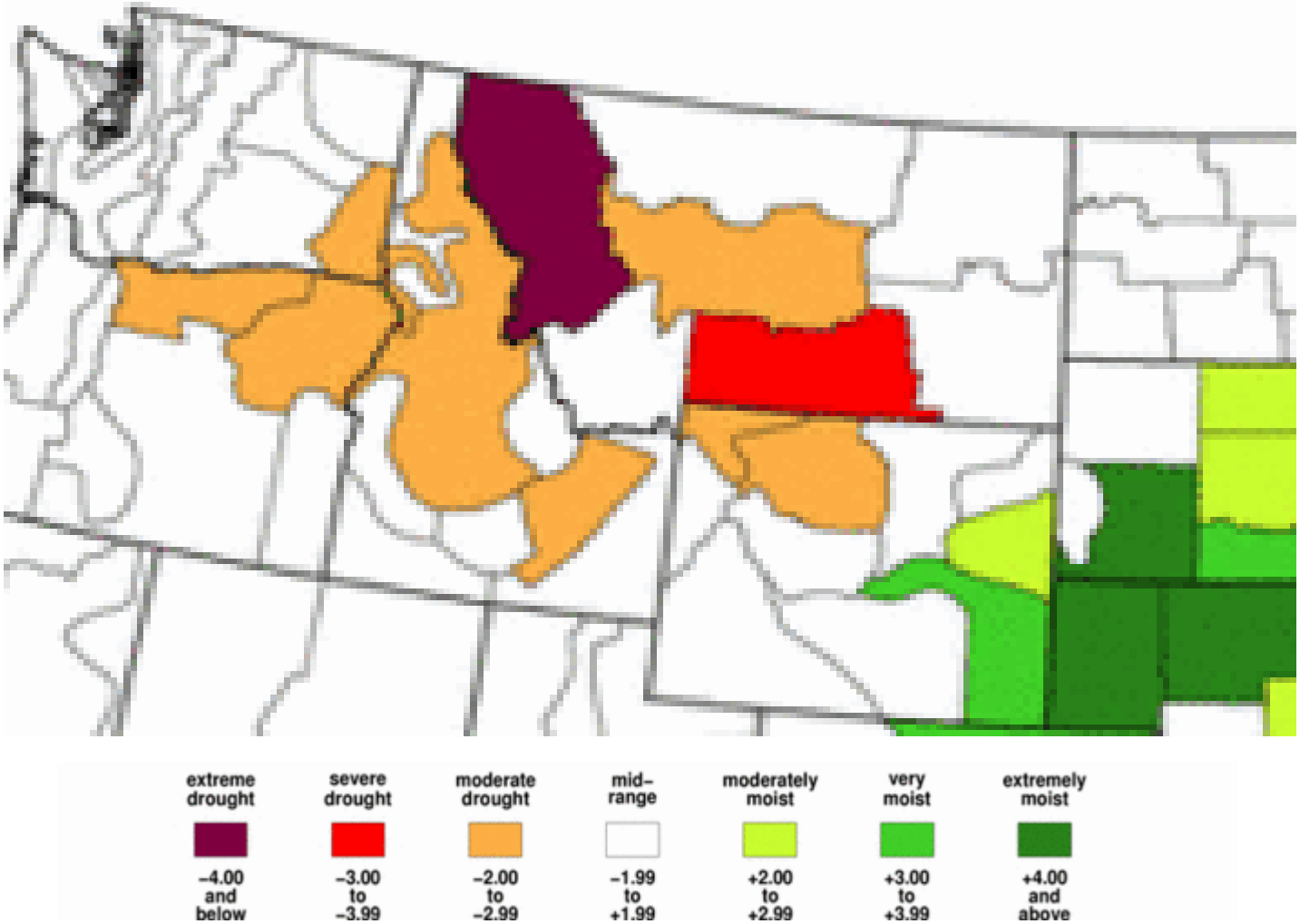
Warmest on Record

Avg Temp	20th Century Average	Departure
45.3°F	41.2°F	4.1°F

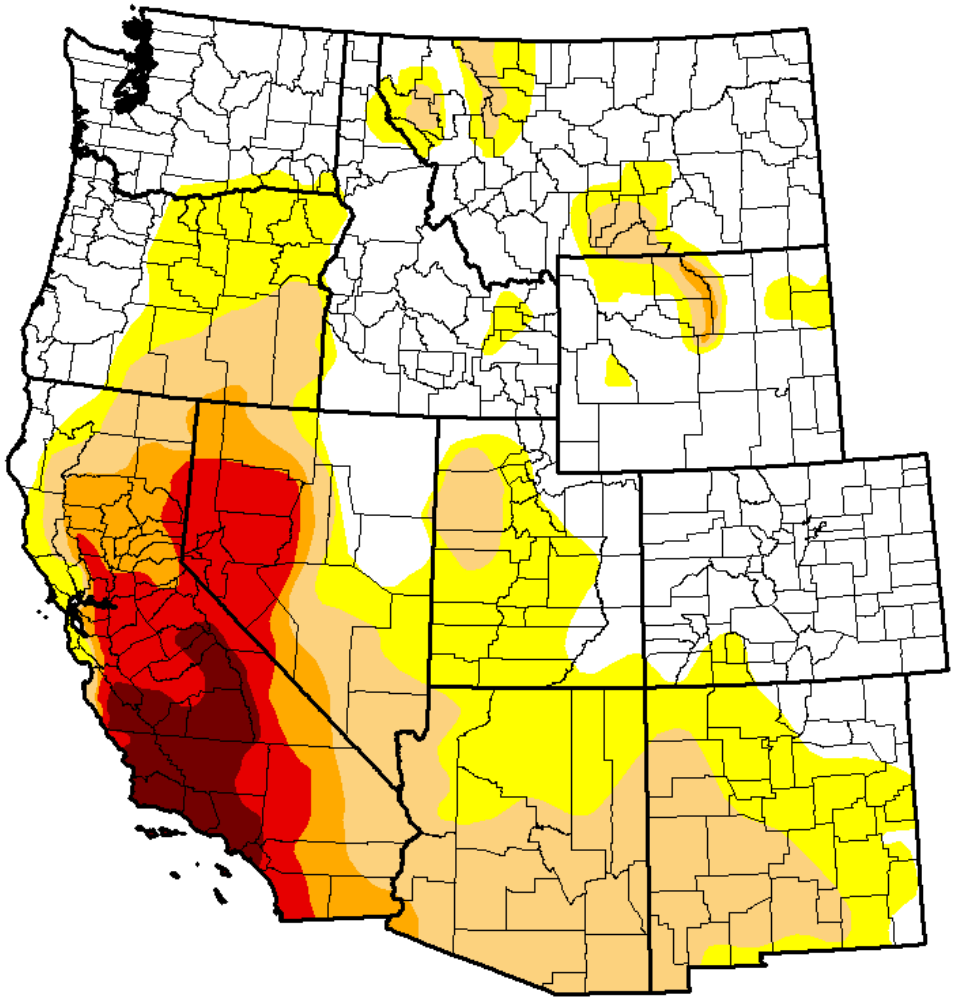
Precipitation Just Below Normal (69th Wettest)

Precip	20th Century Average	Departure
18.17”	18.66”	-0.49”

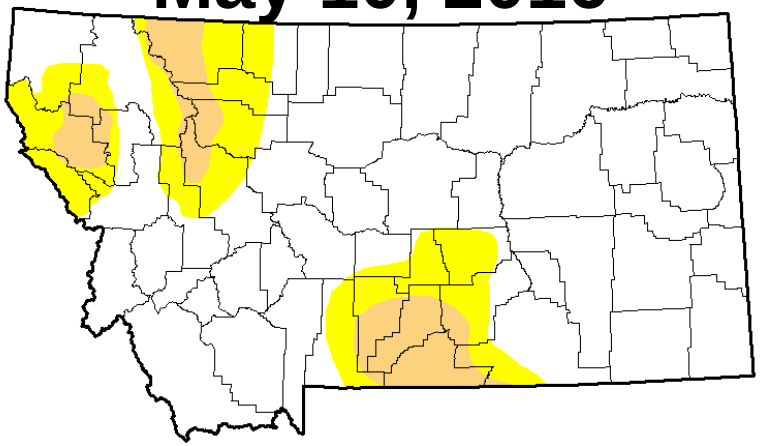
Latest Palmer Drought Index



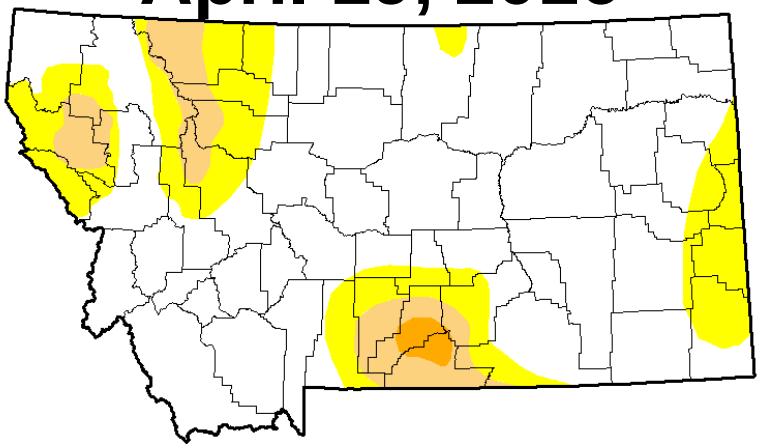
U.S. Drought Monitor – May 10 2016



May 10, 2016

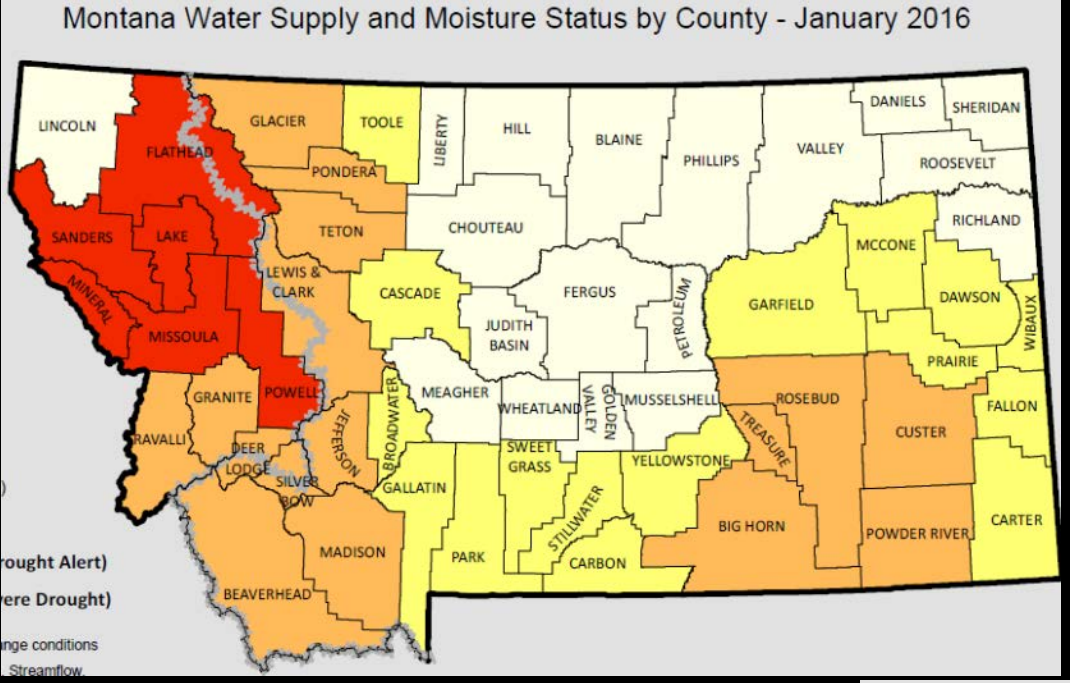


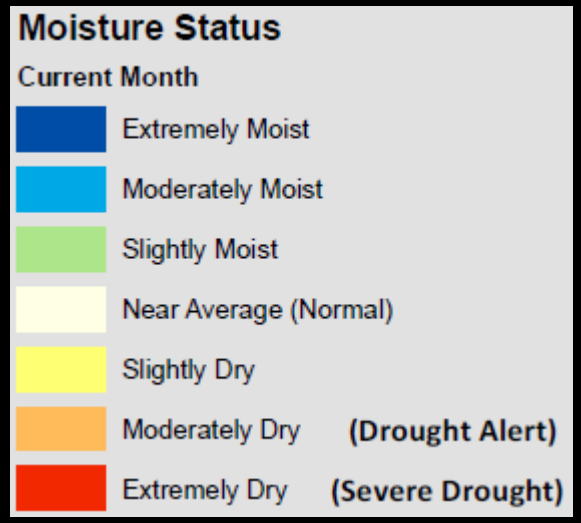
April 19, 2016

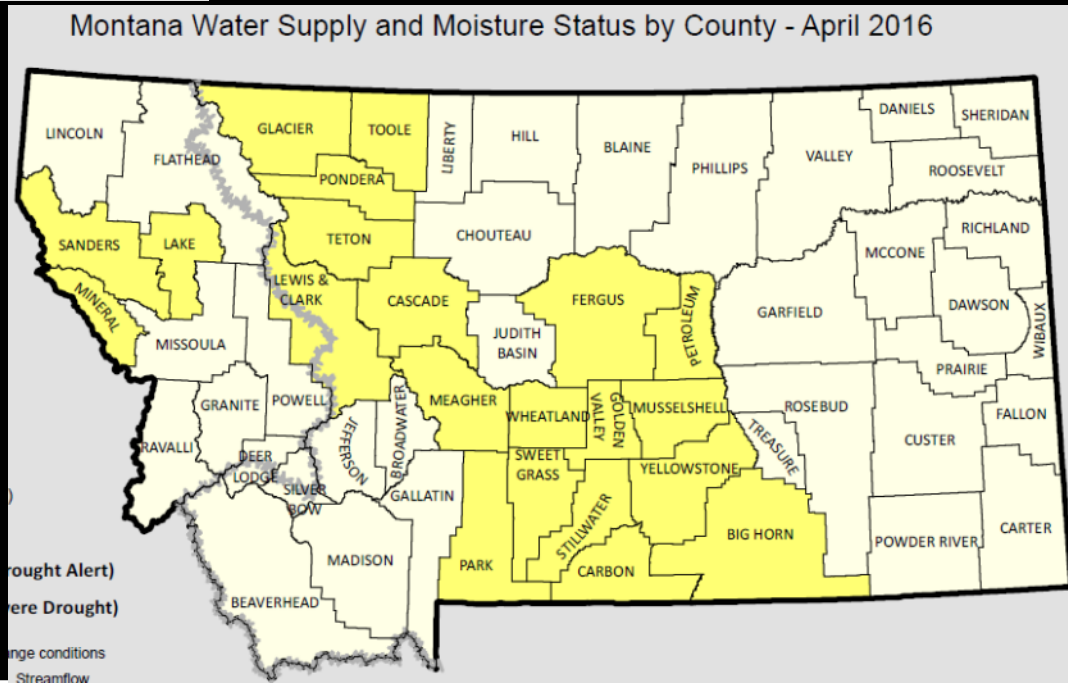


Montana Drought Status

January vs. April

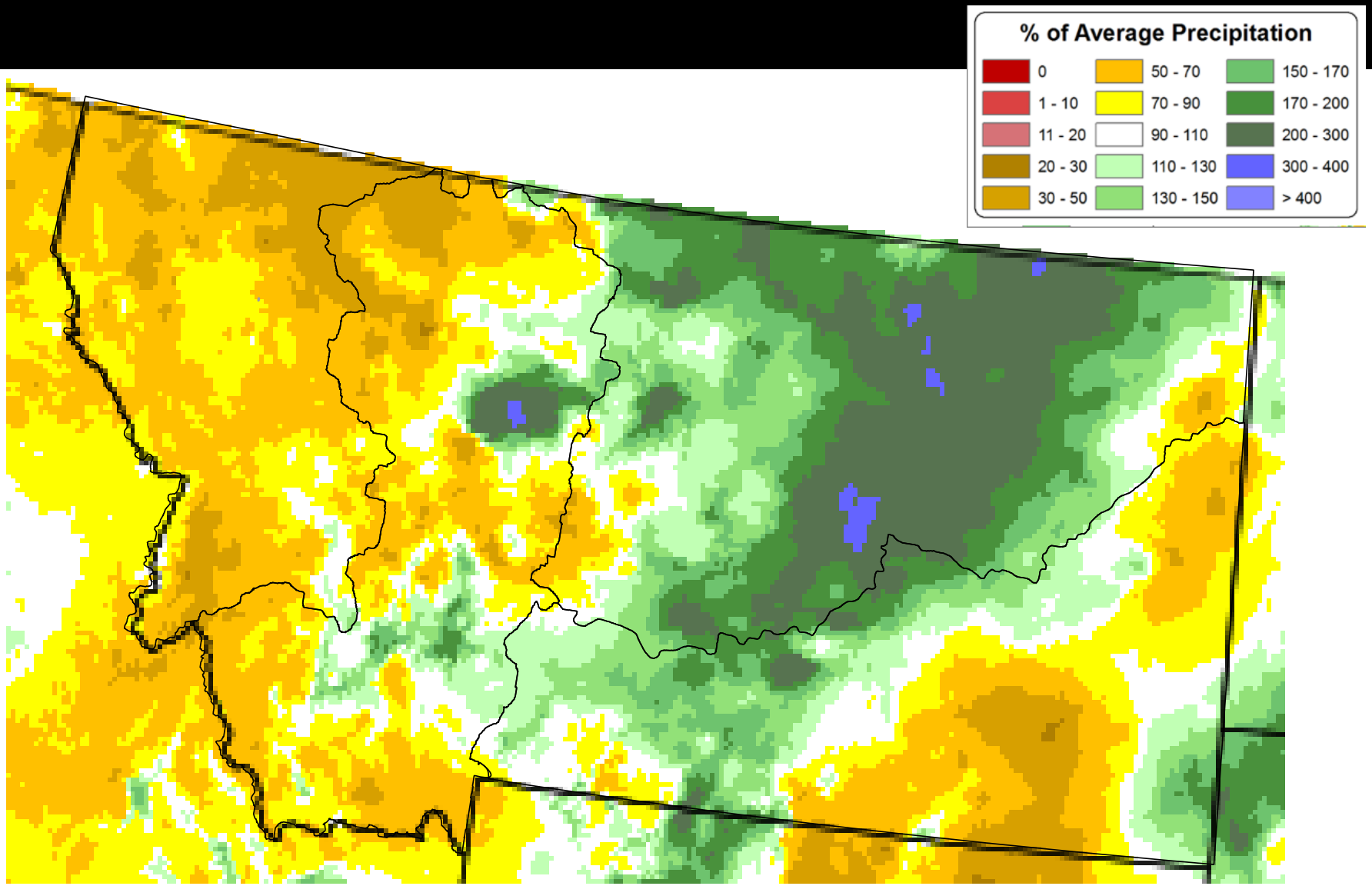




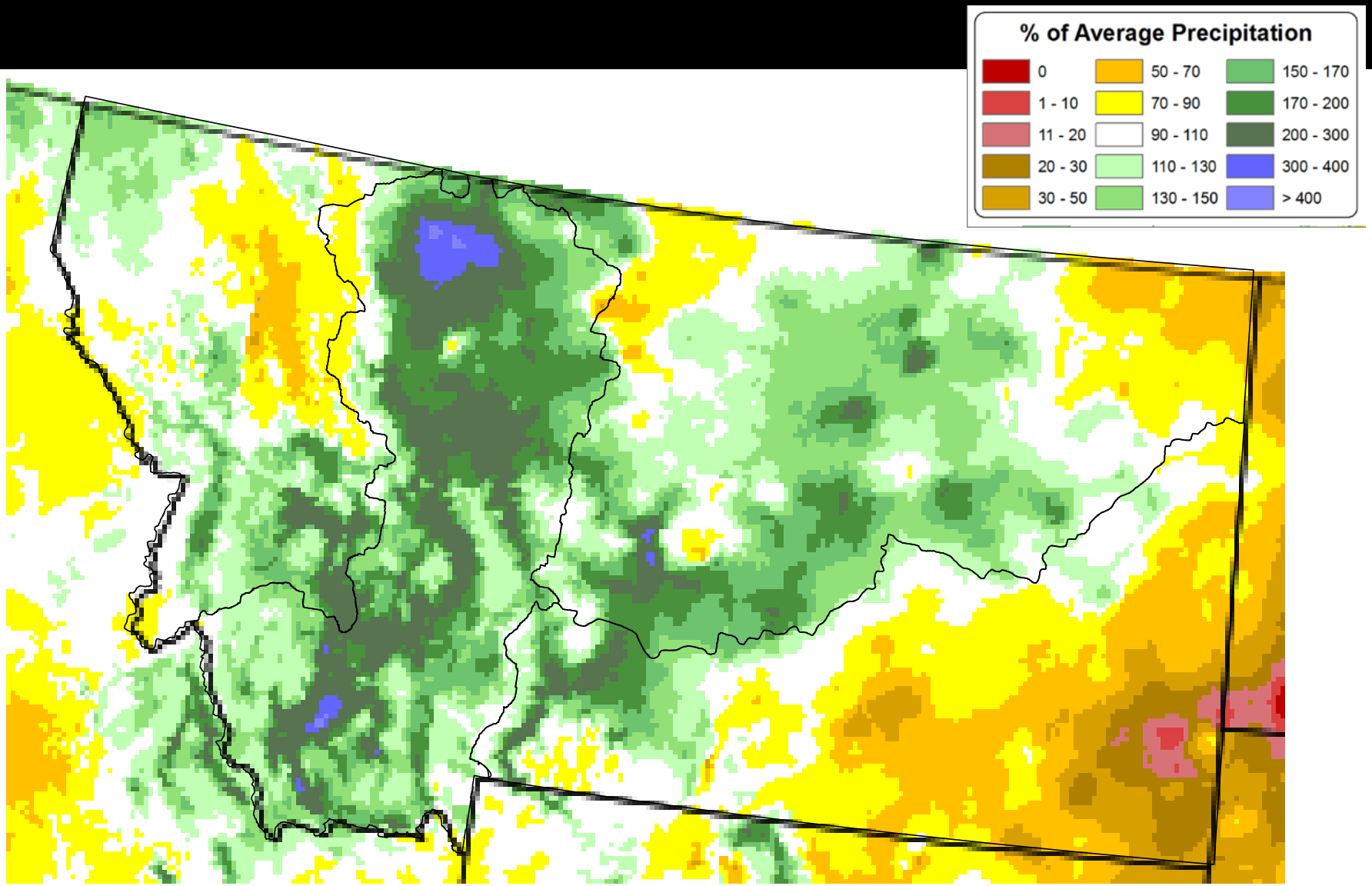


MONTHLY PRECIPITATION ANOMALIES

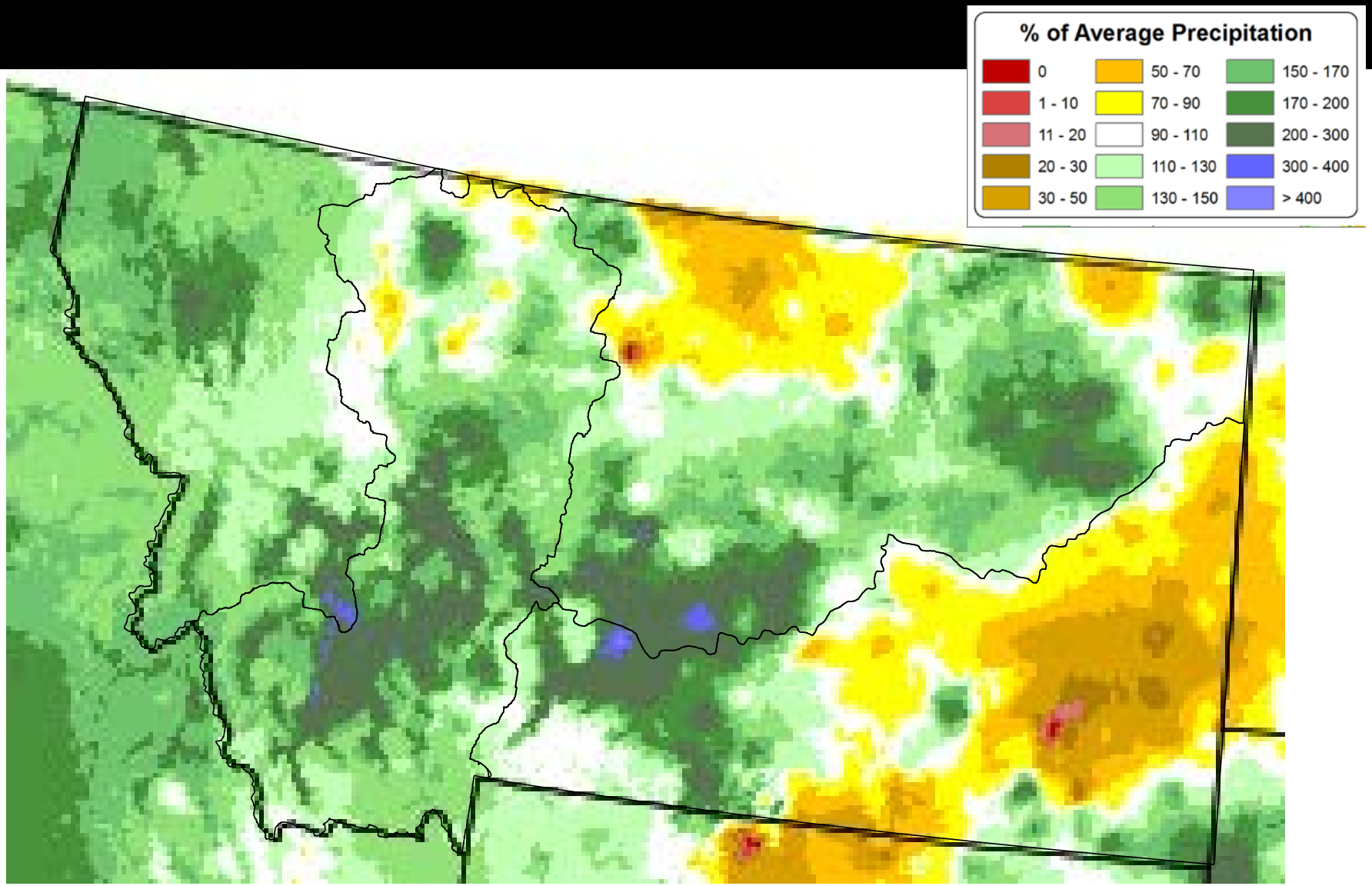
Precipitation Anomaly Oct 15



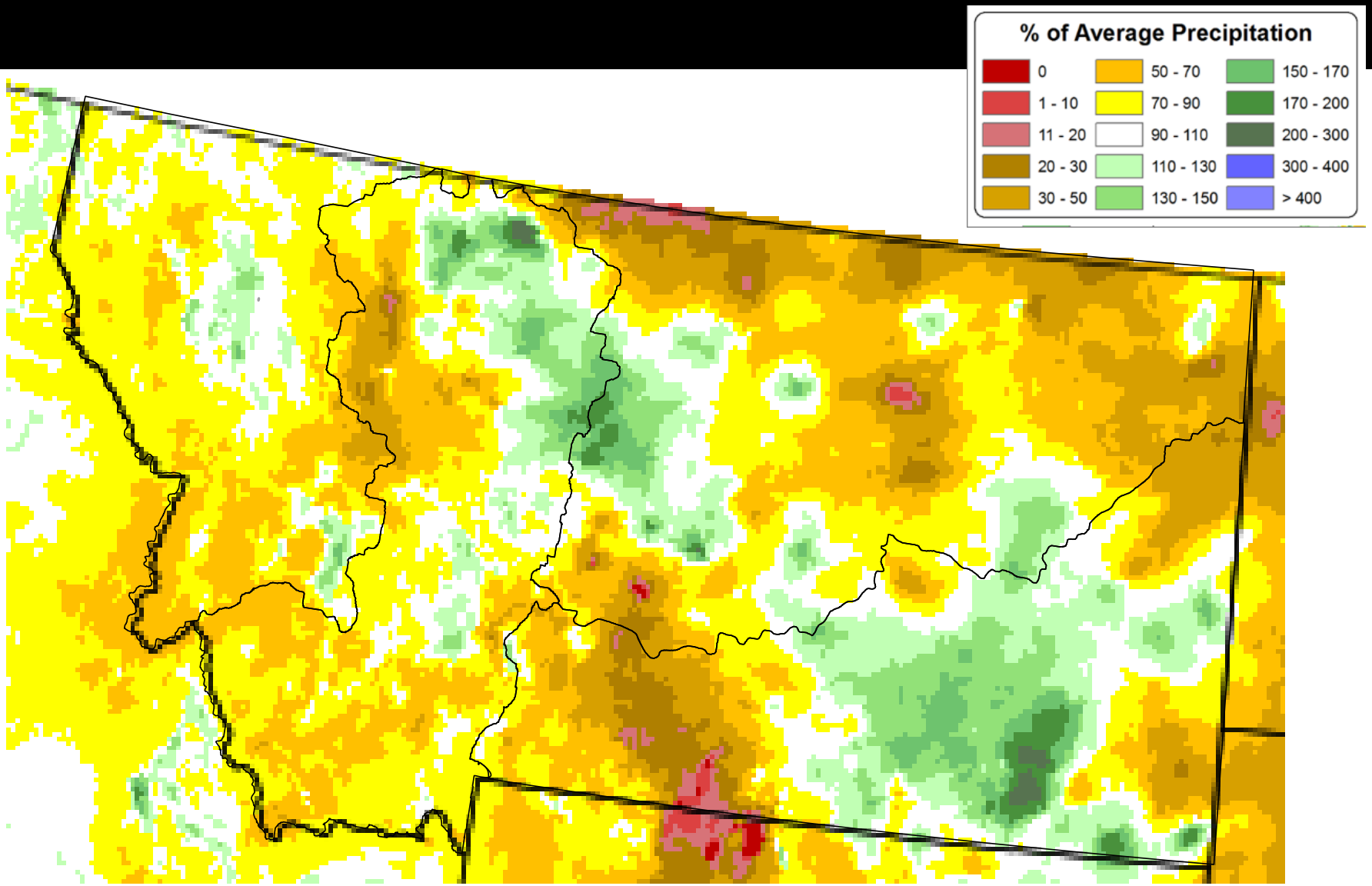
Precipitation Anomaly Nov 15



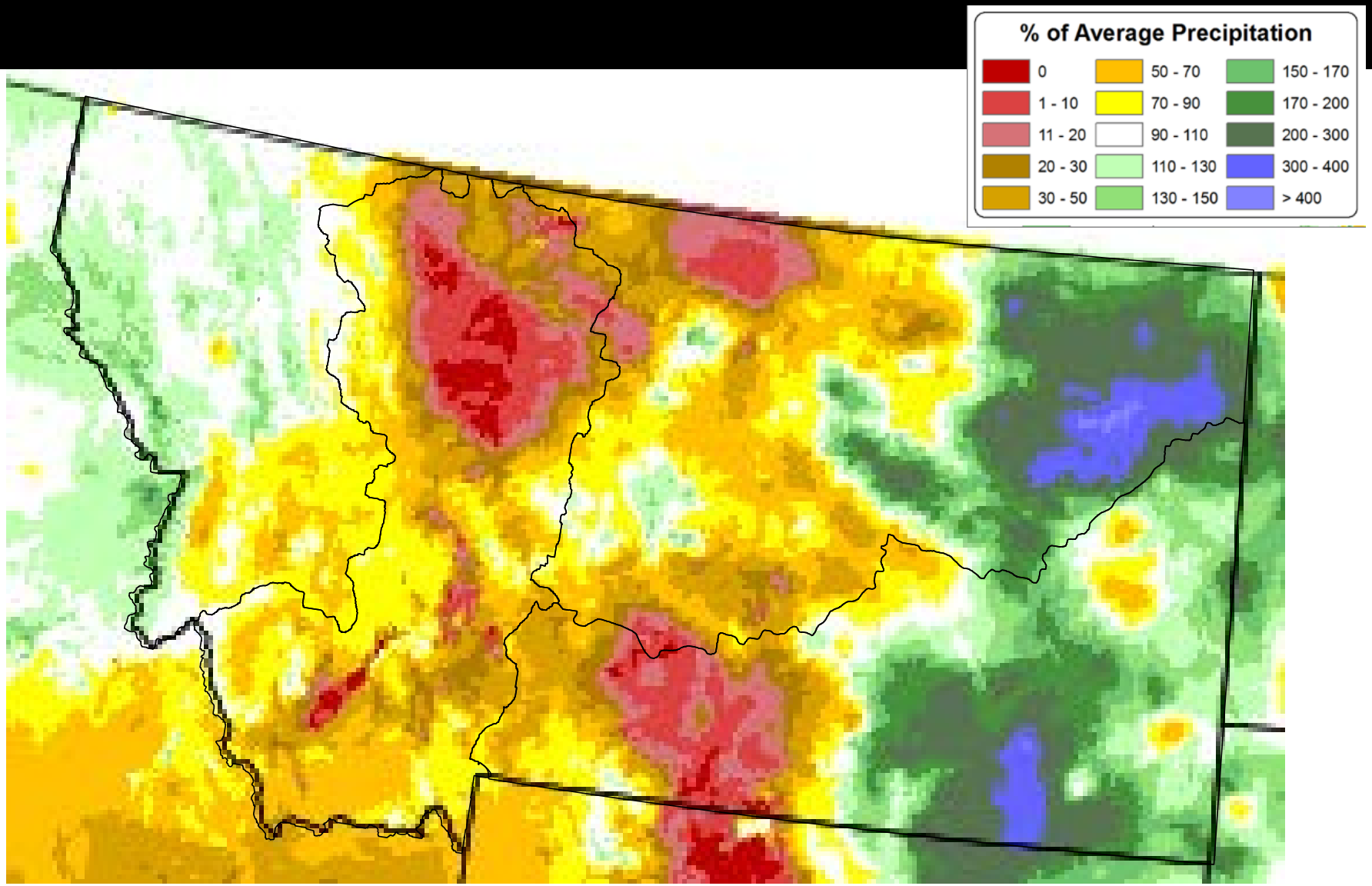
Precipitation Anomaly Dec 15



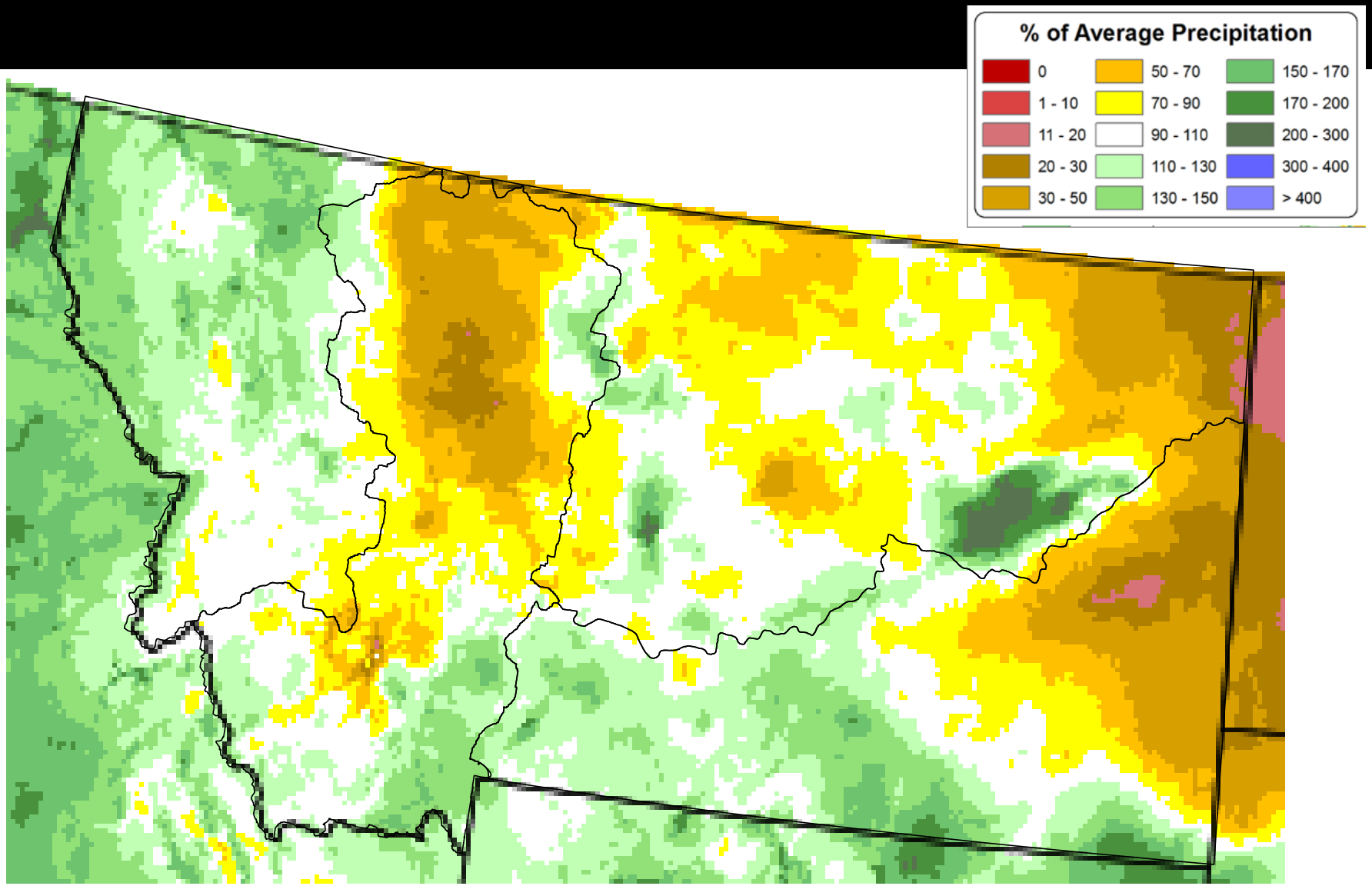
Precipitation Anomaly Jan 16



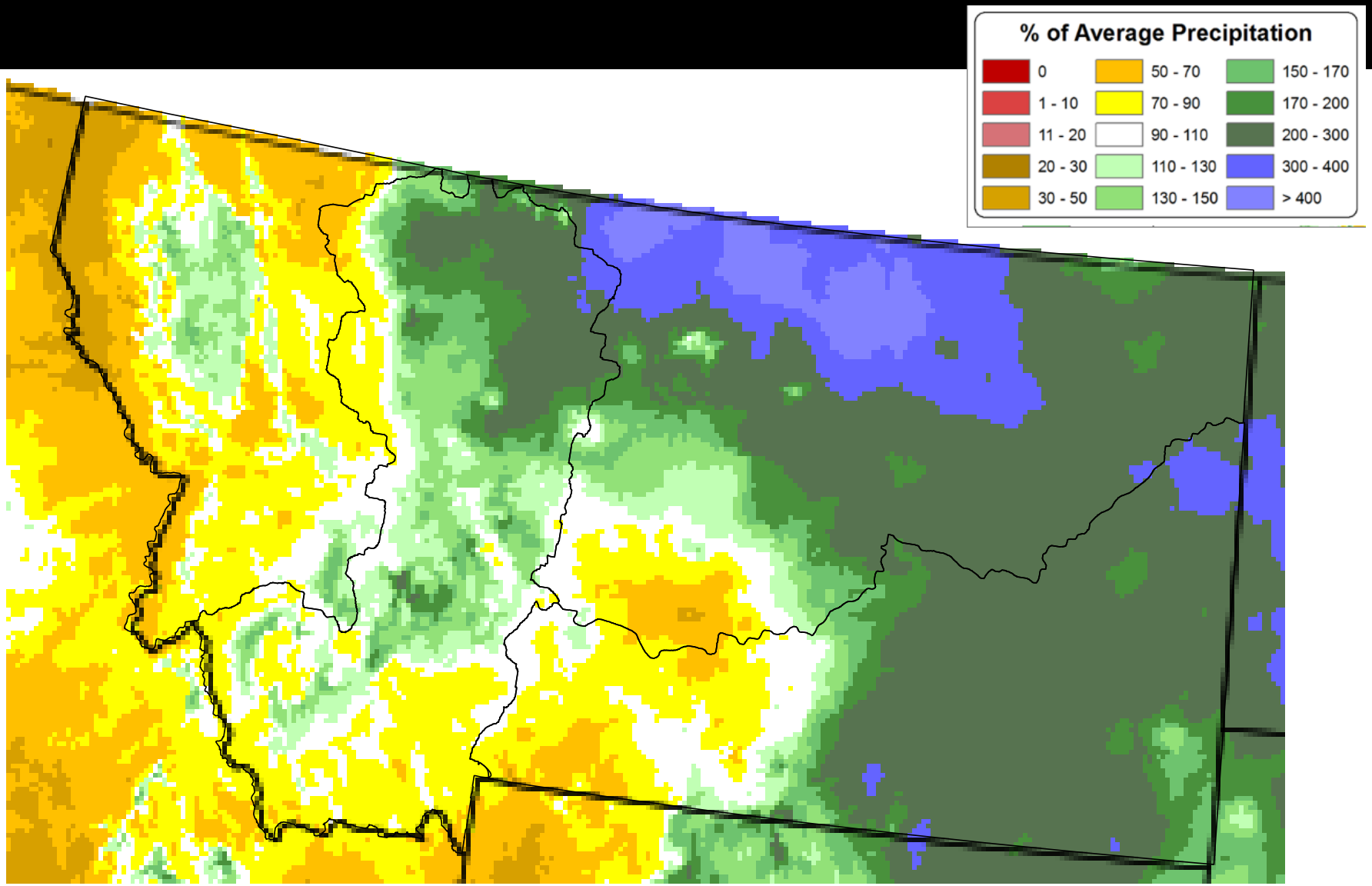
Precipitation Anomaly Feb 16



Precipitation Anomaly Mar 16



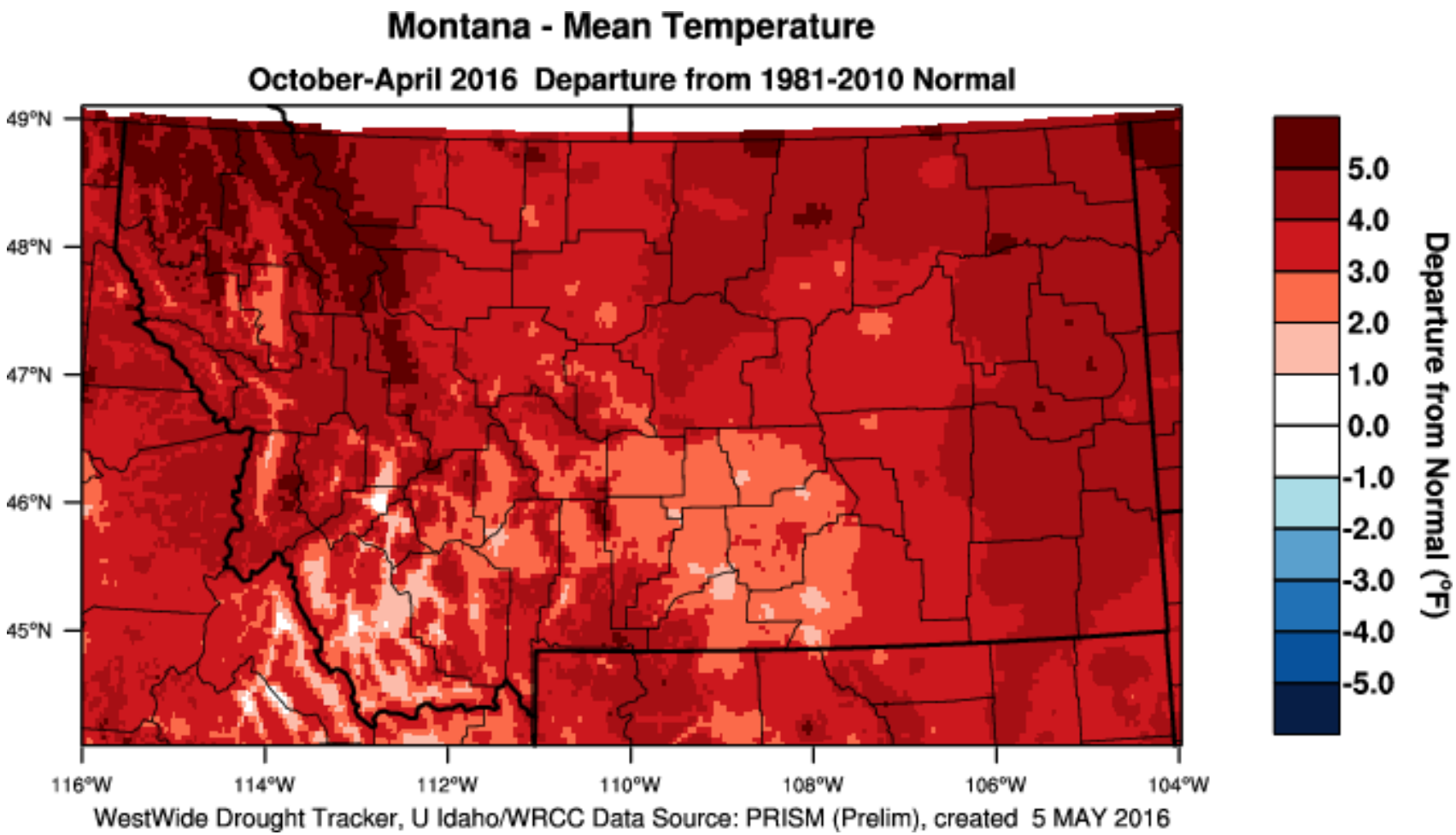
Precipitation Anomaly Apr 16



TEMPERATURE ANOMALIES

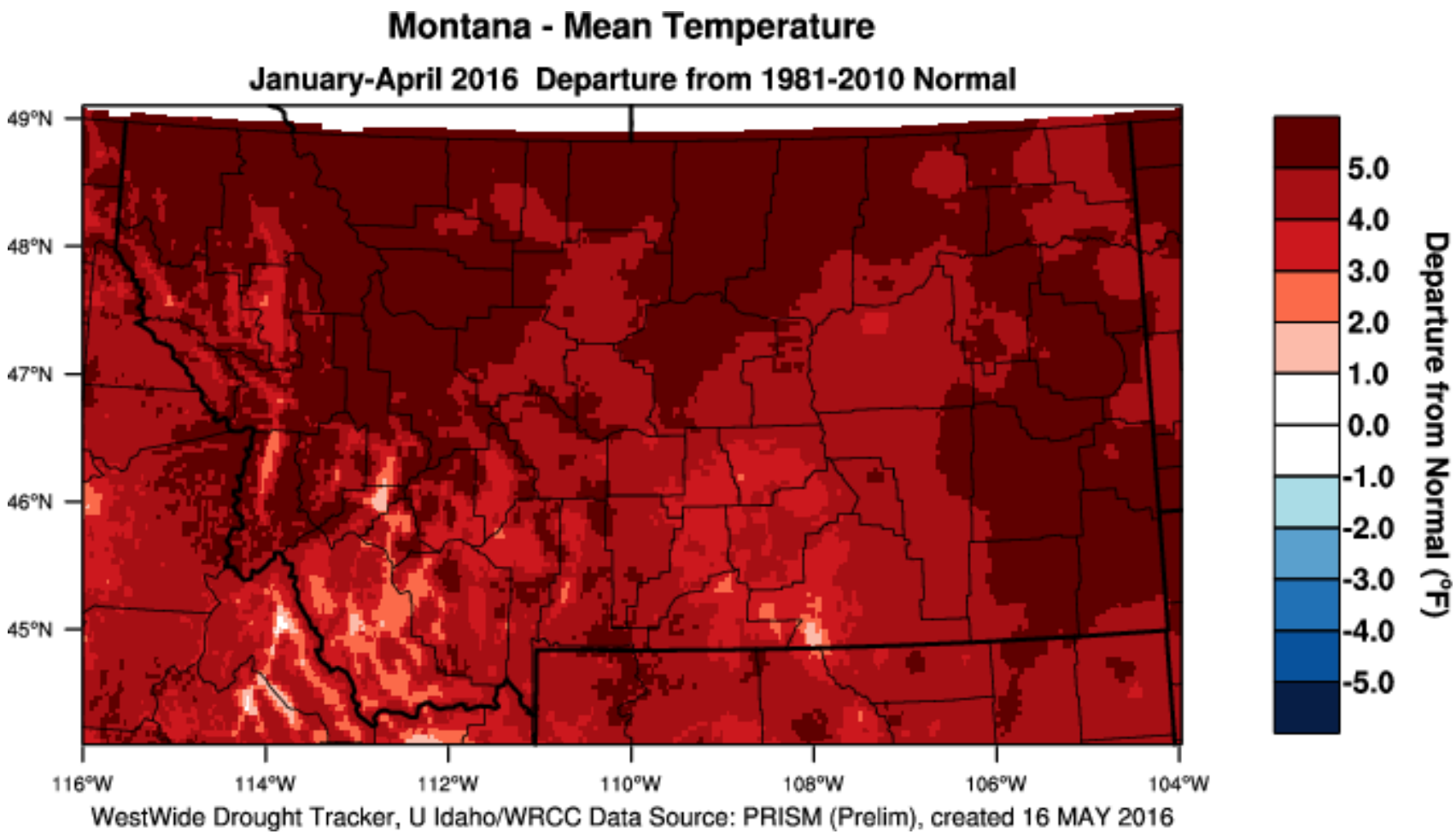
Mean Temperature

Water Year 2016



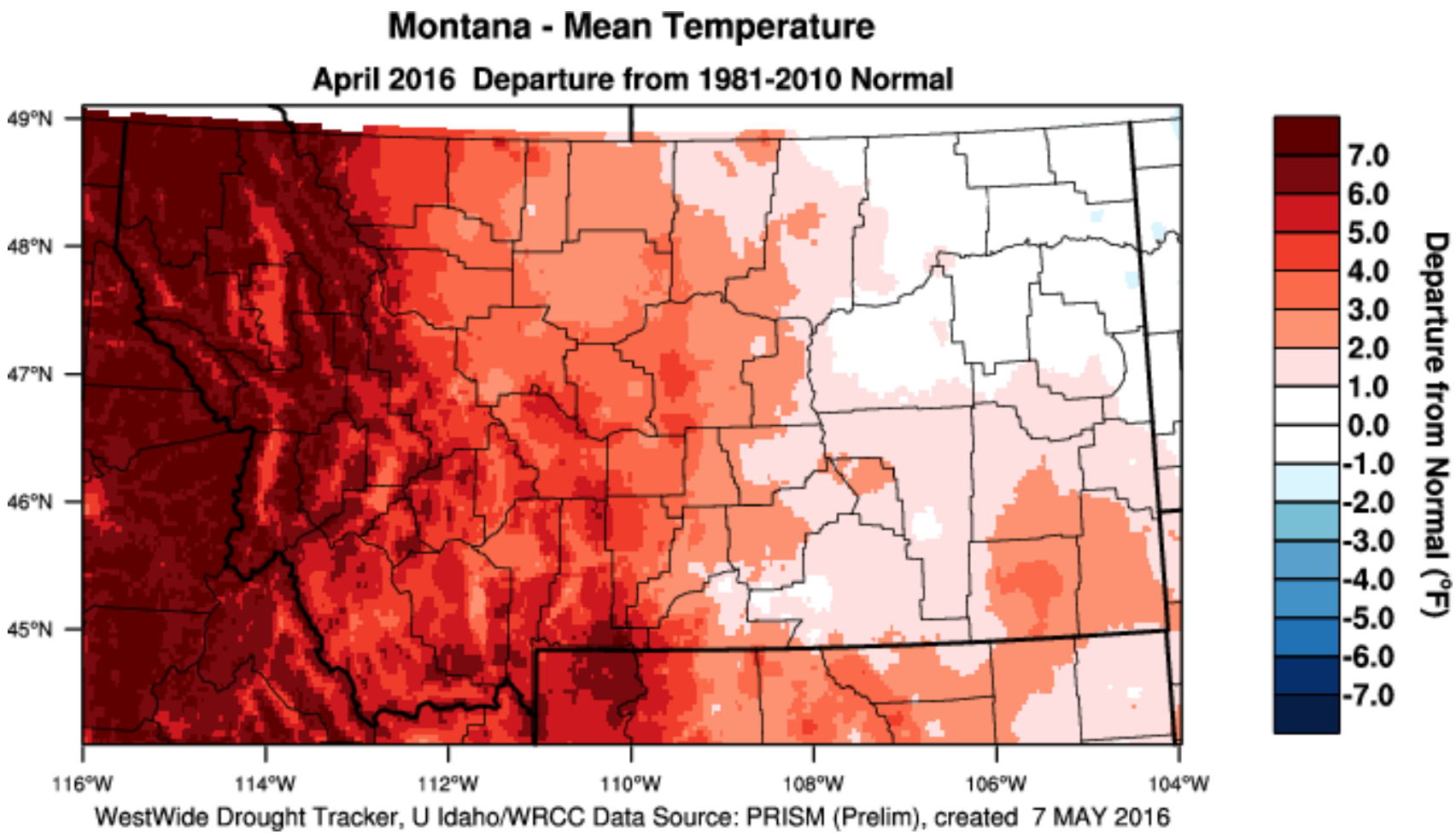
Mean Temperature

Calendar Year 2016

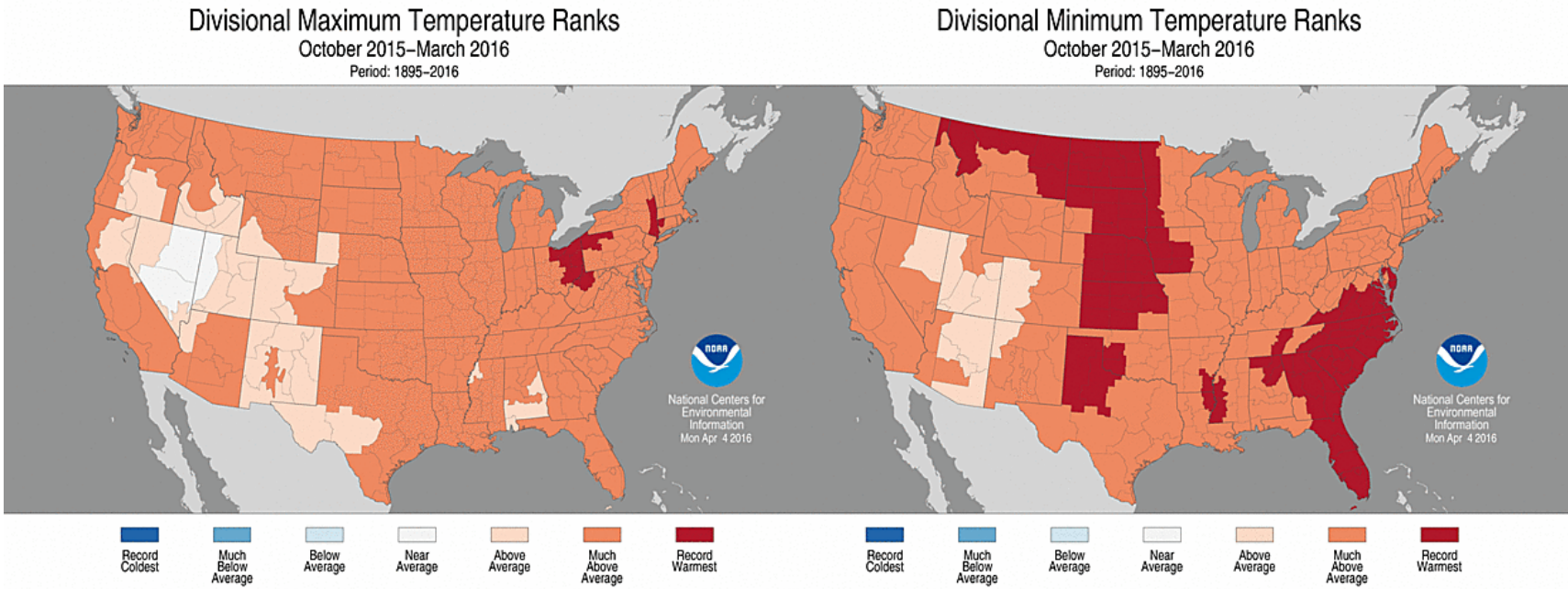


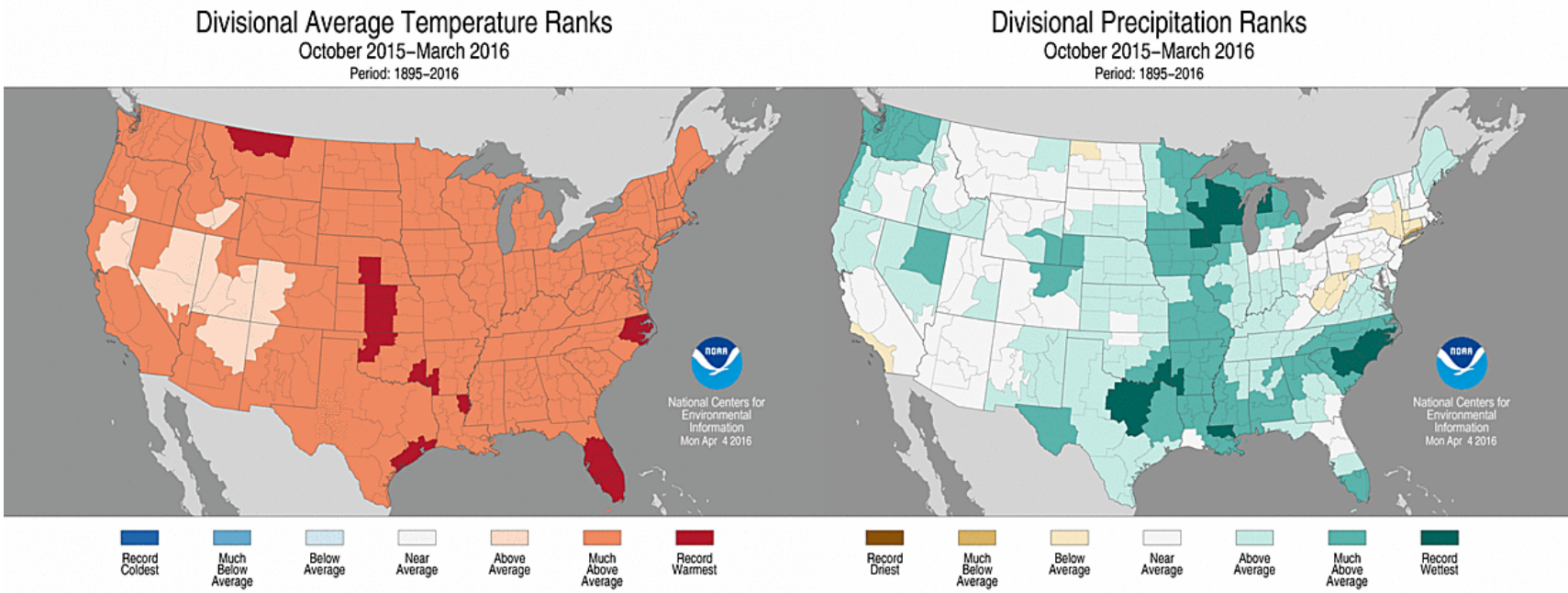
Mean Temperature

April 2016



Oct 2015 - April 2016

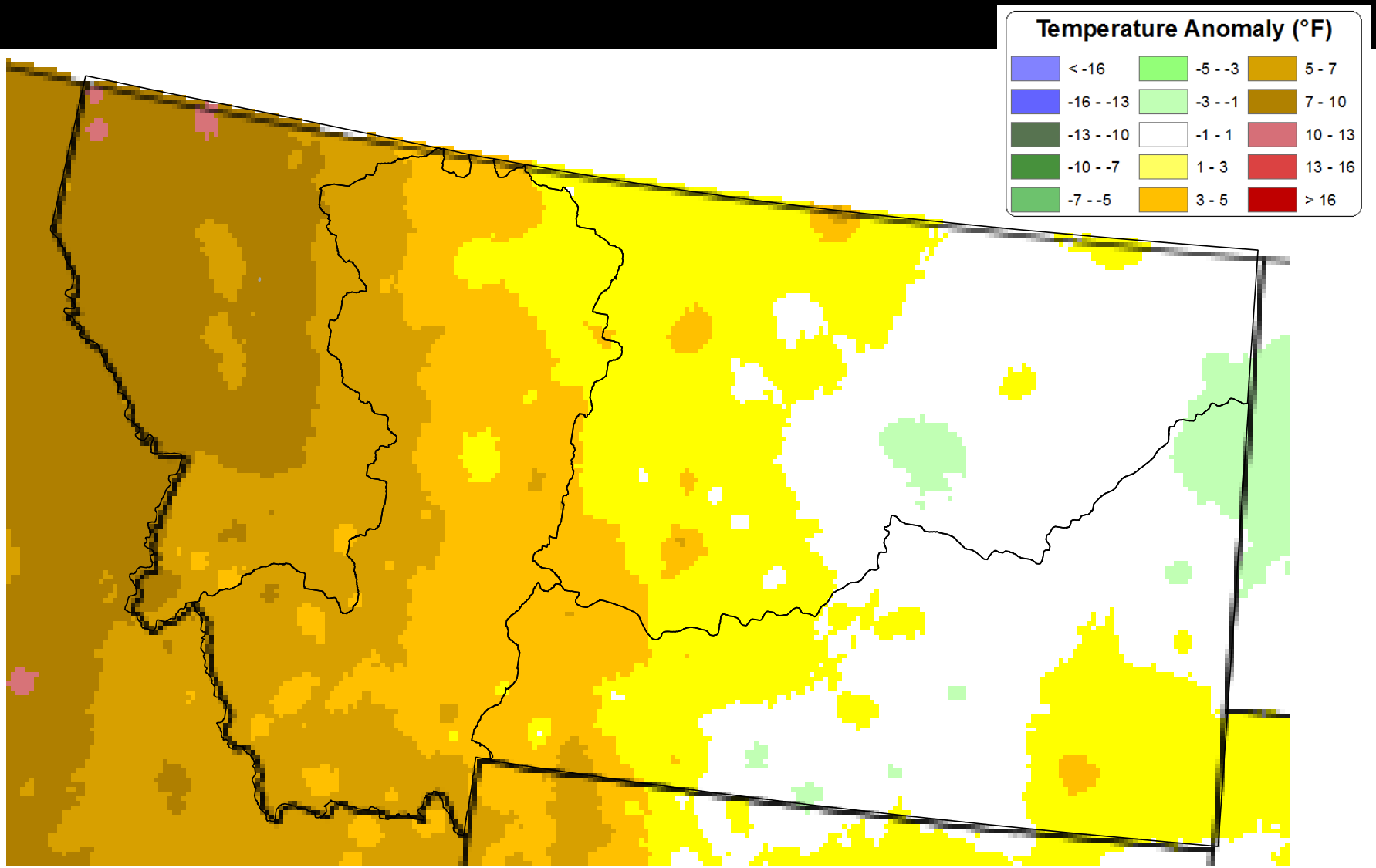




CURRENTLY…

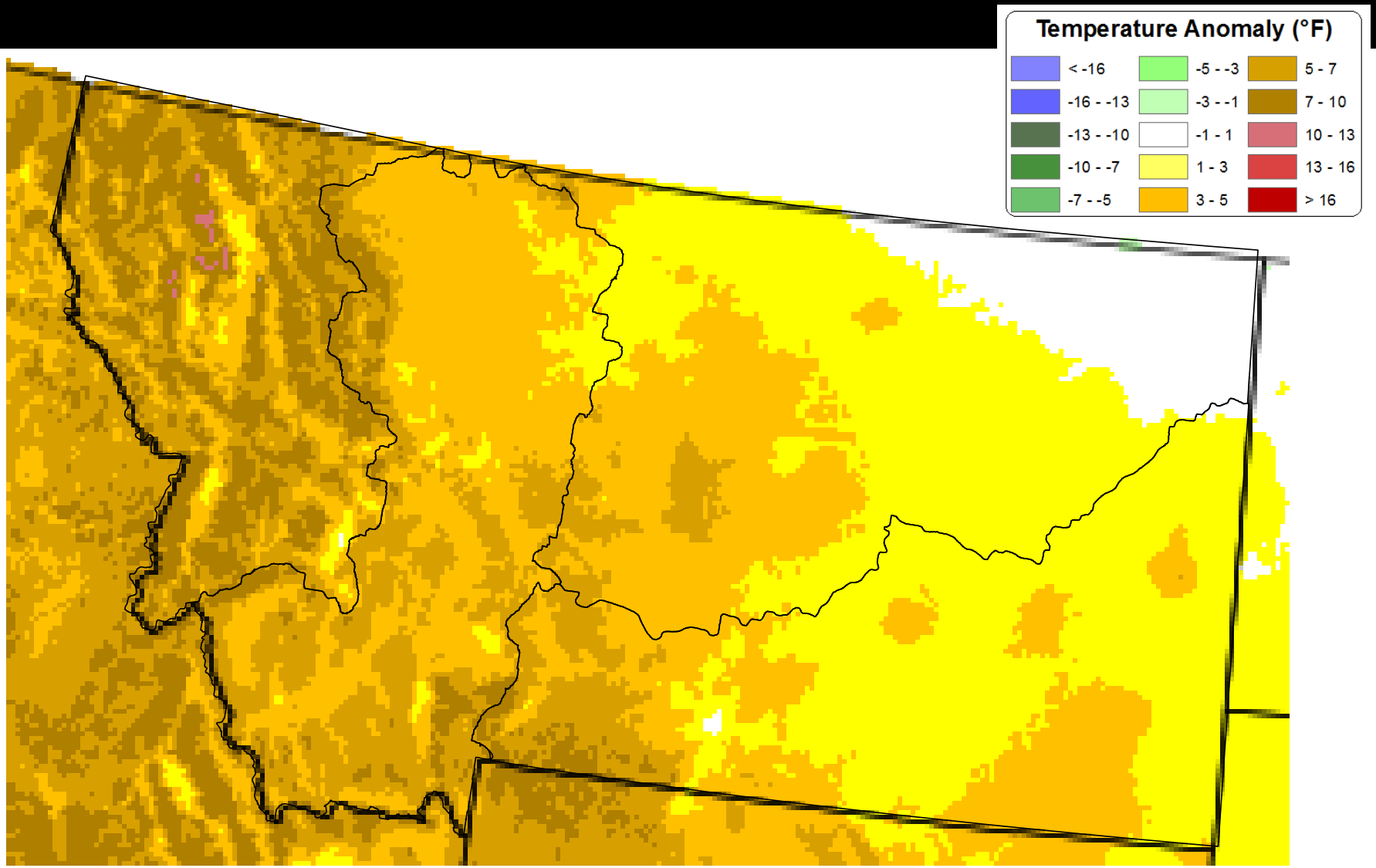
May Maximum Temperatures

Warmest Anomalies West of the Divide

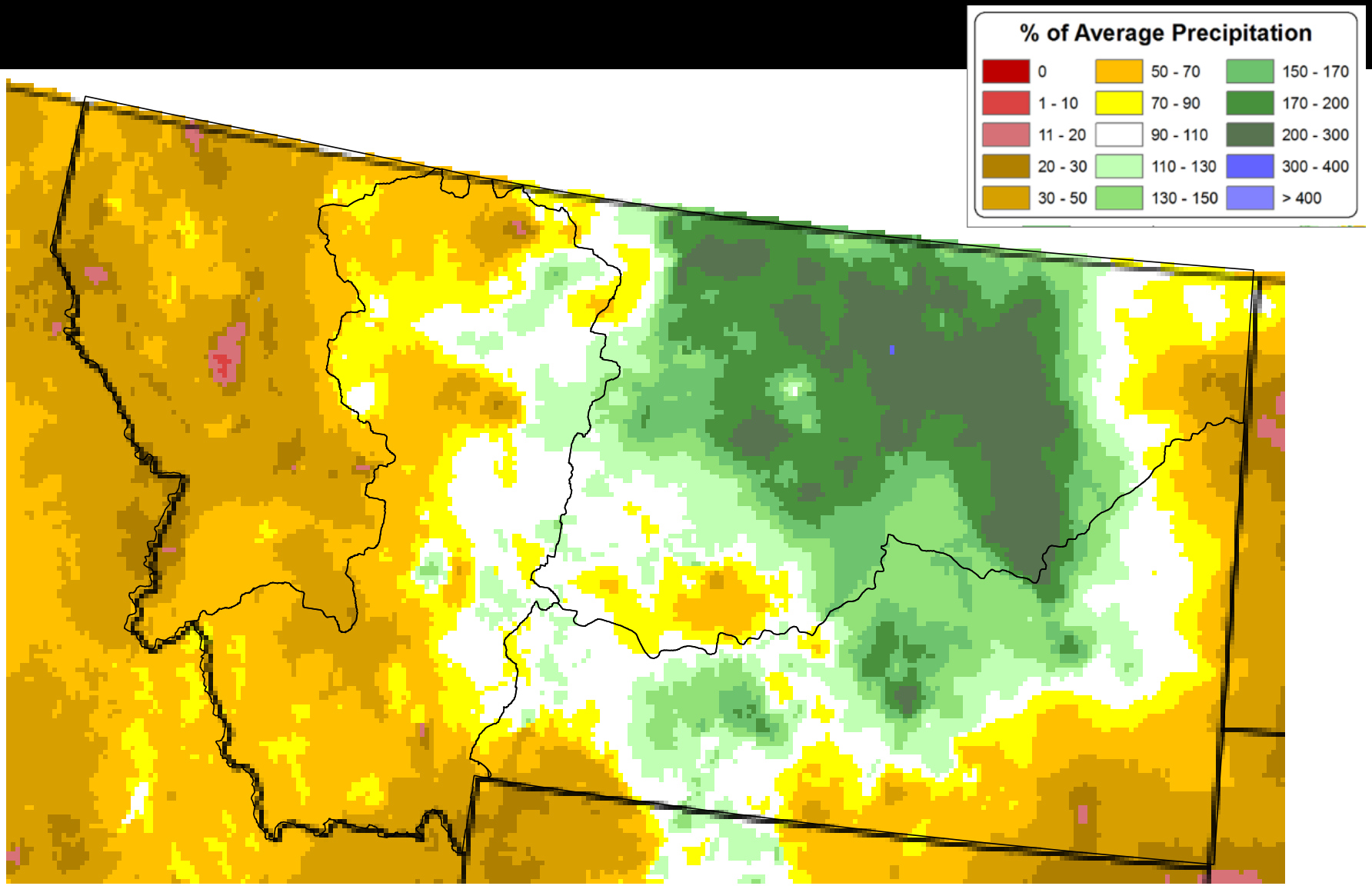


May Minimum Temperatures

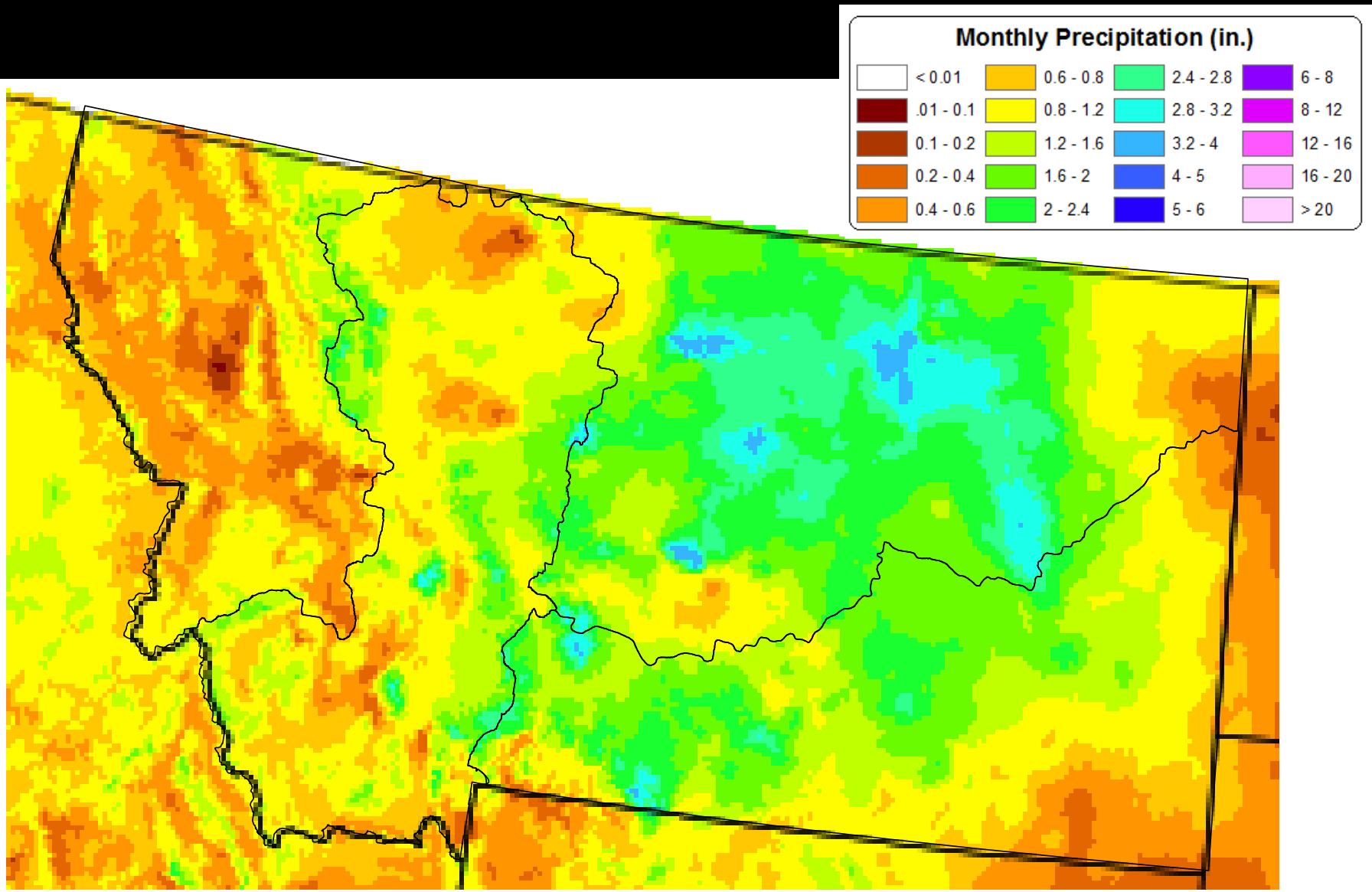
Anomalies More Statewide



May Precipitation Anomalies



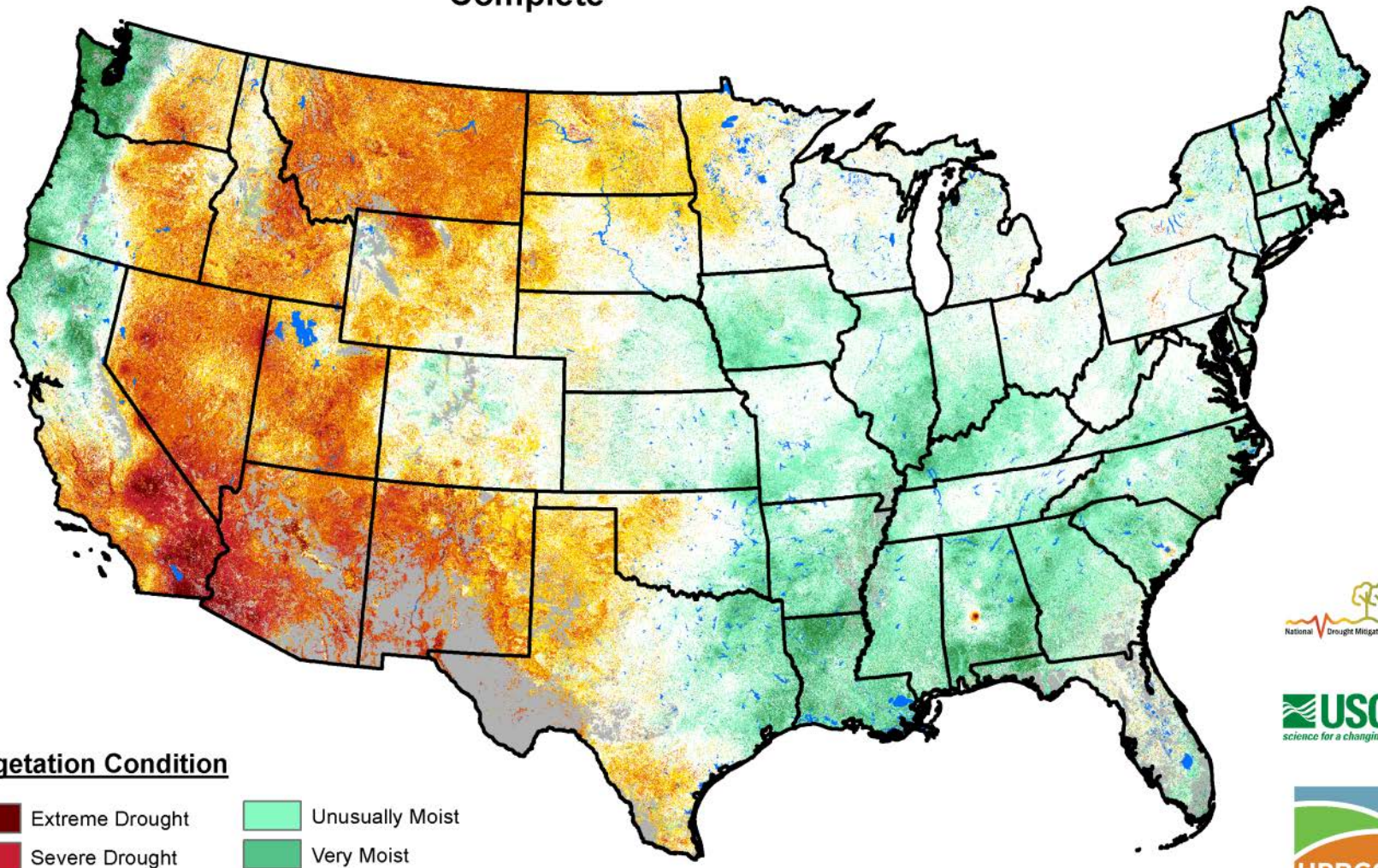
May Precipitation Thru May 17



Vegetation Drought Response Index

May 8, 2016

Complete



Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water

National Drought Mitigation Center

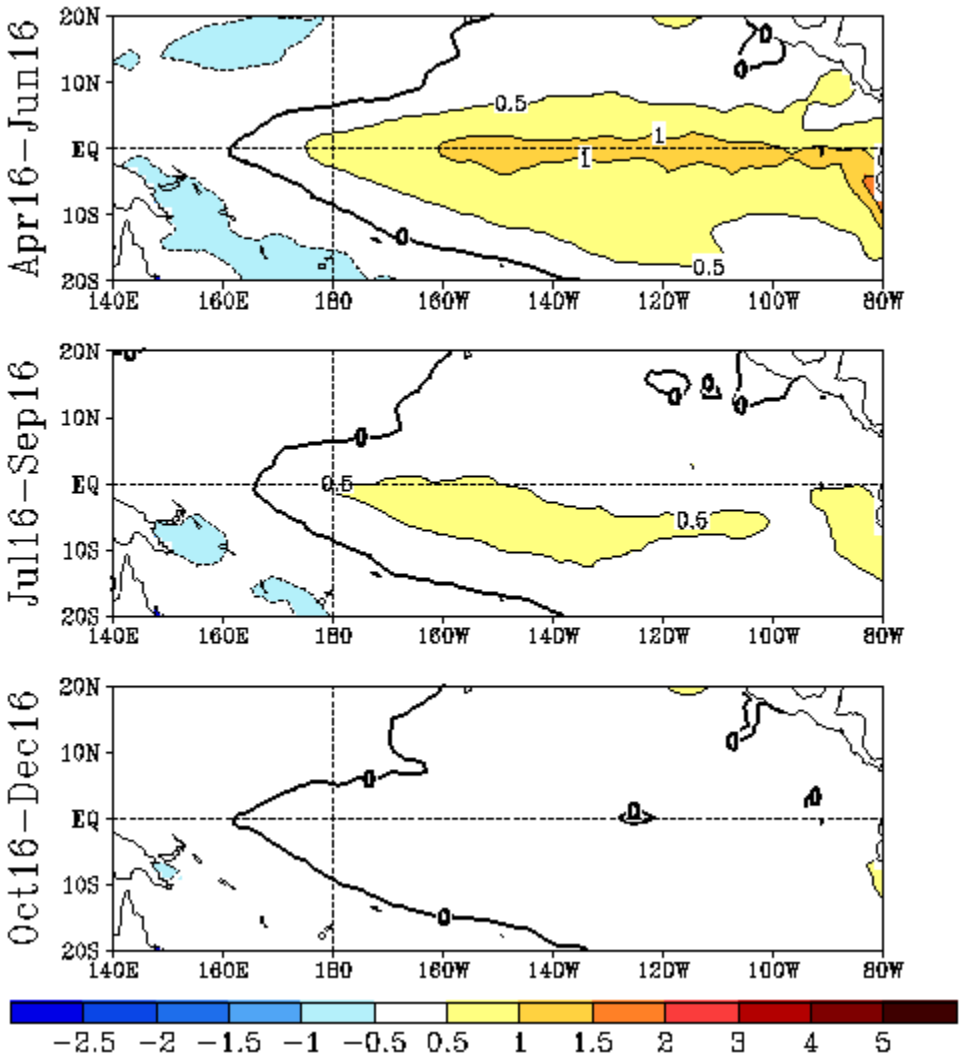
USGS science for a changing world

HPRCC

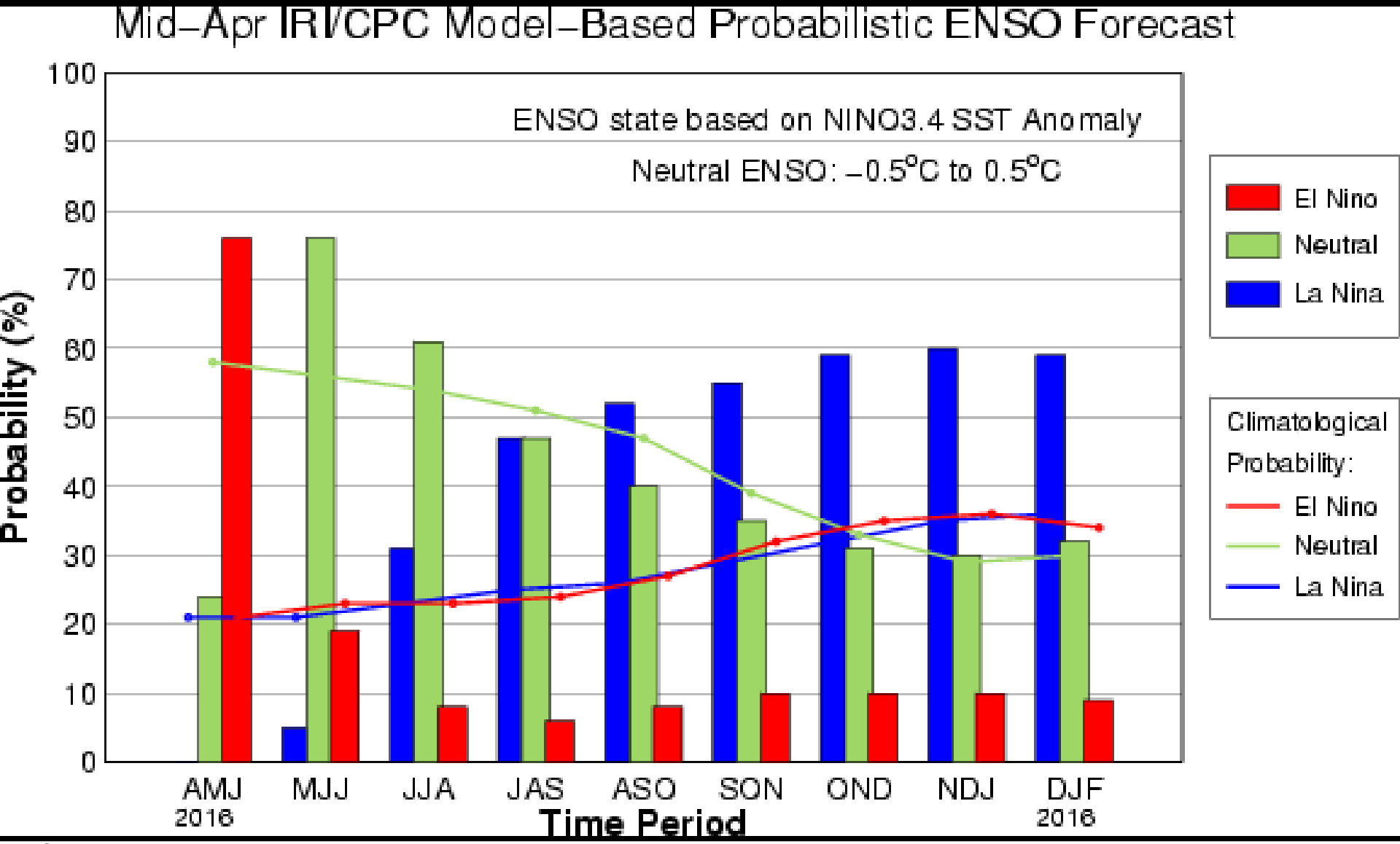
RMA

FORECAST…

El Niño / La Niña

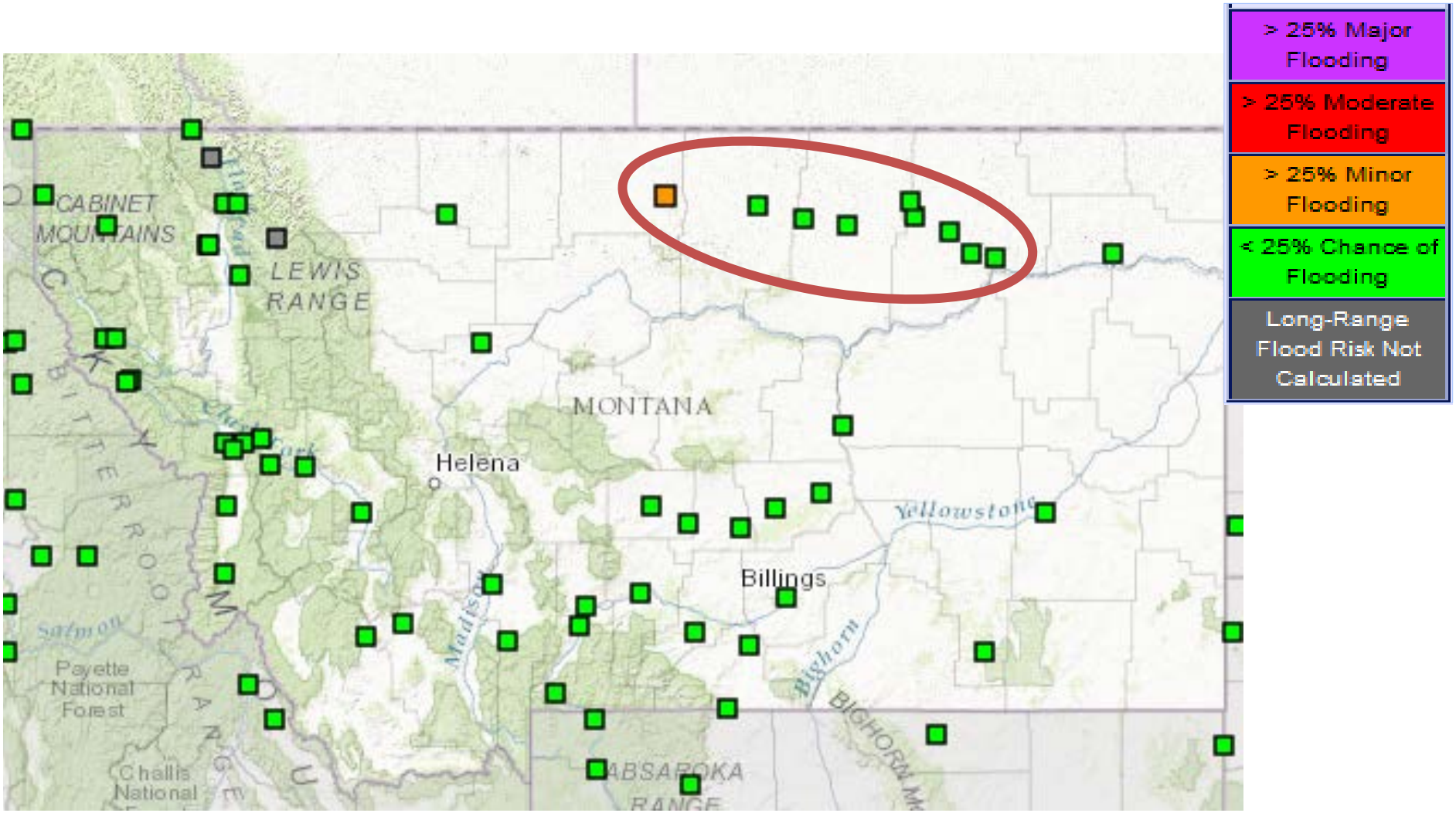


El Niño / La Niña



> 25% Probability of Flooding

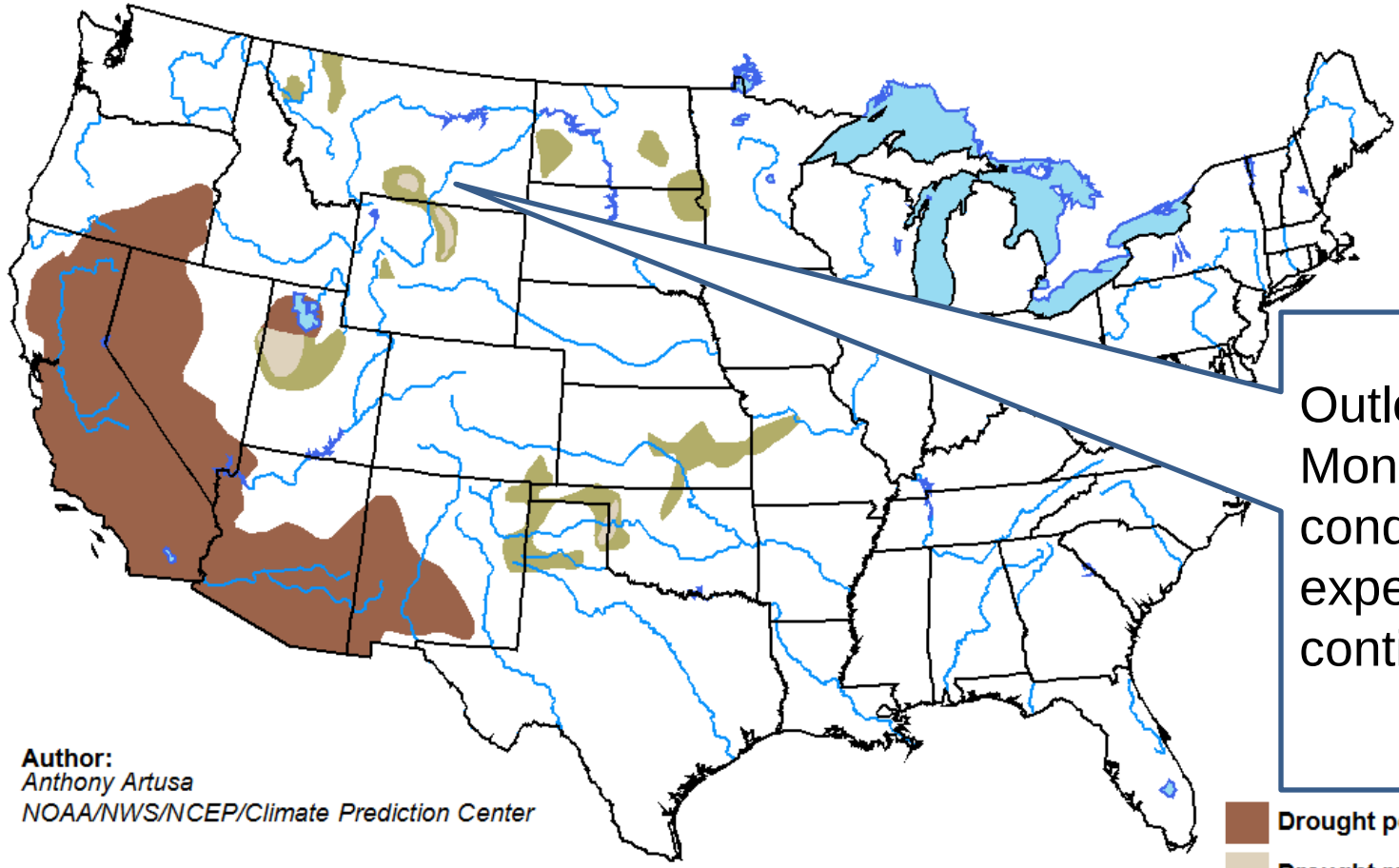
May - July



U.S. Seasonal Drought Outlook

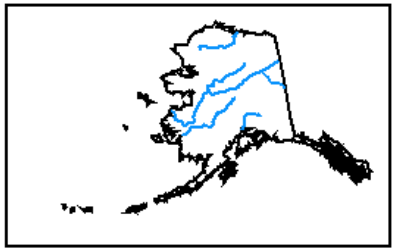
Drought Tendency During the Valid Period

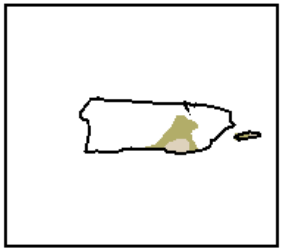
Valid for April 21 - July 31, 2016
Released April 21, 2016



Outlook suggests Montana drought conditions are expected to continue improving

Author:
Anthony Artusa
NOAA/NWS/NCEP/Climate Prediction Center





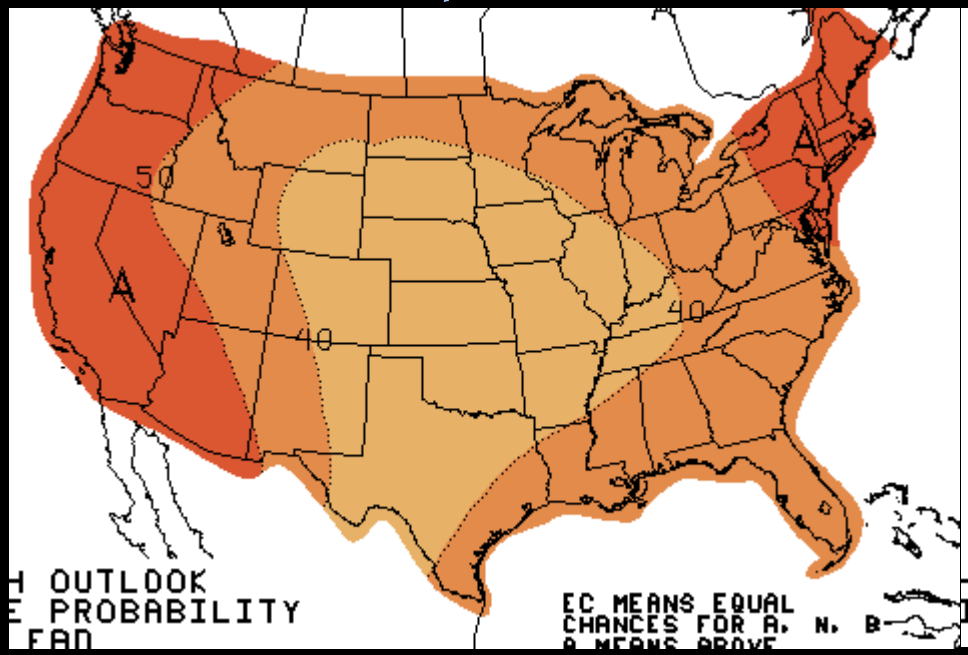
- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely

http://go.usa.gov/3eZ73

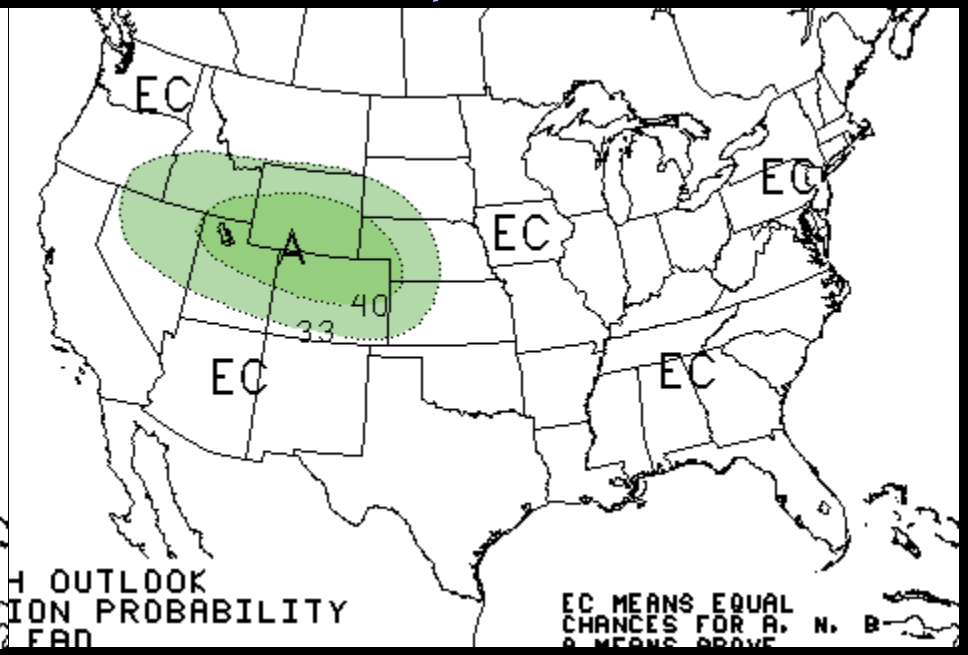
July – September Outlook

Created April 21

Temperature



Precipitation



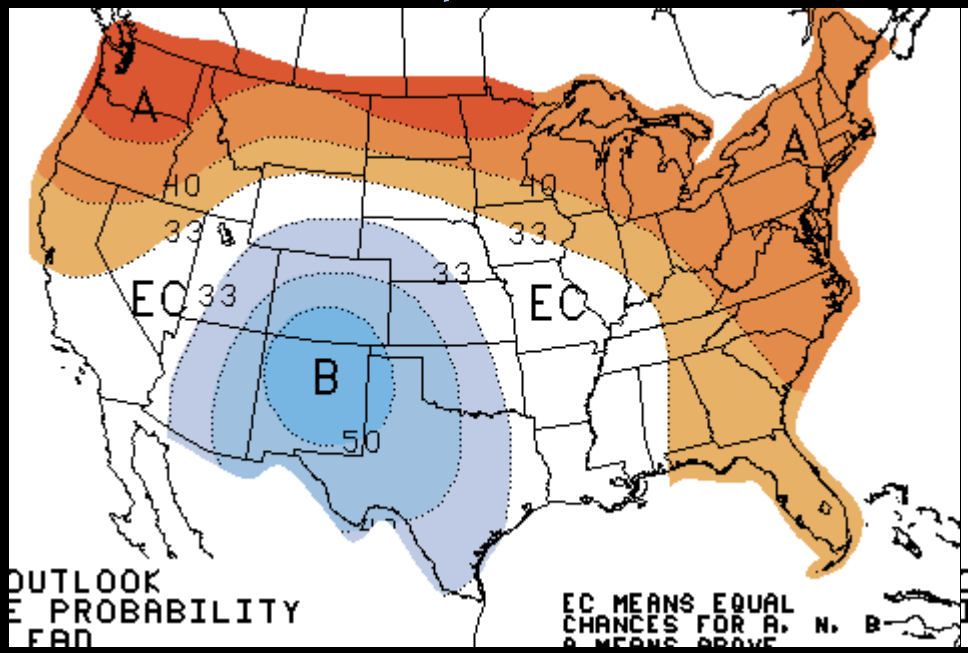
- Generally 40% to 50% chance of above normal temperatures statewide

- Equal chances for above, below, or near average nearly entire state

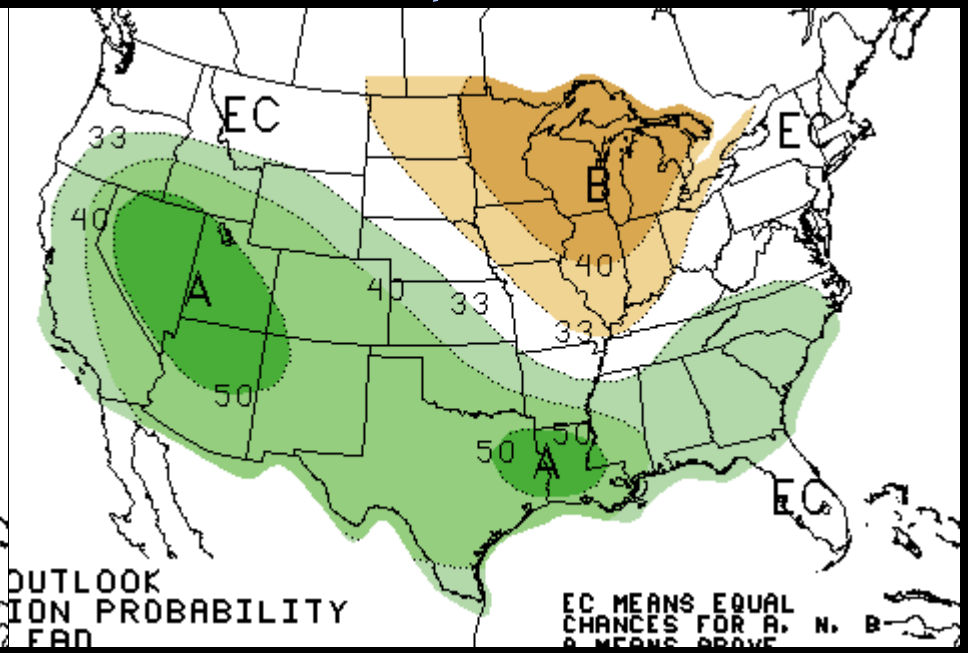
June Outlook

Created April 30

Temperature



Precipitation



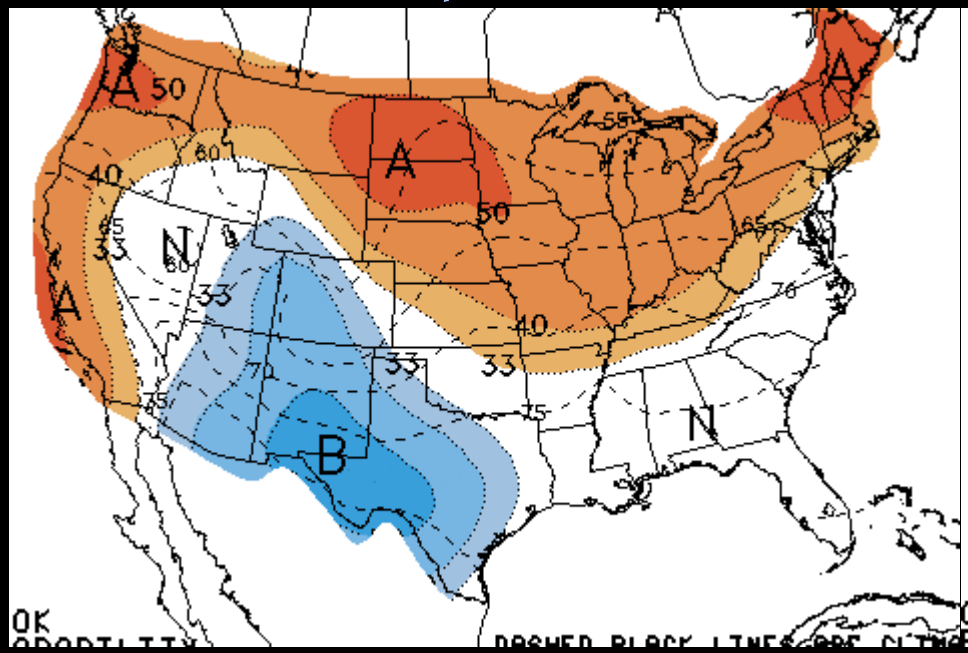
- Generally 40% to >50% chance of above normal temperatures statewide

- Equal chances for above, below, or near average nearly entire state… with 33% chance of above normal precip in extreme SW Montana

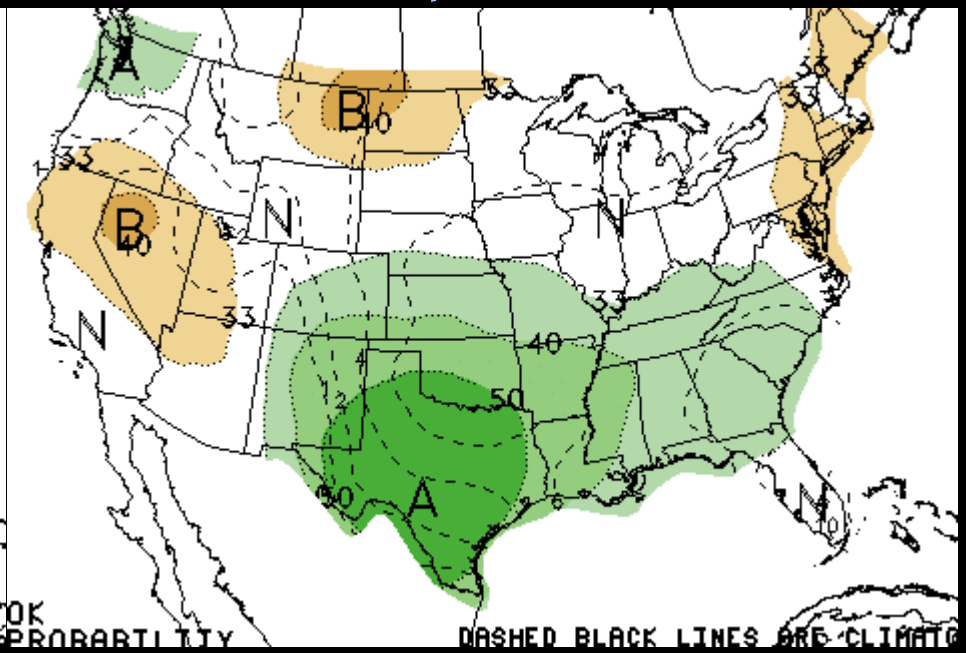
8 – 10 Day Outlook

Created May 18

Temperature



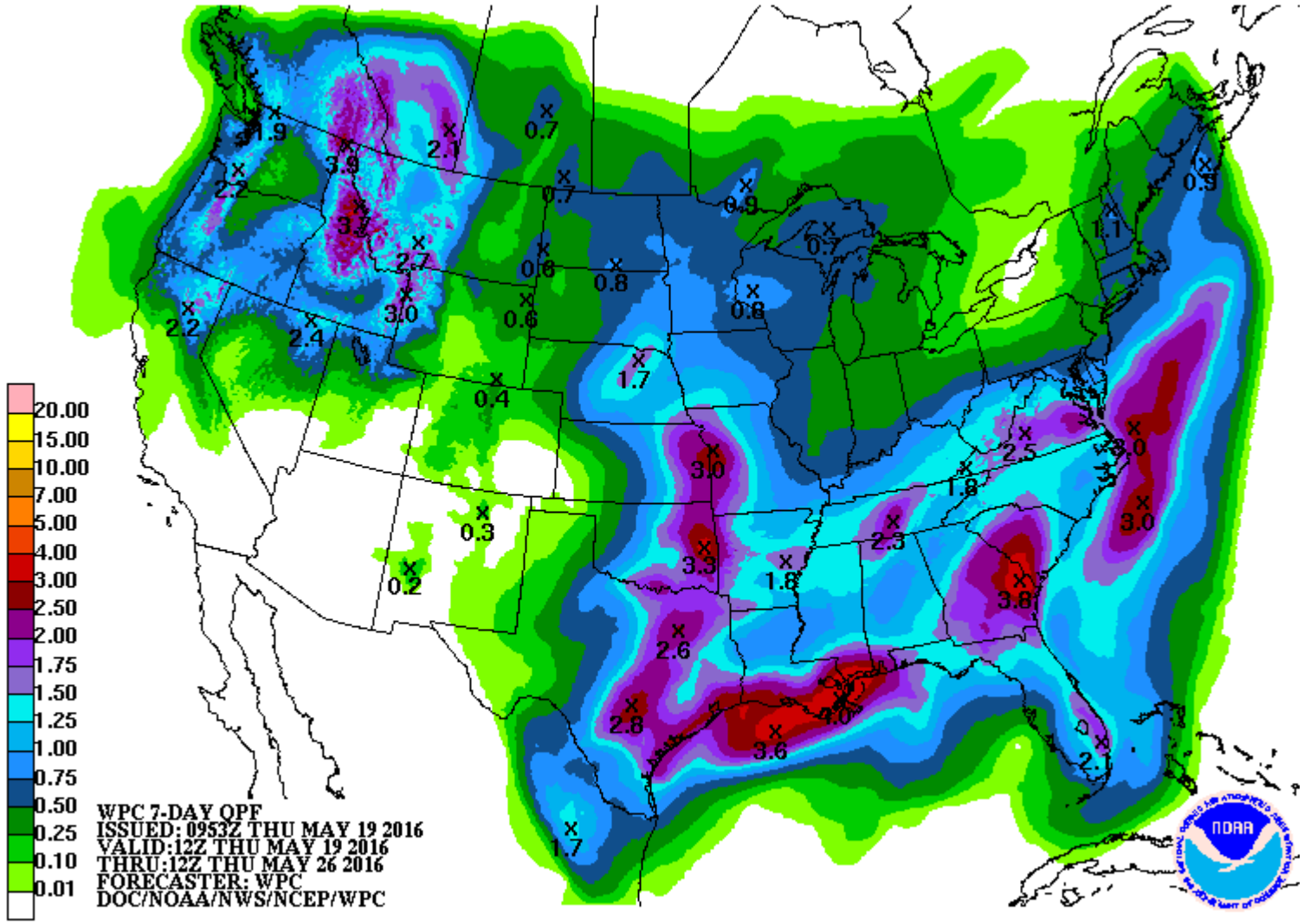
Precipitation



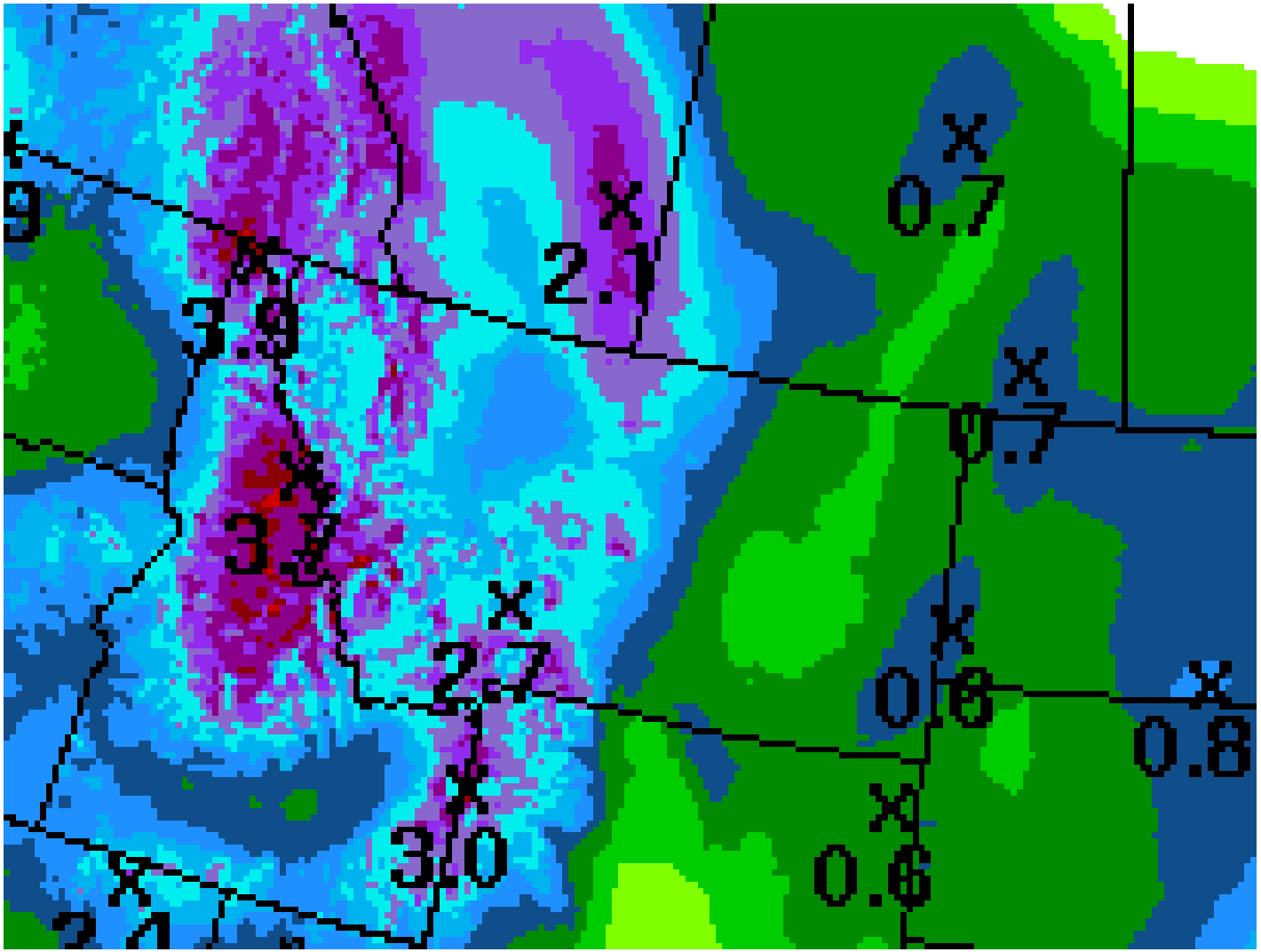
- Generally 40% to >50% chance of above normal temperatures statewide…particularly E Montana

- Equal chances for above, below, or near average W half of state…with 33% to 50% chance of below normal precip in E half of Montana

7-Day WPC Precipitation Forecast



7-Day WPC Precipitation Forecast



In Summary...

- Conditions have been generally drier than normal over western Montana
- April precipitation benefitted the lower Missouri basin
- May and June are climatologically wettest months
- El Niño will continue to weaken with La Niña conditions developing as we head into winter
- Drought Outlook currently indicates slowly improving conditions
- Flood Outlook indicates little chance of significant flooding statewide

weather.gov

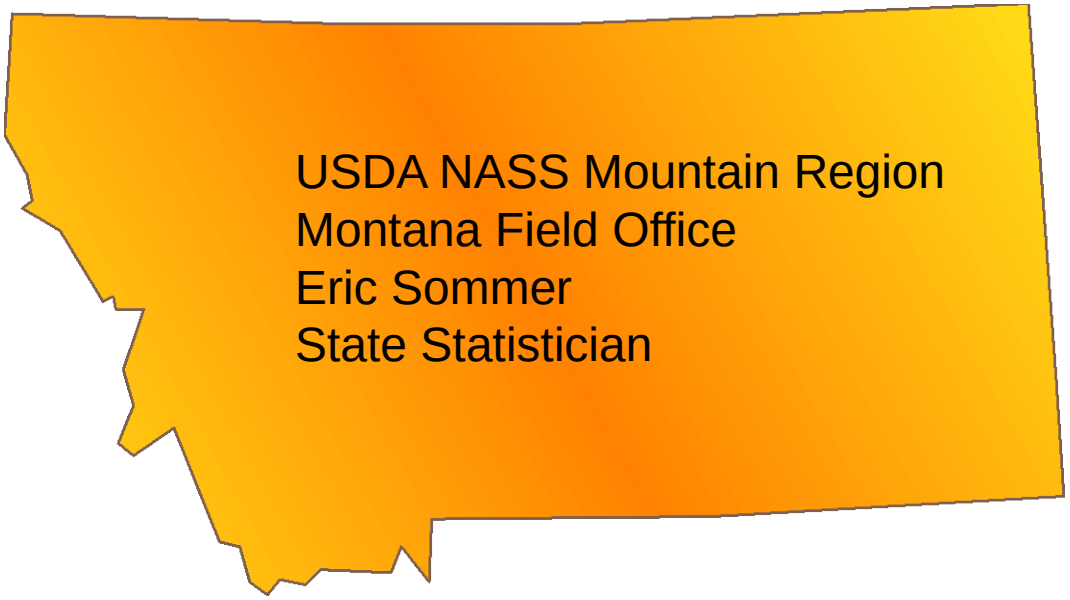
weather.gov/billings

weather.gov/glasgow

weather.gov/missoula

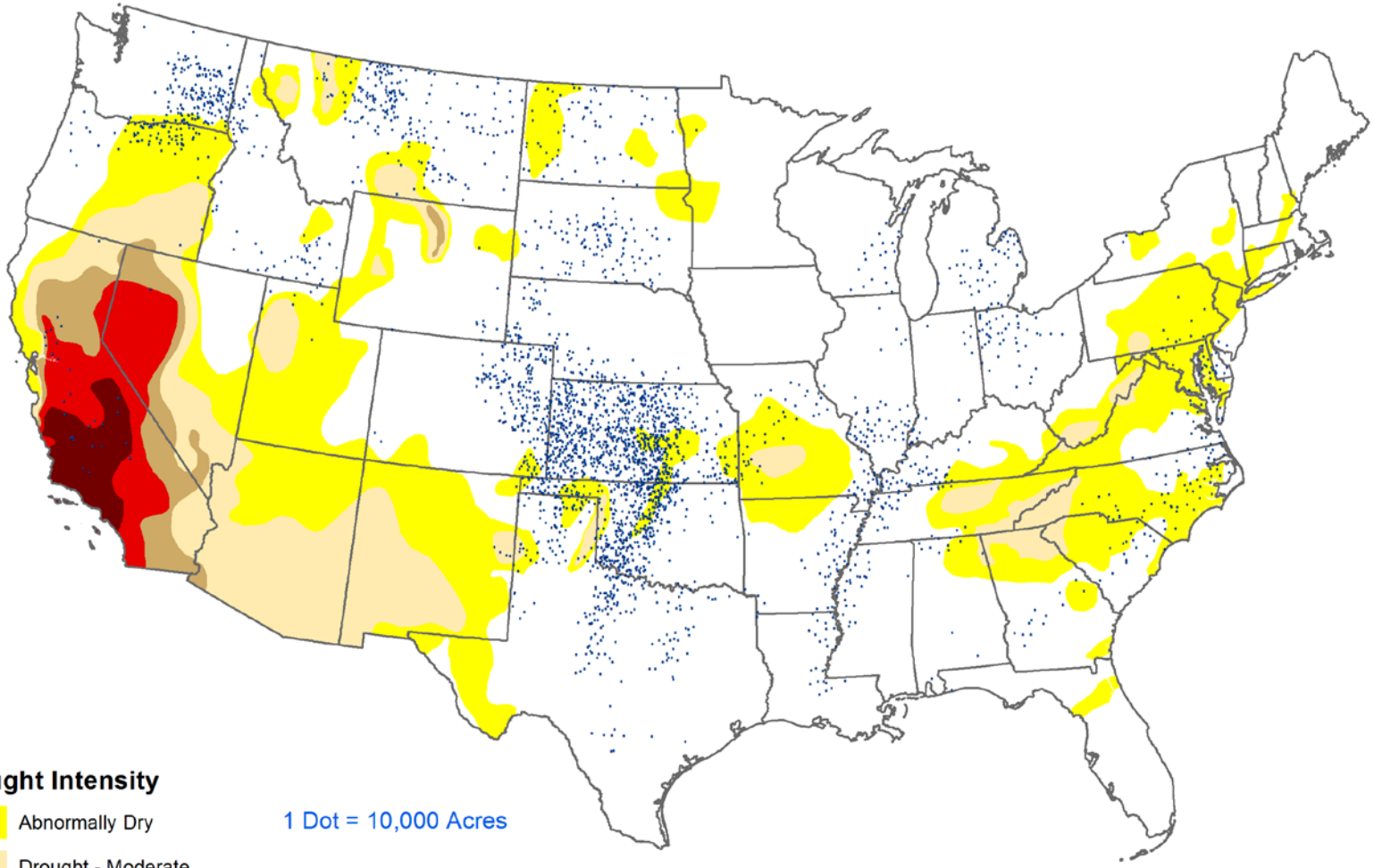
weather.gov/greatfalls

Governor’s Drought & Water Supply Advisory Committee



USDA NASS Mountain Region
Montana Field Office
Eric Sommer
State Statistician

U.S. Drought Intensity For May 3, 2016
Compared With Winter Wheat Acreage



Drought Intensity

- Abnormally Dry
- Drought - Moderate
- Drought - Severe
- Drought - Extreme
- Drought - Exceptional

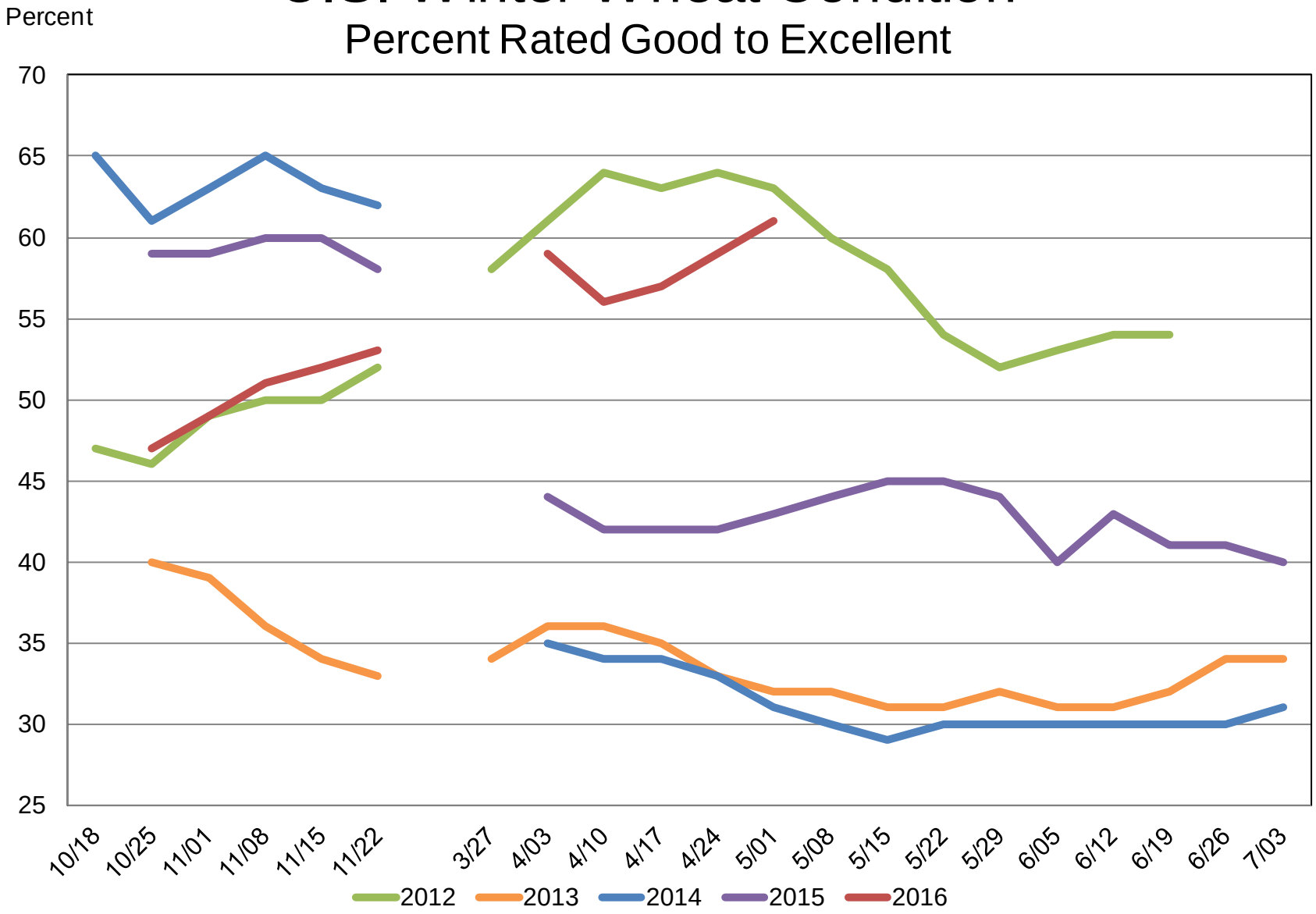
1 Dot = 10,000 Acres

Sources:
2012 Census of Agriculture, USDA-NASS
U.S. Drought Monitor (http://drought.unl.edu/dm/monitor.html)
National Drought Mitigation Center
U.S. Department of Agriculture
National Oceanic and Atmospheric Administration

USDA-NASS
5-10-16

U.S. Winter Wheat Condition

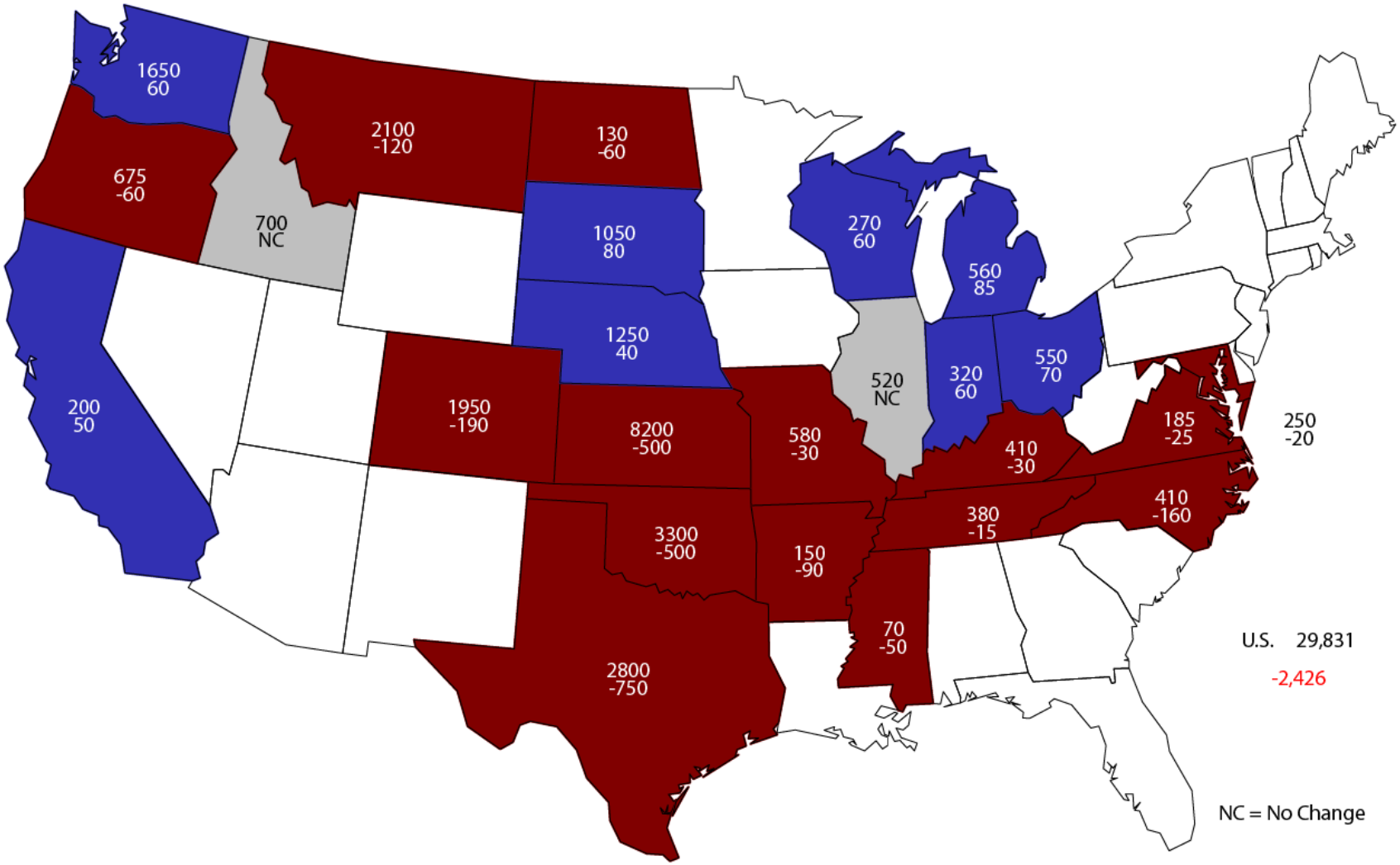
Percent Rated Good to Excellent



USDA-NASS
5-10-16

2016 Winter Wheat Harvested Area

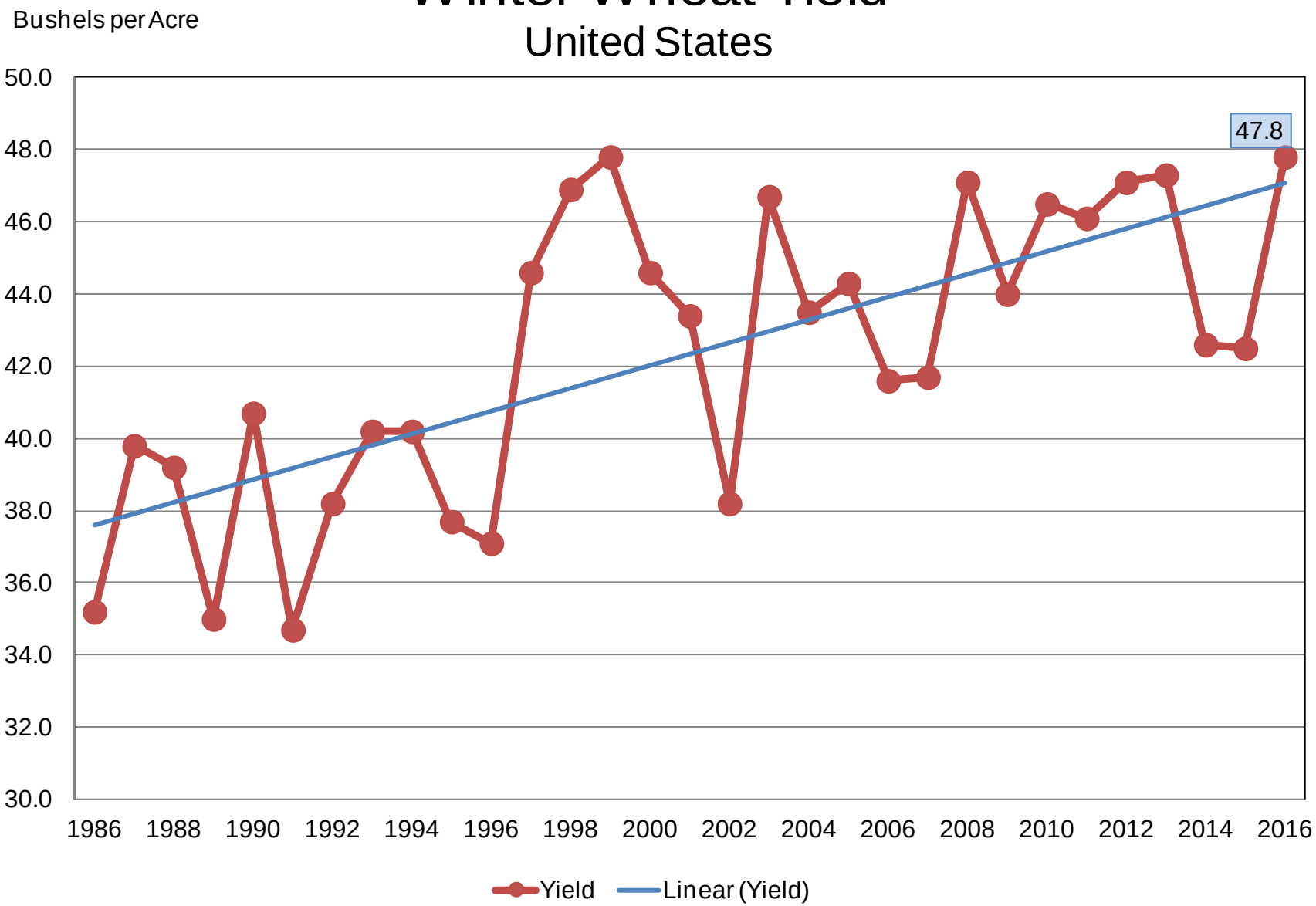
(000) Acres and Change From Previous Year



USDA-NASS
5-10-16

Winter Wheat Yield

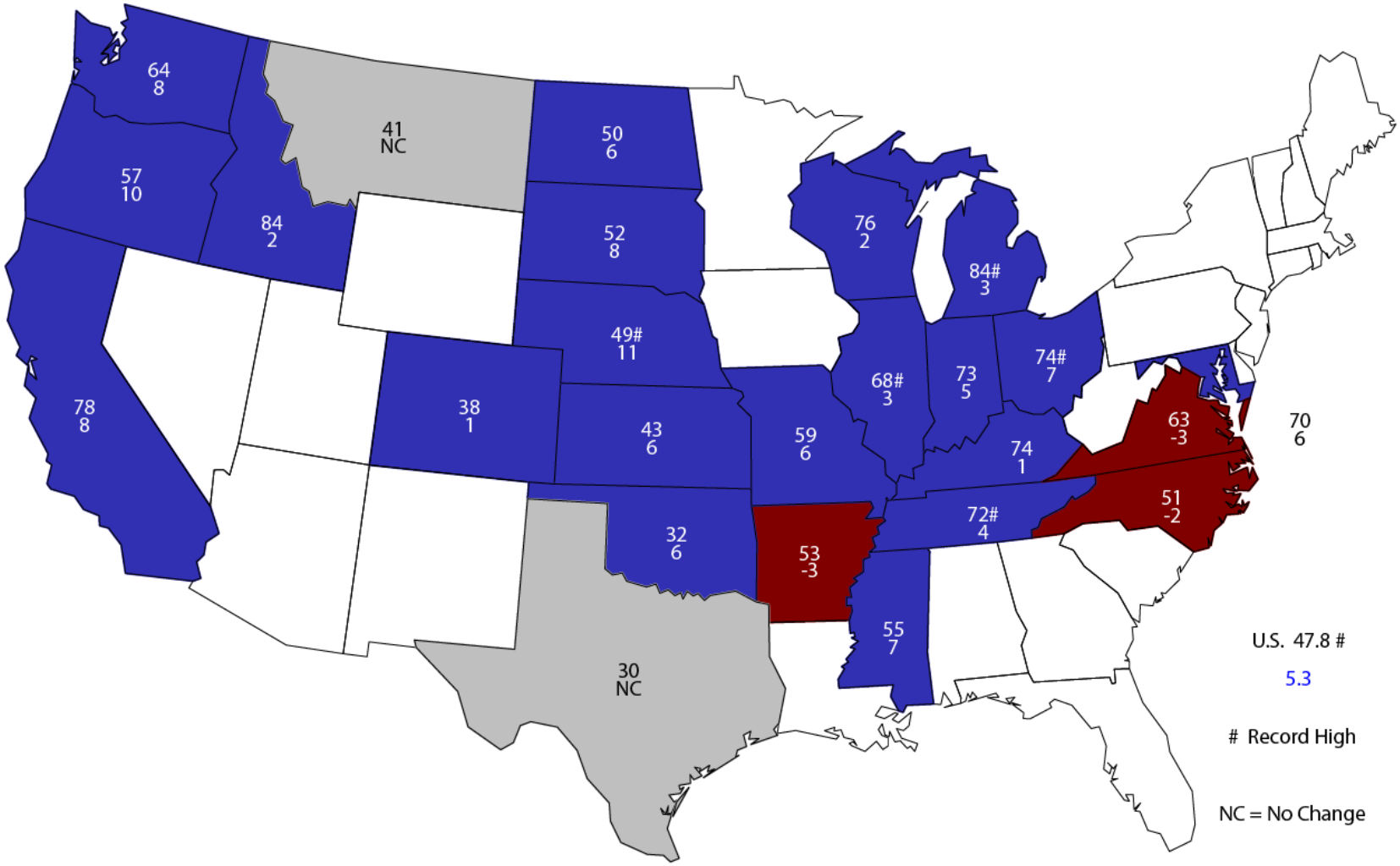
United States



USDA-NASS
5-10-16

May 1, 2016 Winter Wheat Yield

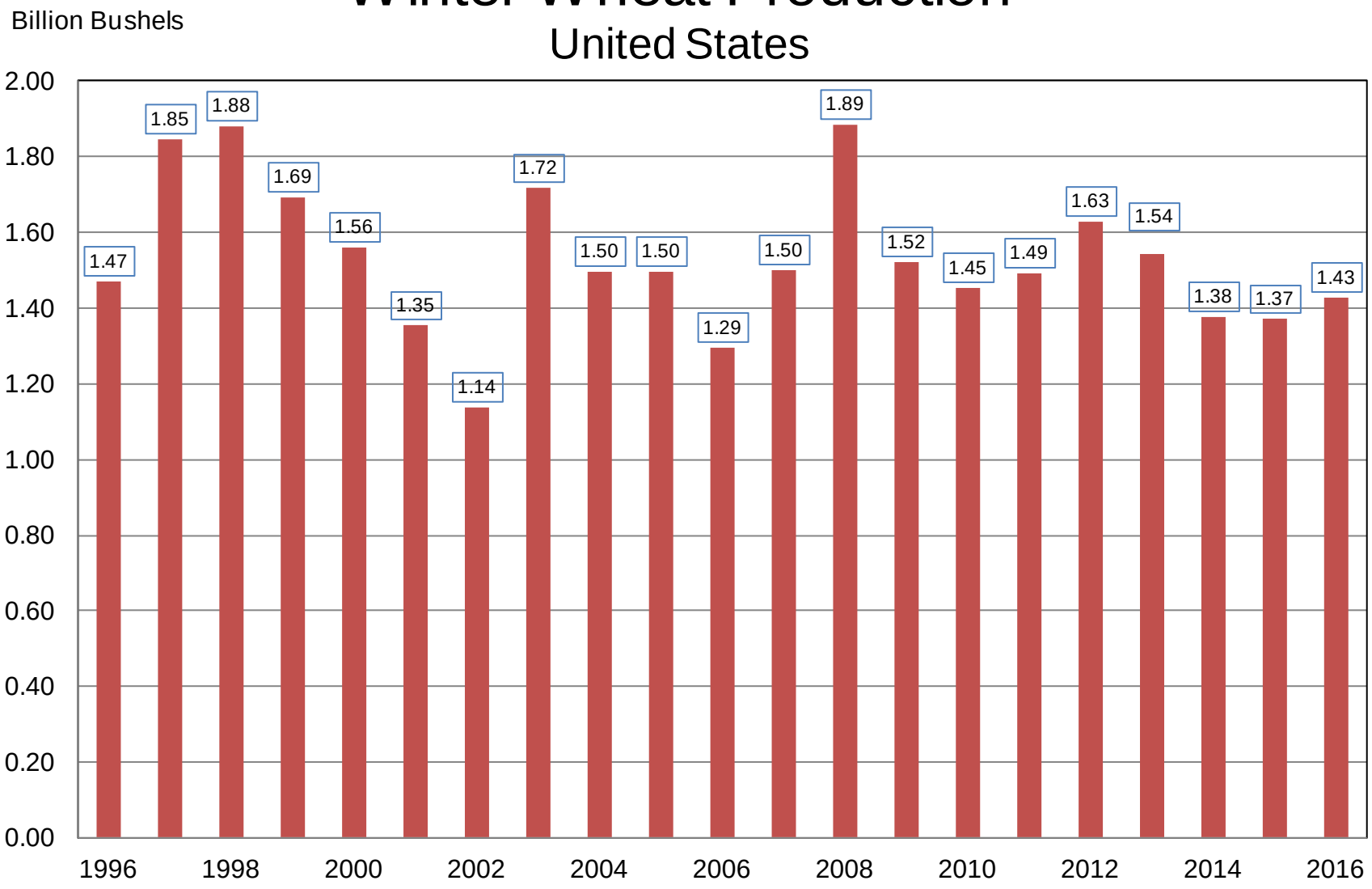
Bushels and Change From Previous Year



USDA-NASS
5-10-16

Winter Wheat Production

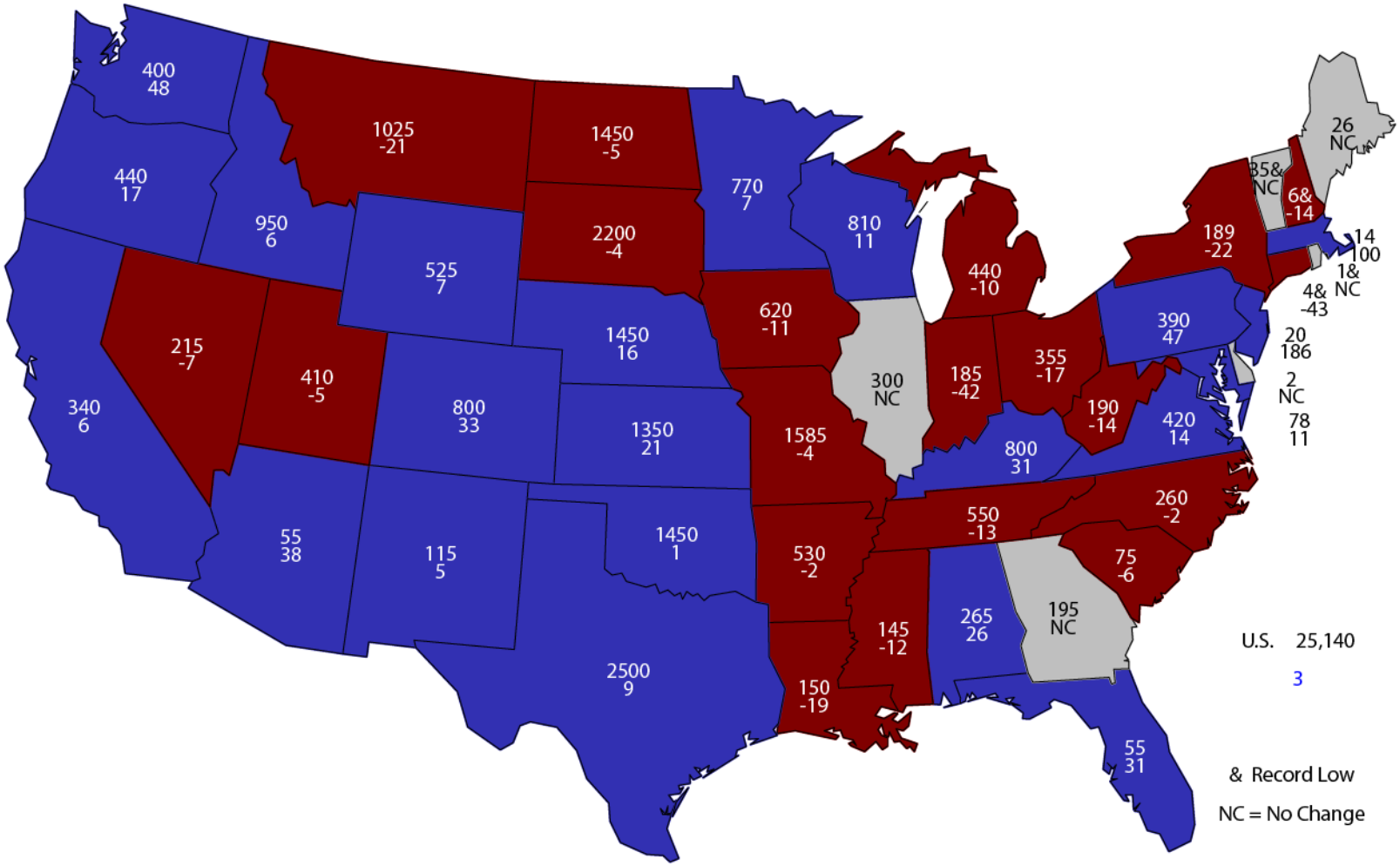
United States



USDA-NASS
5-10-16

May 1, 2016 Hay Stocks

(000) Tons and Percent Change From Previous Year



USDA-NASS
5-10-16

Crop Weather Report
Week Ending May 15, 2016

- Topsoil moisture conditions were better than a year ago and the five year average. Subsoil moisture conditions were better than last year but worse than the five year average.

- Producers have made a lot of progress seeding their spring crops. Weeks ahead of the five year average on most crops. Due to warm and dry conditions.

Topsoil Moisture

Week Ending May 15, 2016

	This week	Last week	Last year	5-yr avg.
Very short	6	6	11	7
Short	12	15	29	21
Adequate	76	74	52	59
Surplus	6	5	8	13

Subsoil Moisture

Week Ending May 15, 2016

	This week	Last week	Last year	5-yr avg.
Very short	7	7	8	8
Short	23	25	26	20
Adequate	63	62	53	61
Surplus	7	6	13	11

Winter Wheat Condition
Week Ending May 15, 2016

	Very poor	Poor	Fair	Good	Excellent
This week	1	5	30	45	19
Last week	1	5	31	46	17
Last year	3	7	32	39	19
5-yr avg.	2	8	30	44	16

Seeding Completed
Week Ending May 15, 2016

	This week	Last week	Last year	5-yr avg.
Spring Wheat	86	78	92	70
Durum Wheat	71	60	88	51
Barley	89	83	96	82
Oats	80	71	86	61
Dry Peas	92	86	93	77
Lentils	78	70	78	69
Flaxseed	71	65	73	44
Canola	67	58	84	61

Seeding Completed
Week Ending May 15, 2016

	This week	Last week	Last year	5-yr avg.
Corn	68	57	73	56
Potatoes	27	11	35	33
Sugar Beets	87	76	94	77

Emerged
Week Ending May 15, 2016

	This week	Last week	Last year	5-yr avg.
Spring Wheat	48	34	66	30
Durum Wheat	23	14	26	9
Barley	74	50	77	43
Oats	44	22	44	27
Dry Peas	52	30	45	23
Canola	24	13	24	17
Sugar Beets	28	10	68	38

Livestock Grazing
Week Ending May 15, 2016

- 61 percent of Cattle and Calves have been moved to summer ranges, ahead of last years 50 percent and the five-year average of 47 percent.
- 64 percent of Sheep and Lambs have been moved to summer ranges, ahead of last years 60 percent and the five-year average of 44 percent.
- 32 percent of cattle & calves and 35 percent of sheep & lambs were receiving supplemental feed

Range & Pasture Feed Condition

Week Ending May 15, 2016

	Very poor	Poor	Fair	Good	Excellent
This week	5	13	44	35	3
Last week	5	16	47	29	3
Last year	5	14	48	30	3
5-yr avg.	6	17	38	33	6

Lambing Completed
Week Ending May 15, 2016

- 91 percent of ewes have lambed, compared to 94 percent last year and 86 percent for the five-year average.

Surveys

- June Acreage Surveys
- June Hogs
- June Grain Stocks
- Montana Wheat Varieties Survey
- CEAP (Conservation Effects Assessment Project)

June Releases

- June Hog Report released on June 24
- June Acreage, and June Stocks Reports released on June 30

Summary
Week ending May 18, 2015

- Topsoil moisture conditions have improved to above average due to recent moisture but subsoil moisture conditions continue to be below average
- 3.7 days were suitable for field work during the week, compared to 4.6 days last year and 5.2 days for the five-year average
- Spring planting of most crops is progressing well ahead of the five year average

USDA, NASS, Montana Field Office

Eric Sommer, State Statistician

1-800-835-2612 or 406-441-1240

Email: nassrfomtr@nass.usda.gov

www.nass.usda.gov/mt/

https://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Crop_Progress_&_Condition/

Fire Season 2016

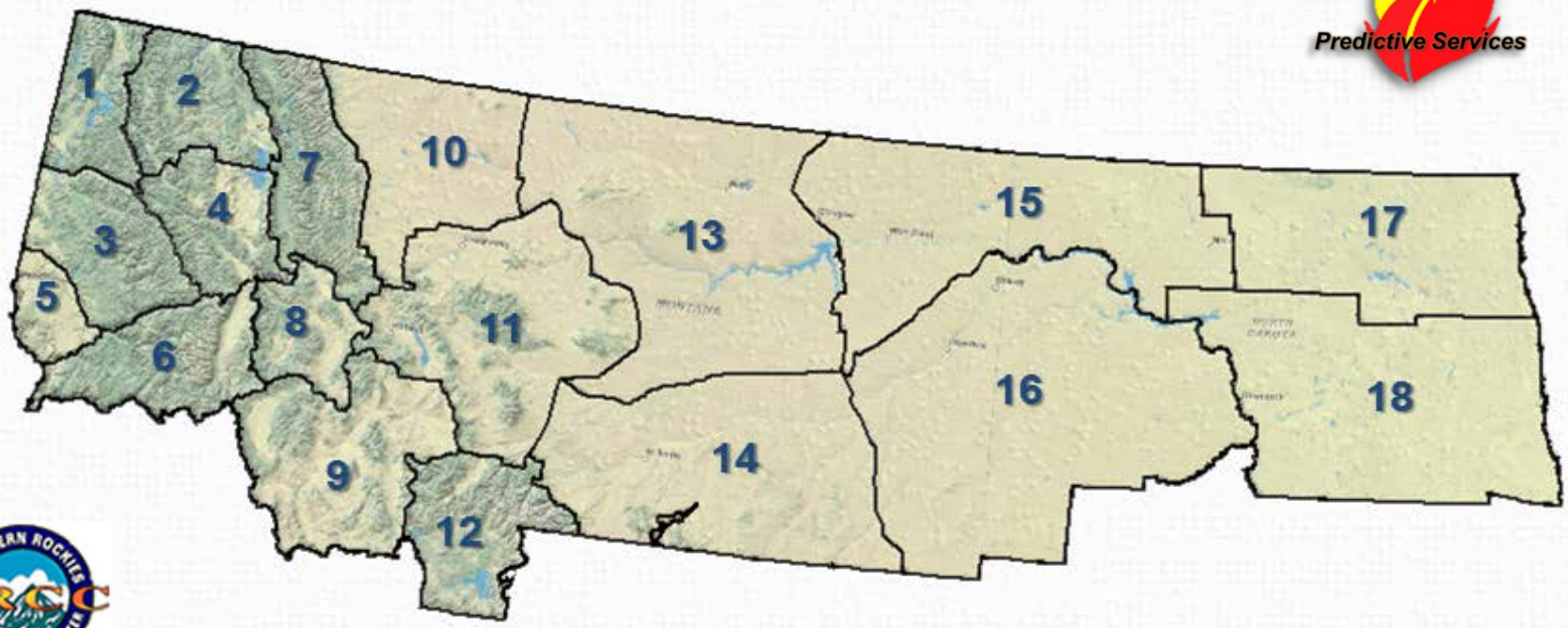
Predictive Services

19 May, 2016

Outlook- NRGA

Michael Richmond/Bryan Henry
Meteorologists
NRCC

PSA Boundaries

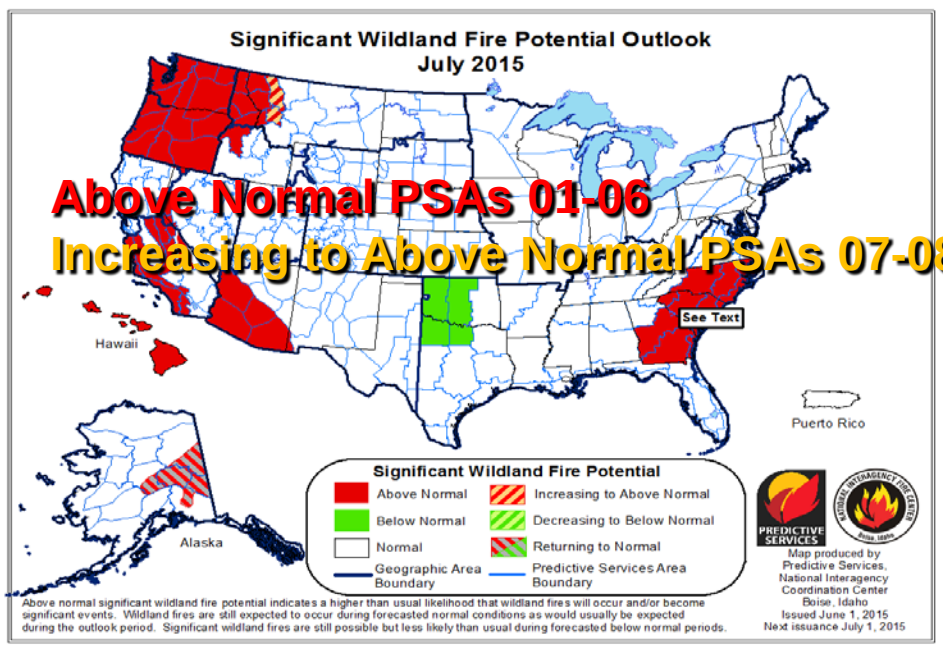


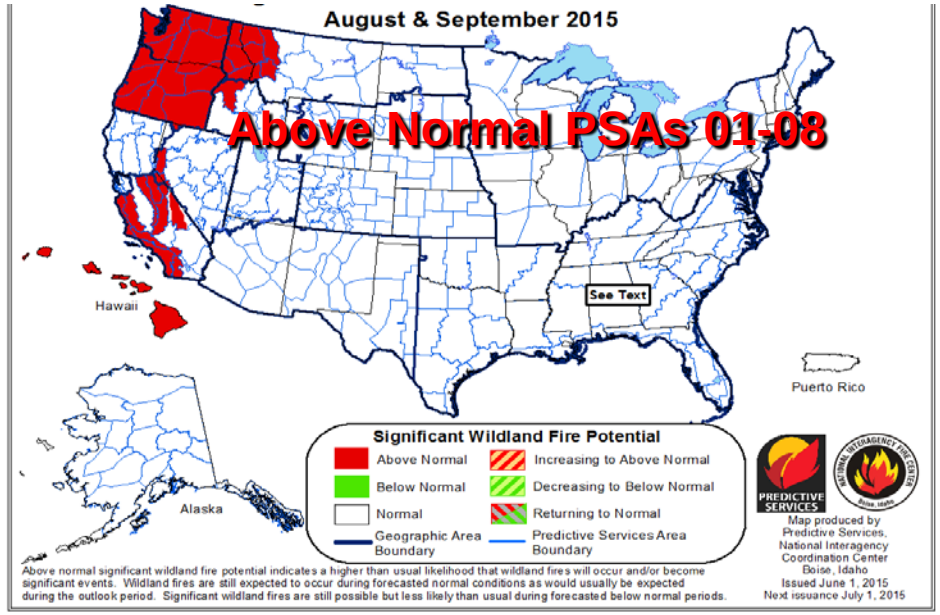
NR01 – North Idaho Panhandle
NR02 – Northwest Montana
NR03 – South Idaho Panhandle
NR04 – Western Montana
NR05 – Camas Prairie of Idaho
NR06 – North Central Idaho and Bitterroot/Sapphire Mountains
NR07 – Glacier NP and Wilderness Areas
NR08 – SW Montana West of the Continental Divide
NR09 – Big Hole/SW Montana East of the Continental Divide
NR10 – Northern Front Range
NR11 – West Central Montana
NR12 – South Central Montana and Yellowstone NP
NR13 – Northern Plains and Missouri Breaks
NR14 – Southern Montana (Big Horn/Powder River)
NR15 – NE Montana and NW North Dakota
NR16 – SE Montana and SW North Dakota
NR17 – Northeastern North Dakota
NR18 – Southeastern North Dakota

10-Year Averages

COMBINED		WILDLAND FIRE 10-YEAR TOTALS		WILDLAND FIRE 10-YEAR AVERAGE	
		FIRES	ACRES	FIRES	ACRES
Bureau of Indian Affairs	BIA	8,814	677,146	881	67,715
Bureau of Land Management	BLM	1,058	575,248	106	57,525
Counties	CNTY	1,756	108,091	176	10,809
Department of Defense	DOD	4	0	0	0
Fish & Wildlife Service	FWS	251	126,096	25	12,610
National Park Service	NPS	250	113,896	25	11,390
Other	TRIBE	225	11,459	23	1,146
Private Land	PRI	3,334	855,357	333	85,536
State Agencies	ST	4,662	664,094	466	66,409
USDA Forest Service	USFS	9,225	2,401,546	923	240,155
10-YEAR TOTAL - ALL NRGA AGENCIES		29,579	5,532,933	2,958	553,293

Last Year's Outlook…





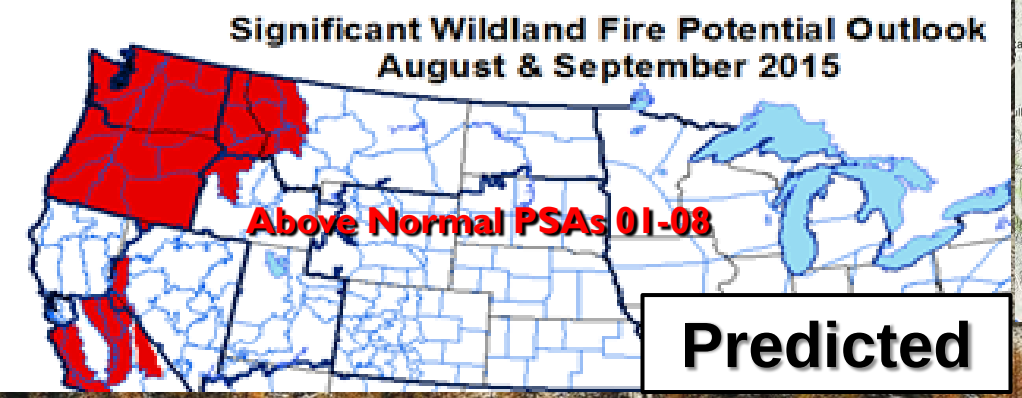
Acres Burned

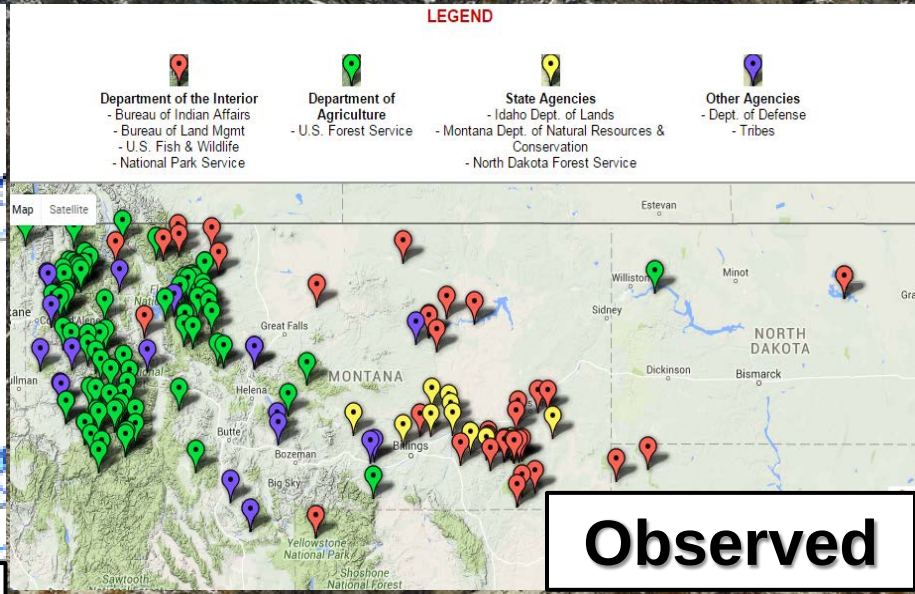
2012	**1,497,972**
2006	1,201,117
2007	1,185,199
2000	1,087,920
2003	942,022
2015	**745,947**
2008	241,854
2001	223,310
1999	218,106
2011	198,624
2005	185,457
2013	179,459
2002	172,197
1998	150,047
2014	143,271
2010	70,474
2009	69,016
2004	40,840
Median	**208,365**
Mean	**474,980**

2015-By the Numbers

2015 was an above-average year. 745,947 acres burned from a total of 3817 fires.

The bottom left map represents the official outlook. The bottom right map shows the observed fire activity.

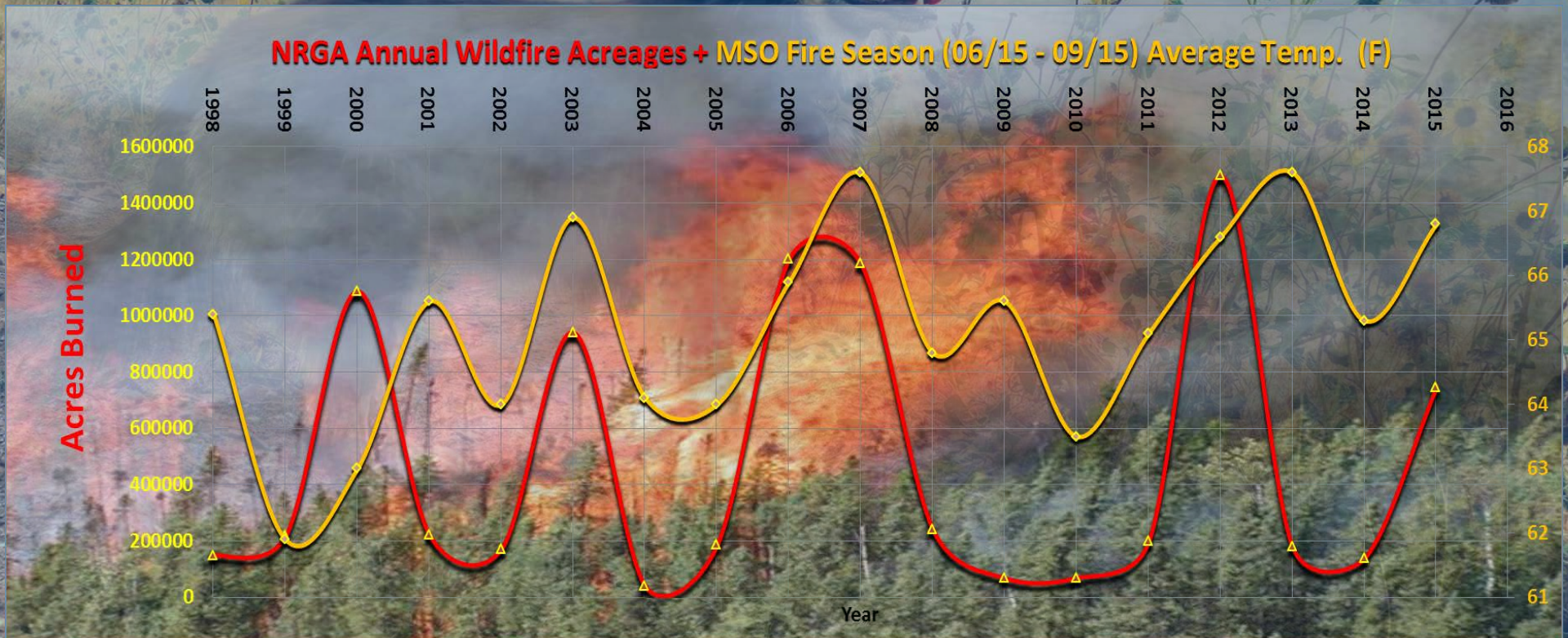




2015 – Was not unexpected, but better than it could have been! (much larger if more lightning came in July, e.g.)

Acres Burned-The Rankings

2012 – 1,497,972
2006 – 1,201,117
2007 – 1,185,199
2000 – 1,087,920
2003 – 942,022
2015 – 745,947

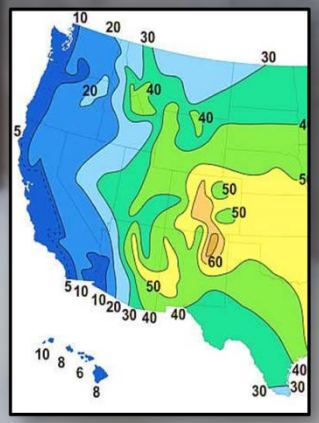


Factors that Influence NRGA Fire Season Severity

July Temperatures and Precipitation

Summer Convection

Number of Thunderstorm Days/Year (NOAA)



Indicators suggest above-normal temperatures but near-average precipitation. Similar snowmelt as in 2015.

Spring Factor

Ocean/Atmospheric Circulations (ENSO/PDO/etc.)

**Snowpack melting rates are much more important than snow pack accrual!*

Winter Snowpack

Fall /Winter were "near average" across North ID/Western/Central MT. Below normal on precip Eastern MT and ND

Fall Moisture and Preexisting Drought Conditions

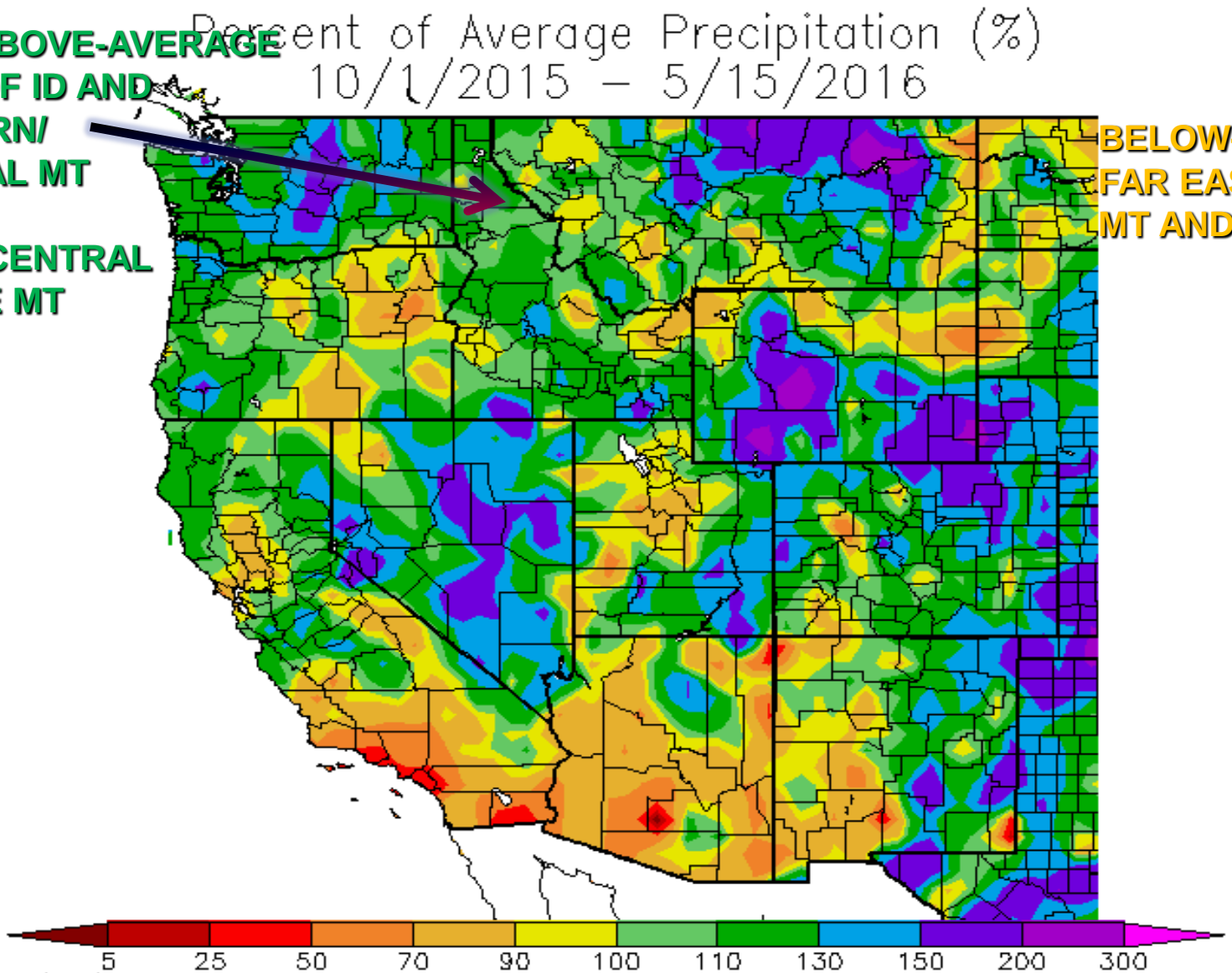
Start - Fall

Live/Dead Fuel Moisture

WATER – YEAR PRECIP – NRGA

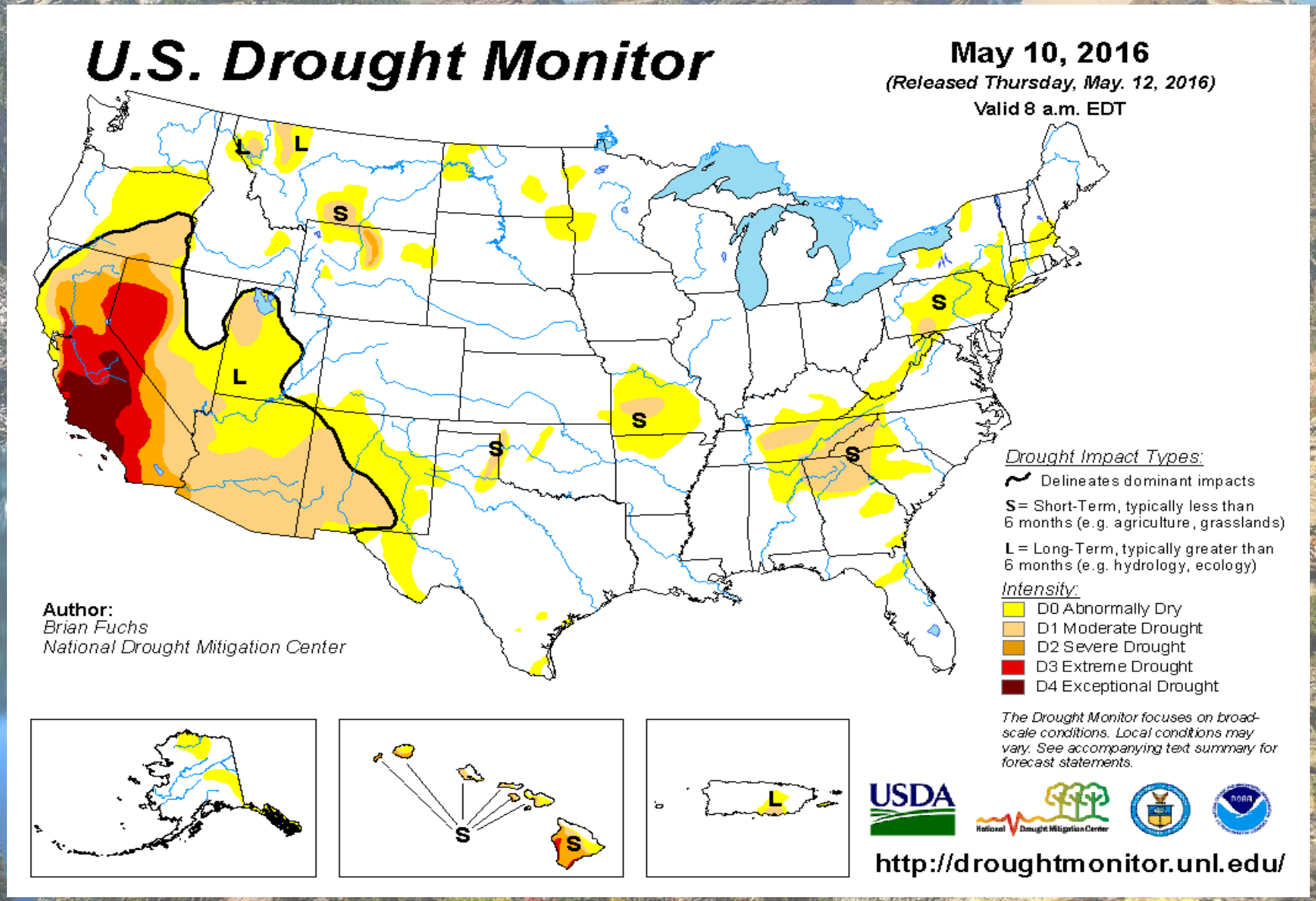
NEAR/ABOVE-AVERAGE MOST OF ID AND WESTERN/ CENTRAL MT

AND N-CENTRAL INTO NE MT

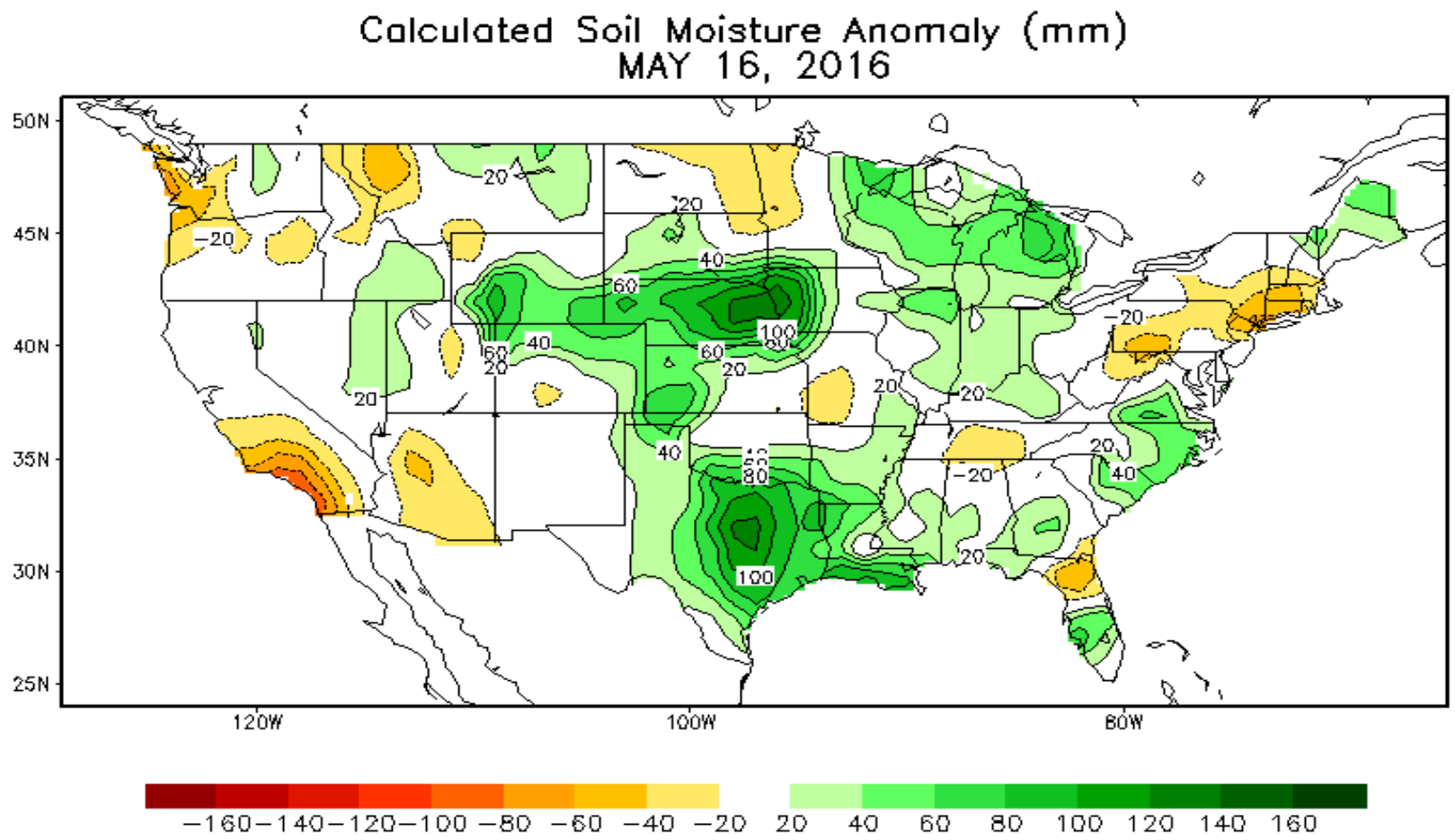


BELOW-AVERAGE FAR EASTERN MT AND SW ND

CURRENT DROUGHT STATUS: Mainly Over North Idaho/NW Montana, Becoming Less Severe Montana East of the Divide (PSA 10), Parts of North Dakota



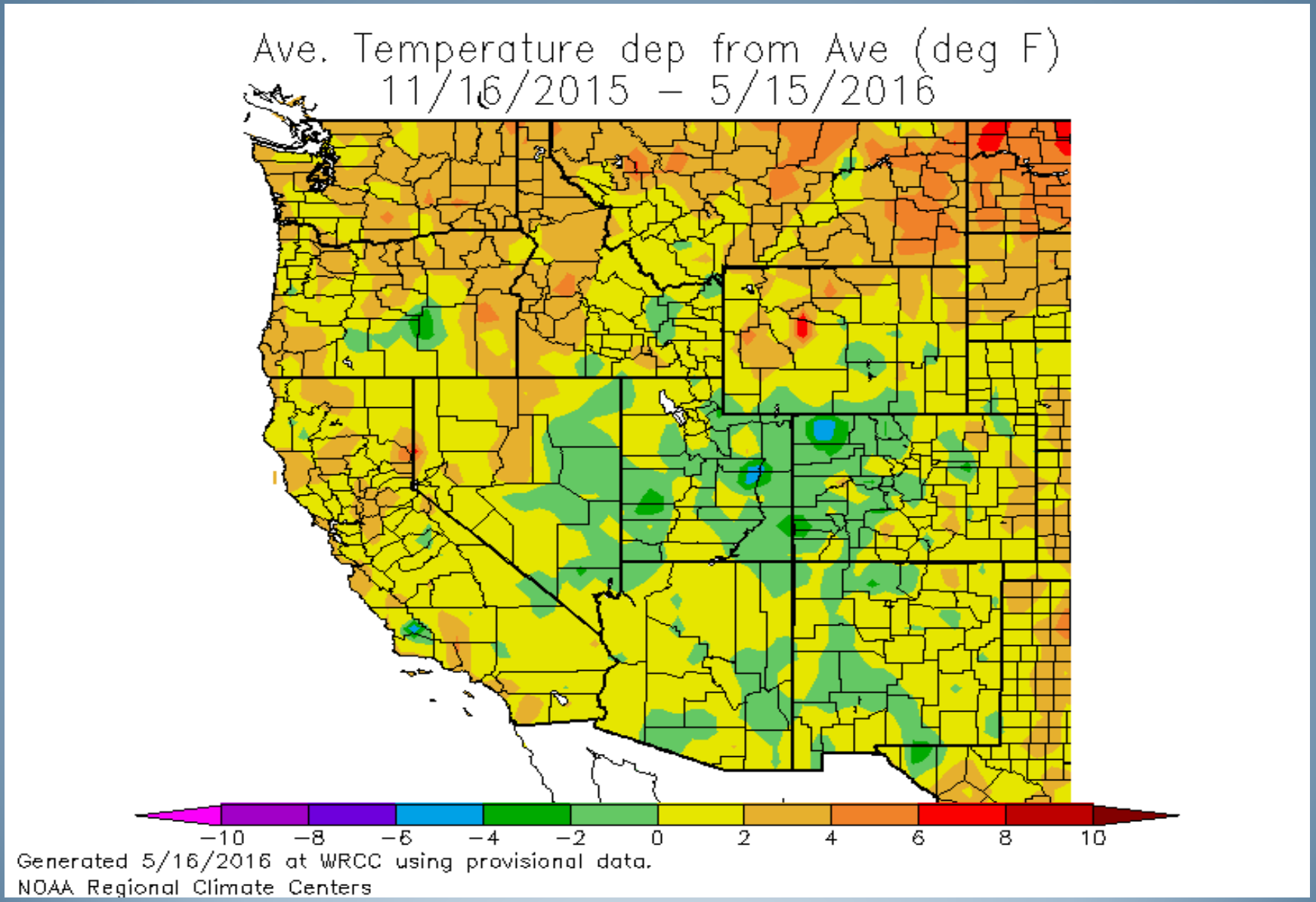
Soil Moisture Anomalies: Below-Average NW Montana/Front Range. Above Average NE Montana.



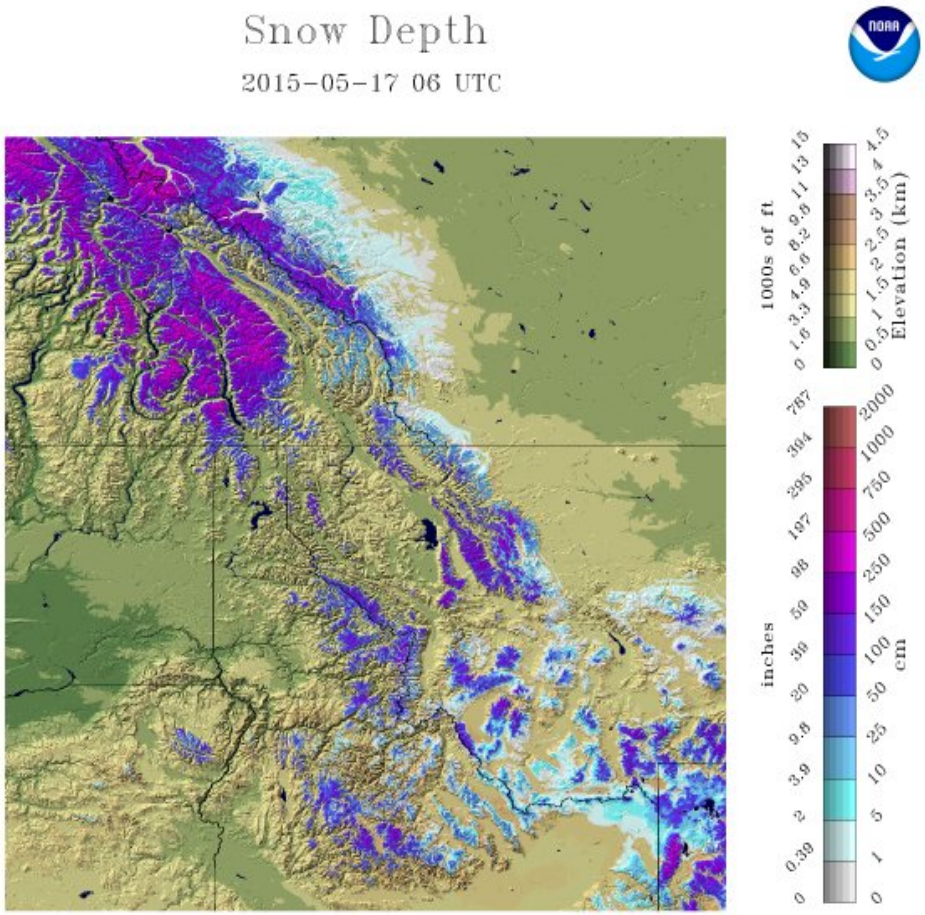
6-Month Temperature Summary: Above-Average Entire NRGA

But Warmest Furthest East

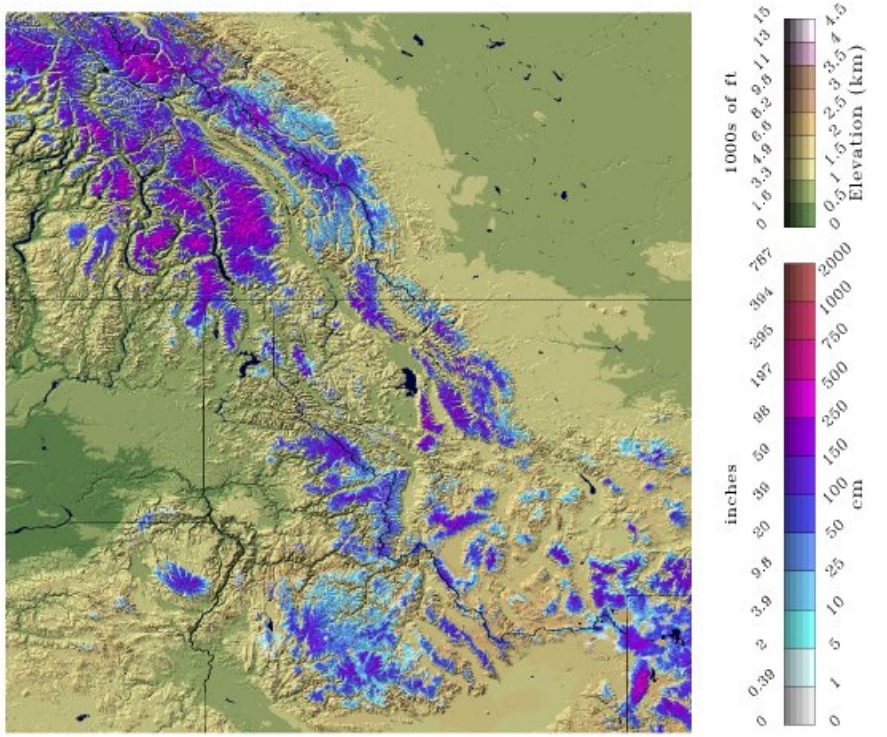
(Typical El Nino Response)



Snowpack coverage slightly better over higher elevations this year, than in 2015.



17 May, 2015



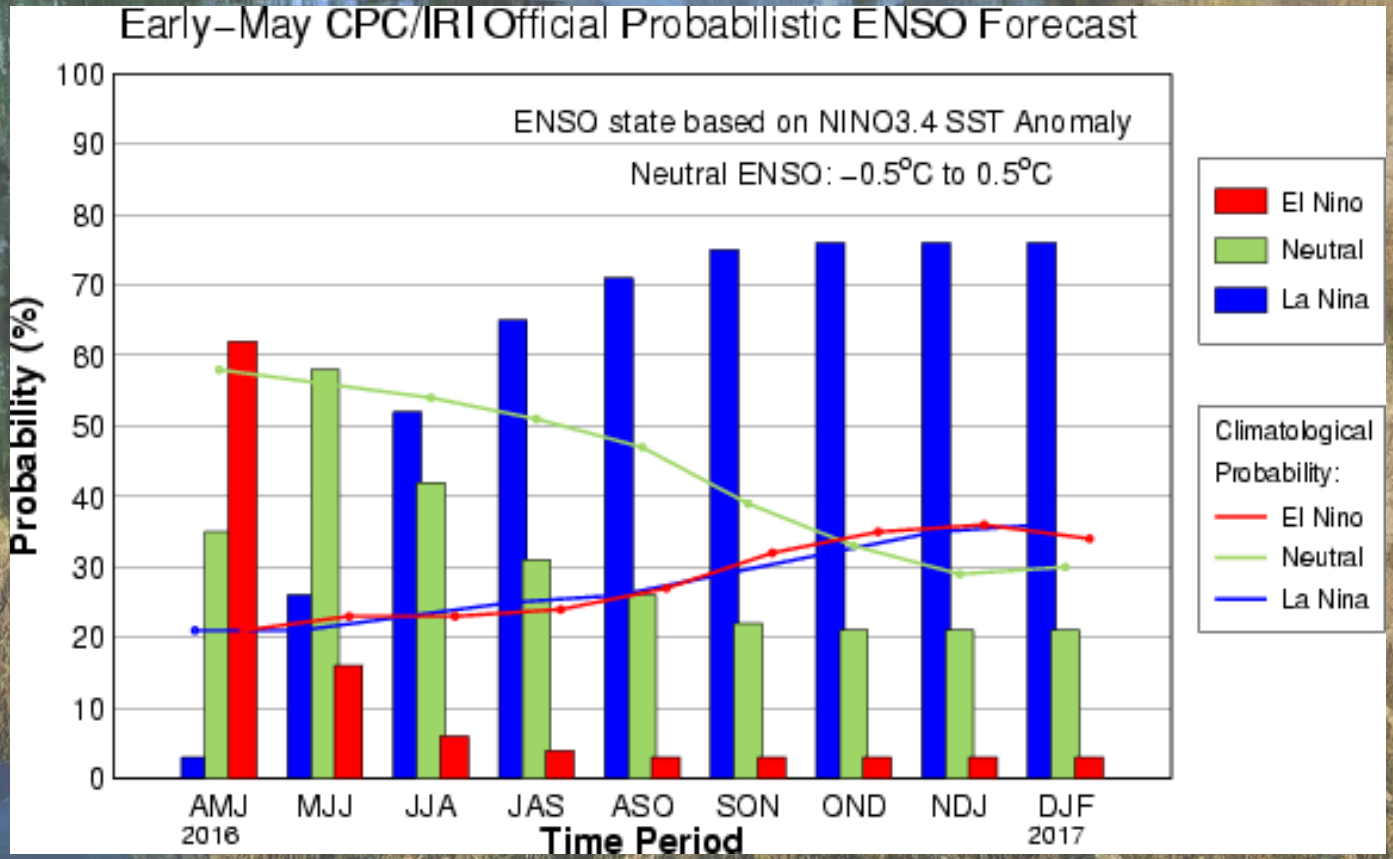
17 May, 2016

National Snow 2014-2015 Analysis

National Snow 2015-2016 Analysis

The strong El Nino is weakening and will transition through "ENSO-Neutral" conditions to "La Nina" in late summer.

Similar to The years 1983, 1992, 1998, and 2010.



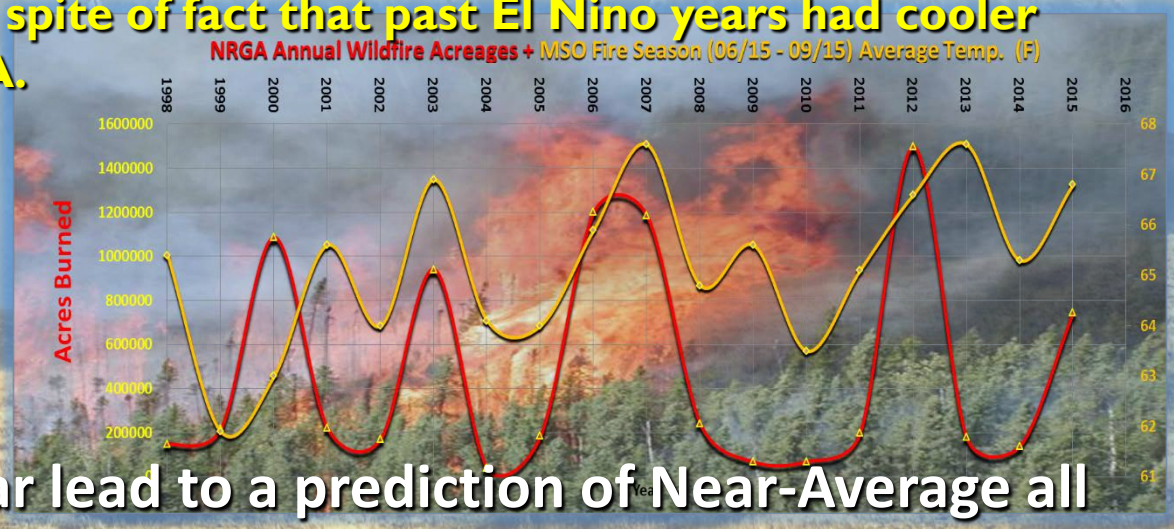
Years following moderate to strong El Nino winters have all had average to above-average May-July precipitation and near to slightly below average temperatures same period in the NRGA. All were under 250,000 acre seasons.

Outlook Recipe

- ENSO - (Heading into Neutral After Strong El Nino)
- PDO – (Positive Phase, Tendency for Warmer Temps.)
- Drought – (None Significant Expected This Year)
- Climatology
- Long Range Outlooks
- Snow Accrual
- Snow Loss Rates
- Previous Fall Weather
- Soil Moisture

Thoughts on Fire Season 2016

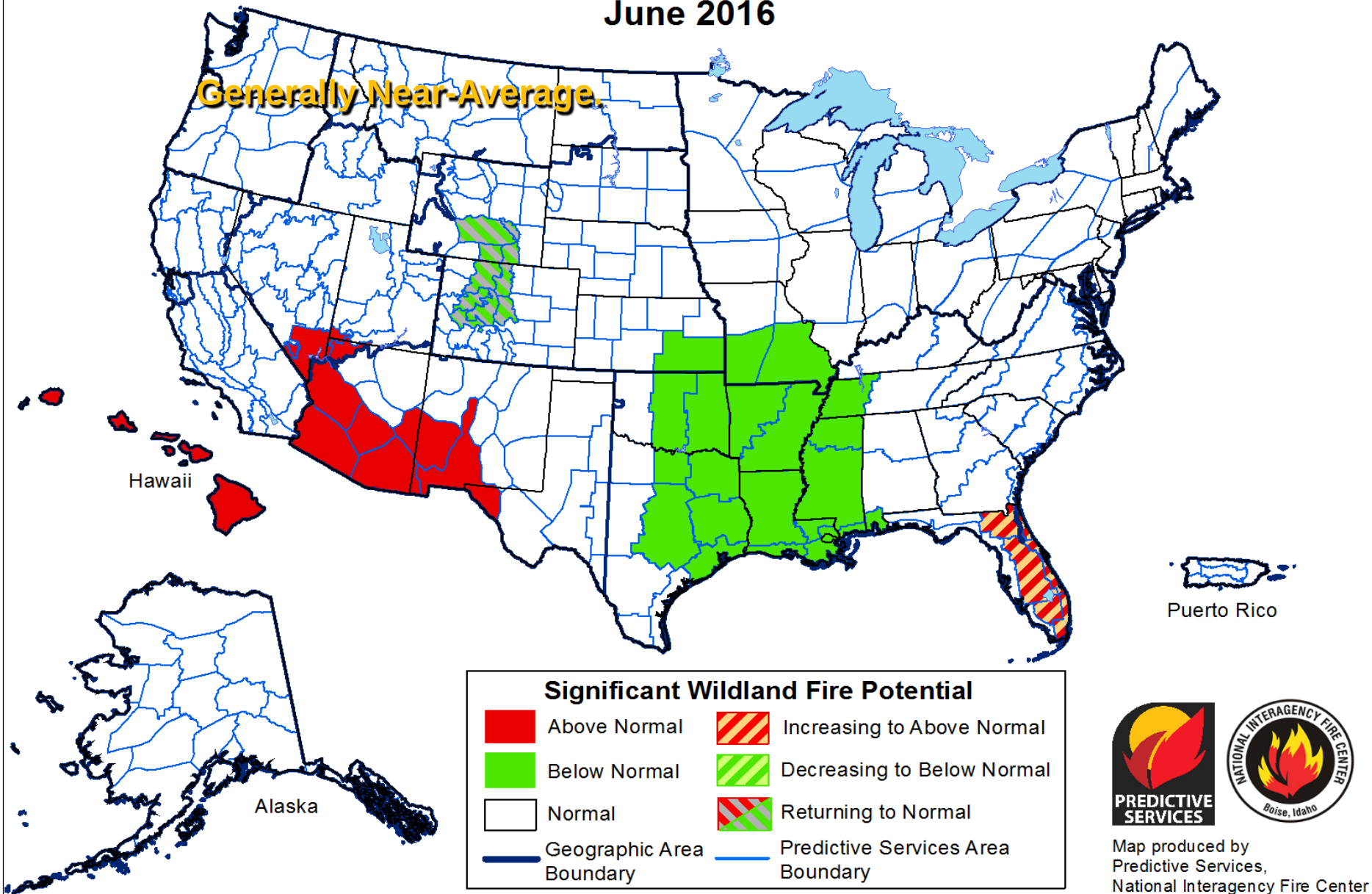
- Drought signals have eased in North ID and Western MT, and are also now easing Central/Eastern Montana and Western North Dakota. Green-up nearly finished plains.
- Snowpack was below average North ID/Western MT, most below average along northern Continental Divide (PSAs 07/10). Melted early low/mid elevations.
- Rest of spring/early summer should continue slightly above-average temperatures but with mainly above average precipitation all areas.
- Strong El Nino weakening to "neutral" conditions by early summer; most similar years were 1983, 1992, 1998, and 2010. Historical NRGA cycle ambiguous. However CPC Spring/summer Temp. outlook maintains warmer than normal temps. ID and western MT, in spite of fact that past El Nino years had cooler May-mid July periods in NRGA.



Other areas of concern: Alaska

The factors assessed thus far lead to a prediction of Near-Average all PSAs through spring into mid summer.

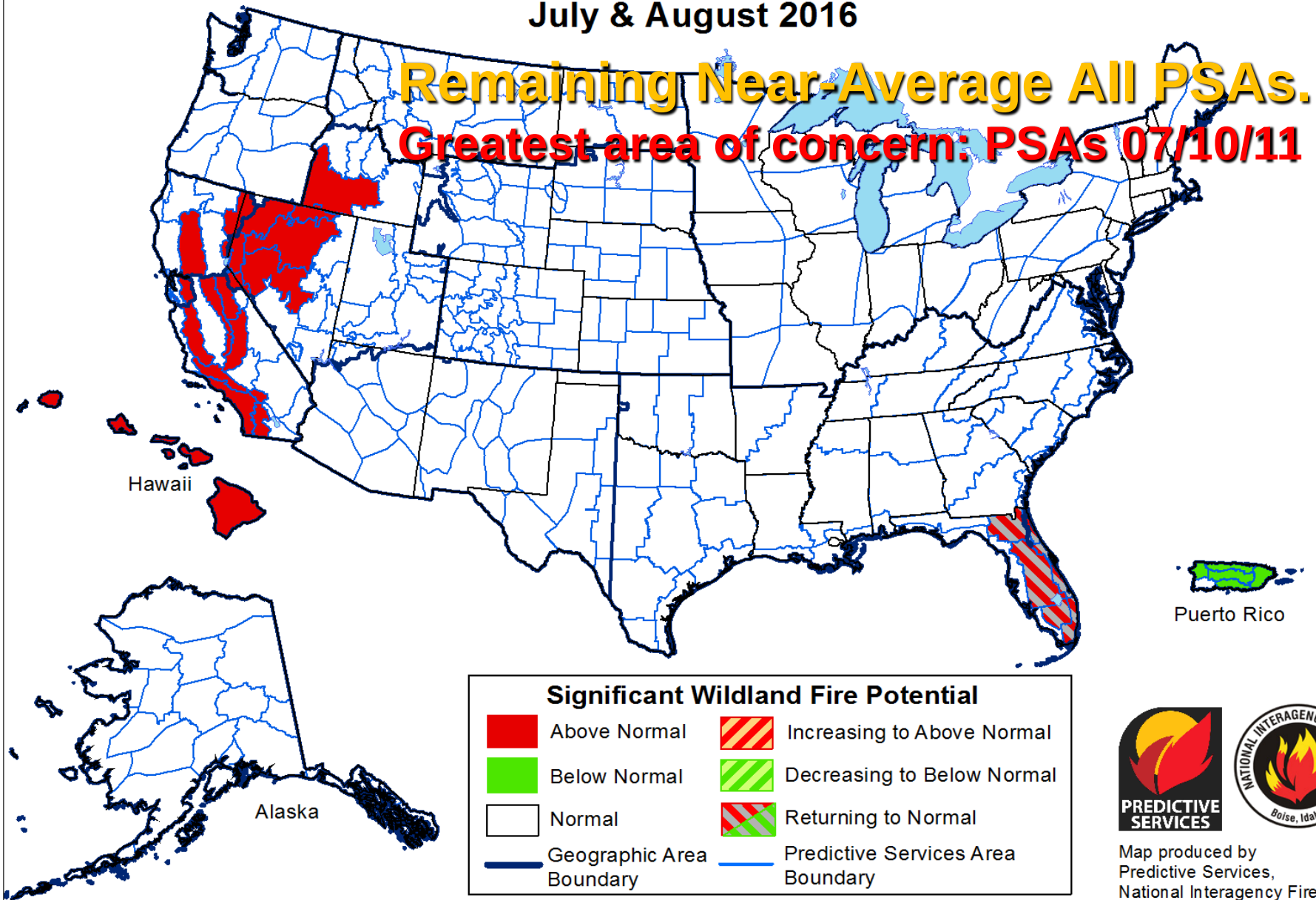
Significant Wildland Fire Potential Outlook
June 2016



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued May 1, 2016
Next issuance June 1, 2016

Significant Wildland Fire Potential Outlook
July & August 2016



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
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MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

WATER RESOURCES DIVISION - STATE WATER PROJECTS BUREAU

April 30, 2016

All Contents in Acre-Feet

RESERVOIR	TOTAL CAPACITY (includes dead storage)*	CONTENTS						READING DATE	COMMENTS
	Full Pool Contents	AVERAGE 1960 - 2014	Last Year 4/30/2015	Last Month 3/31/2016	PRESENT 4/30/2016	% CAPACITY 4/30/2016	%AVERAGE 4/30/2016		
Clark Fork Basin									
W.F. BITTERROOT	32,362	20,328	32,362	16,126	**32,362**	100	159	4/27/2016	spilling
NEVADA CREEK	11,207	10,018	11,244	6,496	**9,802**	87	98	5/2/2016	elev.=4612.06
E.F. ROCK CREEK	16,040	9,666	11,868	8,751	**9,451**	59	98	4/30/2016	elev.=6036.8
Lower Missouri Basin									
ACKLEY	6,722	3,678	4,873	4,194	**4,472**	67	122	4/29/2016	elev. =4308.5
BAIR	7,300	5,289	6,370	5,668	**5,445**	75	103	4/18/2016	elev.=5317.34
DEADMAN'S BASIN	75,968	53,666	75,744	63,427	**66,040**	87	123	4/30/2016	elev.=3916 (62,290 AF)
N.FK. SMITH RIVER	11,406	8,783	10,399	6,789	**6,789**	60	77	5/2/2016	No data reported
FRENCHMAN	2,777	2,431	2,777	2,777	**2,777**	100	114	4/30/2016	spilling - assumed. No data reported
MARTINSDALE	23,348	12,124	22,924	15,648	**17,949**	77	148	4/30/2016	elev.=4773.3
YELLOWATER	3,842	1,356	3,187	3,171	**3,268**	85	241	4/28/2016	elev.=3117
Upper Missouri Basin									
MIDDLE CREEK	10,184	6,523	7,501	5,557	**6,946**	68	106	4/30/2016	elev.=6706
NILAN	10,992	7,138	10,571	8,207	**9,300**	85	130	5/4/2016	elev.=4441.0
RUBY RIVER	37,612	36,156	37,844	32,900	**38,268**	102	106	5/4/2016	elev.=5393.6
WILLOW CREEK	18,000	17,271	16,843	15,560	**18,000**	100	104	5/5/2016	spilling
Yellowstone Basin									
COONEY	28,230	22,403	23,580	23,480	**25,985**	92	116	4/22/2016	elev.=4248.29 (25,795 AF)
COTTONWOOD	1,900	1,518	1,900	1,805	**1,835**	97	121	4/30/2016	estimated
TONGUE RIVER	79,071	51,121	66,537	58,295	**69,747**	88	136	5/2/2016	elev.=3425.6 (69,036 AF)

* Note: Reservoir contents include dead storage at the following:

Ackley	1001 AF	**	Tongue River	711 AF	(O&M storage table includes dead storage)
Cooney	90 AF	**	W. F. Bitterroot	656 AF	(O&M storage table includes dead storage)
Deadman's	3750 AF	**	Willow Creek	269 AF	(O&M storage table includes dead storage)
Nilan	900 AF	**			

** O&M slope storage table does not include dead storage (so dead storage has to be added into the storage from the table)

* Note: Cooney capacity reflects capacity after 1982 dam rehabilitation; prior capacity was 24,195 A.F.. Average storage shown is for post rehabilitation data.

* Note: Middle Creek capacity reflects capacity after 1993 dam rehabilitation; prior capacity was 8,027 A.F.. Average storage shown is for post rehabilitation data.

* Note: Nevada Creek Reservoir Capacity reflects live storage capacity survey conducted in year 2000. Prior live storage capacity documented as 12,723 AF.

* Note: Tongue River capacity reflects capacity after 1999 dam rehabilitation; prior capacity was 68,040 A.F.. Average storage is post rehabilitation data.

* Note: Frenchman Reservoir capacity tables updated based on aerial survey; prior capacity was 3752 A.F. Average shown is pre aerial survey

Water Projects Bureau – May 2016

Most state owned reservoirs are below full capacity but above 100% of average capacity for the present month.

Current Projects

Cavitation Repairs at Tongue River, Martinsdale, and Middle Creek

Canal repairs at East Fork – Embankment failure on existing main canal

Flume replacement at Middle Creek - Cottonwood Creek

RFP for Tower Safety Project – replaces ladders and adds power in the tower – Middle Creek, N.F. Smith, Nevada Creek

Will start design work for fish screen at Allendale Canal (East Fork project)

Canal lining at East Fork and Nevada Creek (Grant Proposals)

Preparing an RRGL Grant proposal for Study and Masterplan at Broadwater Missouri

Scoping alternatives for adding a fish screen at the Douglas canal at Nevada Creek

Painted Rocks – Preparing for spillway and stilling basin inspection in the fall. Reviewing future rehab of the project.

Willow Creek – Project transfer to WUA.

Tongue River Emergency Spillway panel repairs.

Installing telemetry setups at canal gauging stations at Martinsdale, Deadman's Basin and Bair.

Will install telemetry setups on East and West Forks of Hyalite Creek this summer.

Building Drought Resilient Communities in Montana

Hellroaring Creek, Centennial Valley, The Nature Conservancy

Ann Schwend, MT DNRC
Upper Missouri Water Planner

National Drought Resilience Partnership (NDRP)

"Enhancing Community Preparedness for Drought"

National Federal Partners:

- EPA, USDA, DOI, NOAA, USACE, DOE, & FEMA

NDRP (National) Goals

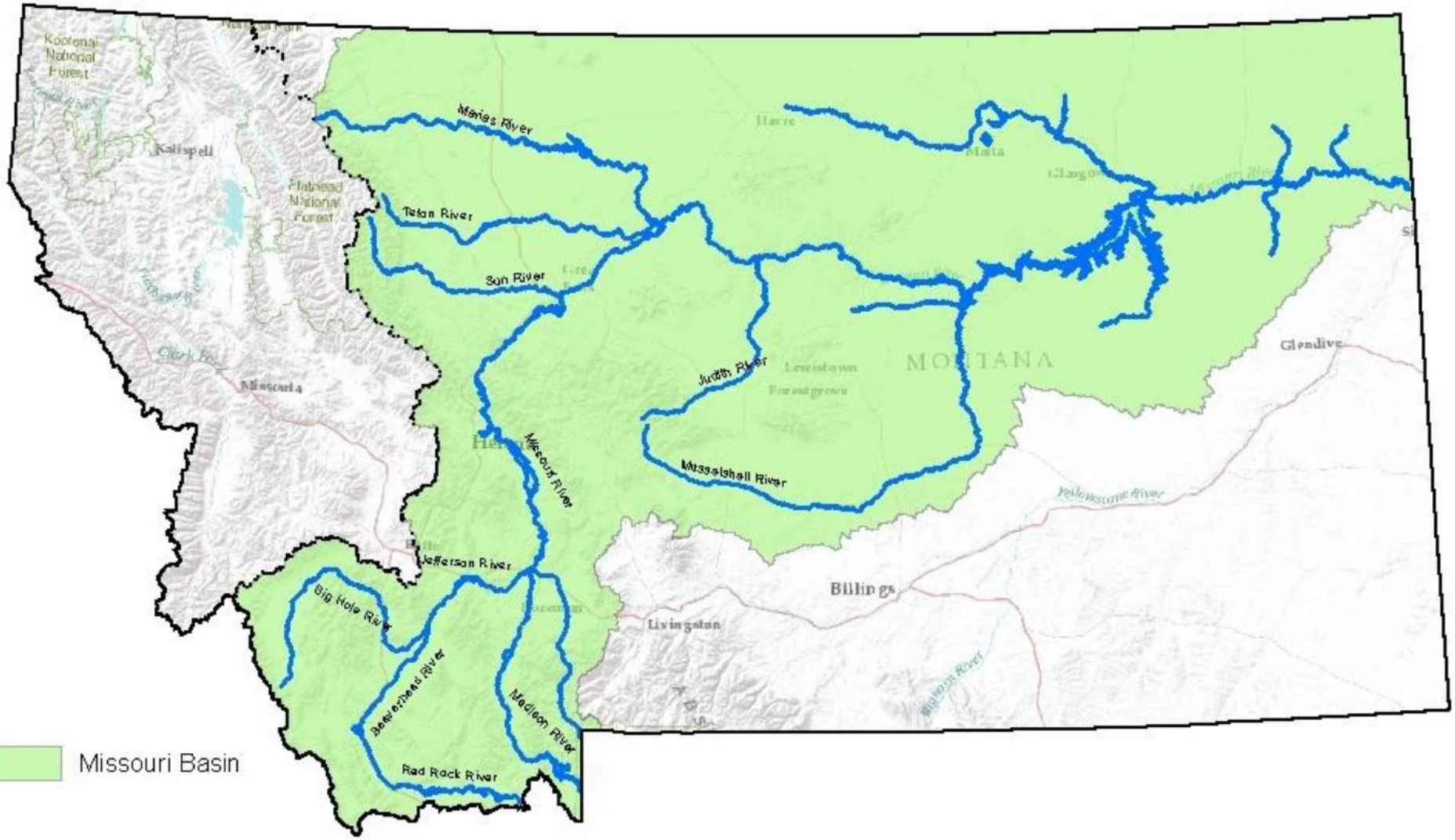
- Create a single federal point of contact for drought;
- Support for a National Soil Moisture Network;
- On-line tools to access Federal resources; and
- Demonstration projects designed to develop and promote resilience strategies at regional levels.

Dan Vermillion & President Obama fishing on the East Gallatin River, copied from MontanaOutdoor.com

Gates of the Mountains, July 2014

MONTANA Drought Resilience Partnership DEMONSTRATION PROJECT

Missouri Basin in Montana



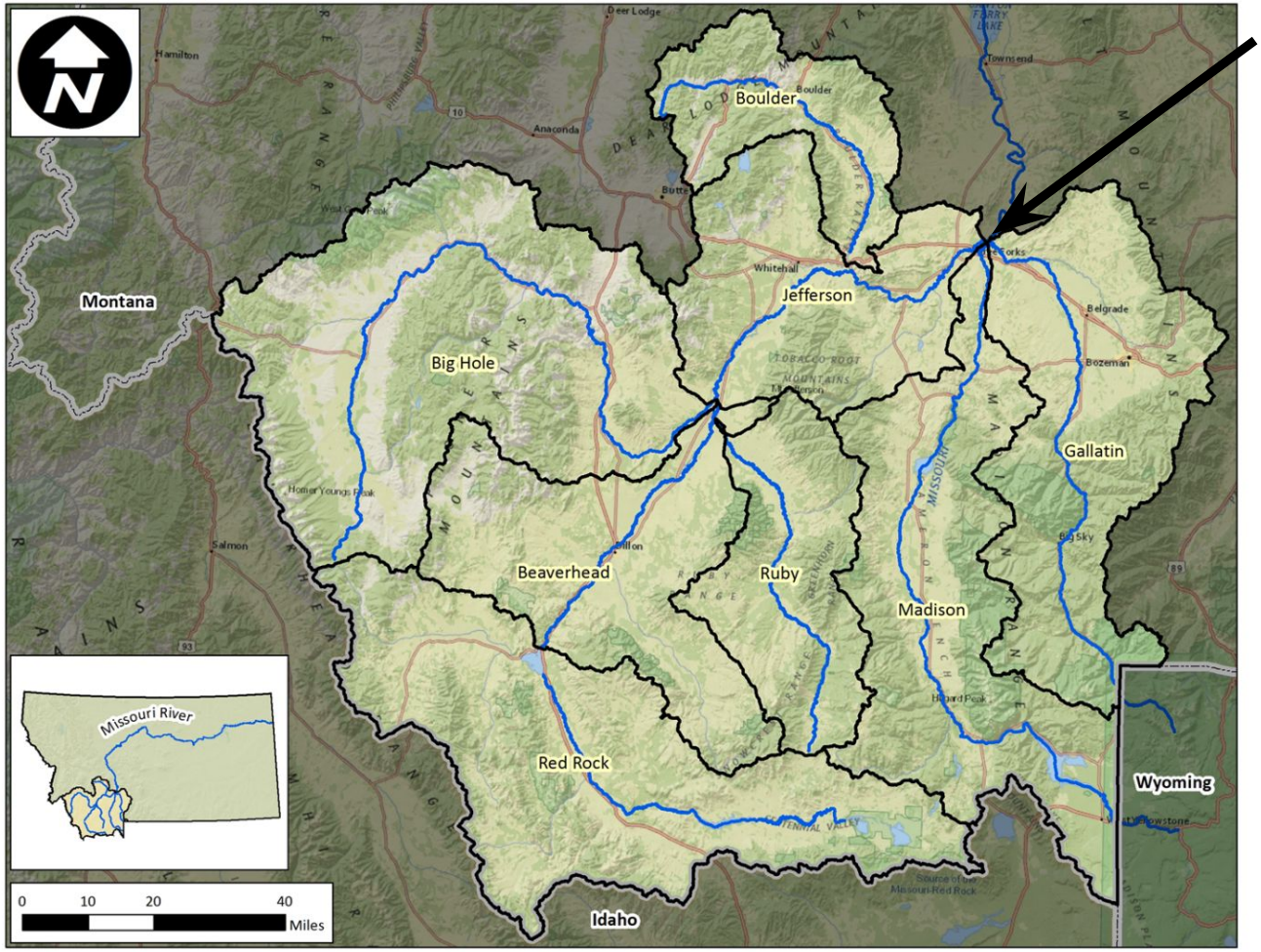
Montana Demonstration Project

Montana's Vision--- Successful drought preparation must be:

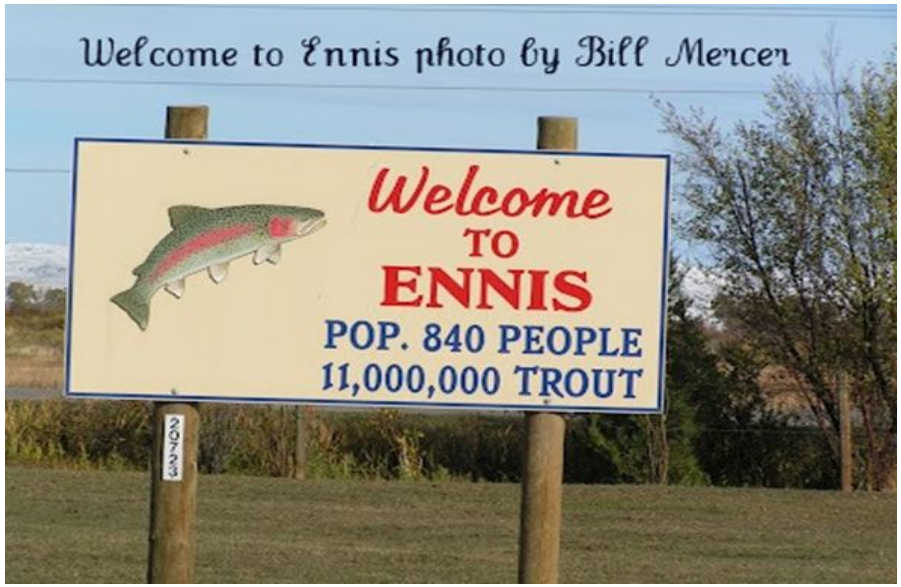
- *locally-led*
- *reflect the water management issues specific to that watershed, and*
- *produce on-the-ground results.*

MT NDRP Demonstration Project

Three Forks: Missouri River Headwaters



Basin Challenges & Opportunities



Opportunities and Partnerships

- Headwaters Basin
- Good mix of public & private lands
- Strong core of Community based organizations (CDs, WSs & BSWC)
- Regional NGOs engaged in the Basin
- Multiple agencies & planning efforts

Challenges

- Persistent and recurring drought
- Large, mostly rural landscape
- Changing demographics & land use
- Basin legislatively closed to new surface water appropriations
- Data integration and resolution
- Limited Funding to support Capacity

Overall Goals

Norwegian Creek, Wildlife Conservation Society

- ***Leverage and deliver resources*** *across the landscape*
- ***Engage communities*** *in drought preparedness planning and*
- ***Implement*** *projects that build ecologic and community resilience in the Missouri Headwaters Basin.*

MT Demonstration Project Partners

Burrowing Owls at Bear River Refuge.tumblr. Katie McVey USFWS

Federal Agency Partners (National, State & Local)

EPA, NRCS, FEMA, NOAA-NIDIS, NDMC, GNLCC, Office of Climate Change Policy, BOR, BLM, USFWS, USGS, BIA, USFS, & USACE

State Agencies & Organizations

MT DNRC, MT DEQ, MT FWP, MT DES & MT Dept of Ag
MACD/SWCDMI, MWCC
Big Sky Watershed Corps

Regional Organizations

CLLC, TNC, FW, One Montana, GYC & HDC

Community Based Organizations

GRTF, GGWC, GVLT, JCP, MCD, MVRG, MRF, WCS (CPP), RVCD, RWC, CVA, BWC/BCD, BCD, BHWC, JWC & LJWC; Beaverhead, Broadwater, Gallatin, Jefferson, Madison County Commissioners & Planners

2014-2015 Activities

- Nov 2014 Federal and State Partners convene in Bozeman to layout plan
- March 2015 NOAA/NIDIS & NDMC host: ***Building Drought Early Warning Capacity Workshop***
- Sept 2015 Develop Drought Resilience Workplan
- Nov 2015 – Shared finalized Workplan with Agency reps in DC

MT Drought Resilience Partnership
Workplan Goals

- *Provide Tools for Drought Monitoring, Assessing and Forecasting*
- *Develop Local and Regional Capacity to Plan for Drought*
- *Implement Local Projects to Build Regional Drought Resiliency*

2016 Activities

- ★ **Establish Drought Monitoring Committee**
- ★ **Develop Communications & Outreach Plan**
- ★ **Montana Drought Resilient Communities Course**
  - Build framework for individual watershed plans
  - Combine plans for Missouri Headwaters Basin Plan
- ★ **Build endowment fund to support local capacity**
- ★ **Identify and implement on-the-ground projects that build resiliency**

Montana Drought Resilient Communities Online Course

- ★ **Drought Planning and Missouri Headwaters**
  - Core Elements
  - Community leaders and stakeholders
  - Linking to other plans
- ★ **Understanding Water, Climate and Drought in the Community**
  - Indicators, forecasting
  - Synthesizing information
- ★ **Vulnerability Assessments**
  - Water and Land Use Sectors
- ★ **Developing Response Plans** (Immediate)
- ★ **Mitigation Strategies** (long term)
- ★ **Communication and Outreach in the Community**

Outcomes

- Increased Community Resilience and Ability to Adapt
- Stronger Partnerships
- Engaged Local Leaders
- Enhanced Planning & Coordination
- Sustainable Capacity/Targeted Funding
- Connected Resources & Landscapes
- Cross Collaboration
- Lessons Learned & Transferability

Missouri River at Fort Benton, A Schwend