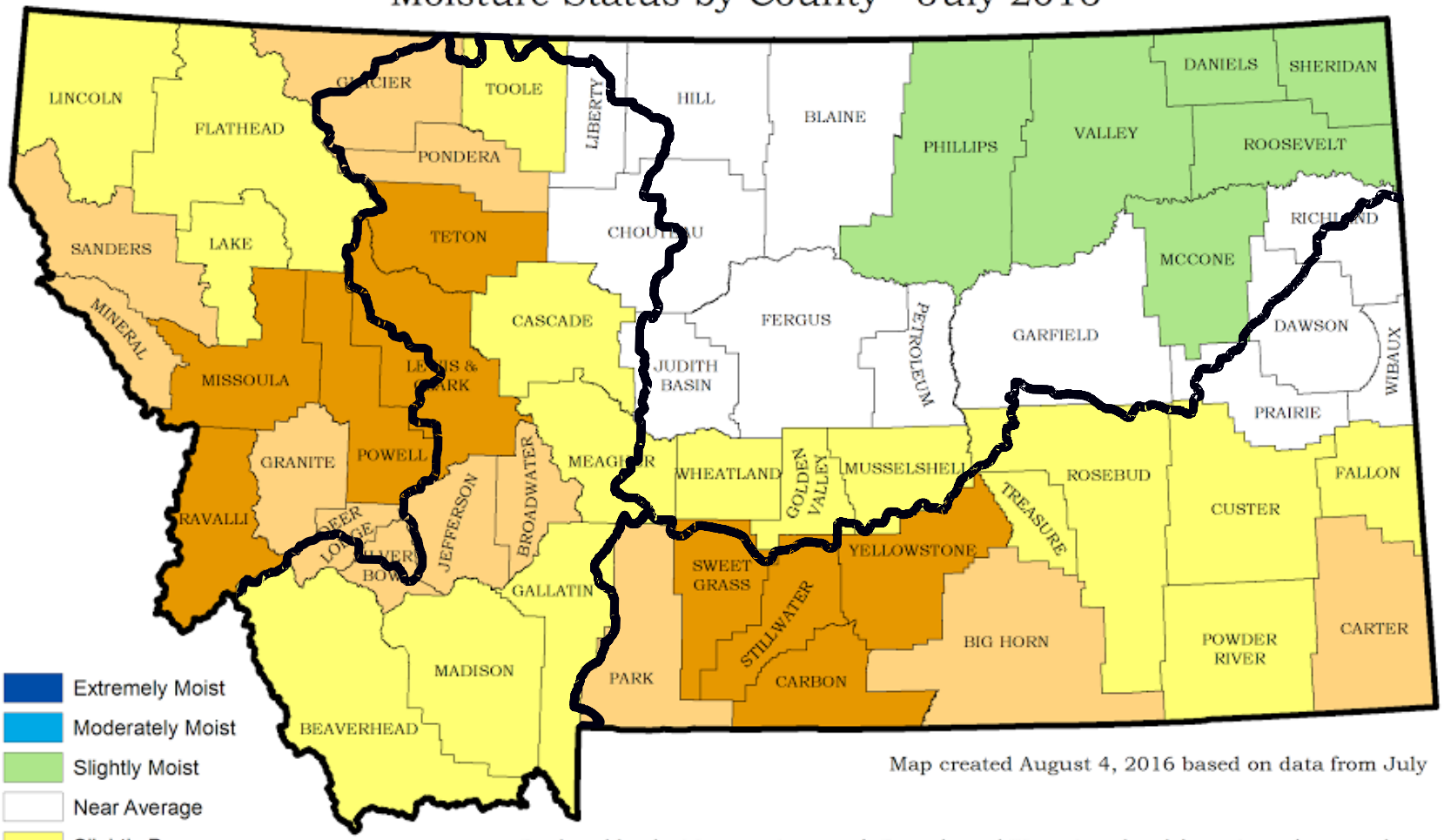
Montana Drought and Water Supply Advisory Committee's Moisture Status by County - July 2016



Map created August 4, 2016 based on data from July

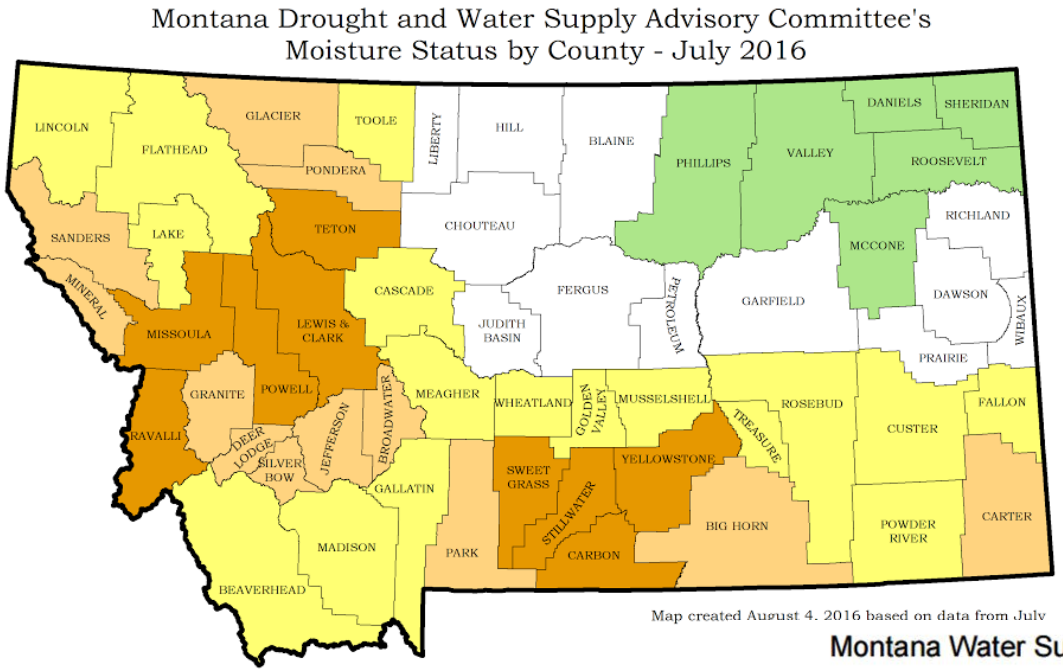
Produced by the Montana Governor's Drought and Water Supply Advisory Committee, made up of experts from the National Weather Service, the Natural Resource Conservation Service, the Farm Service Agency, United States Department of Agriculture, the Montana Department of Natural Resources and Conservation, the Montana State Library, and the Montana Bureau of Mines and Geology.

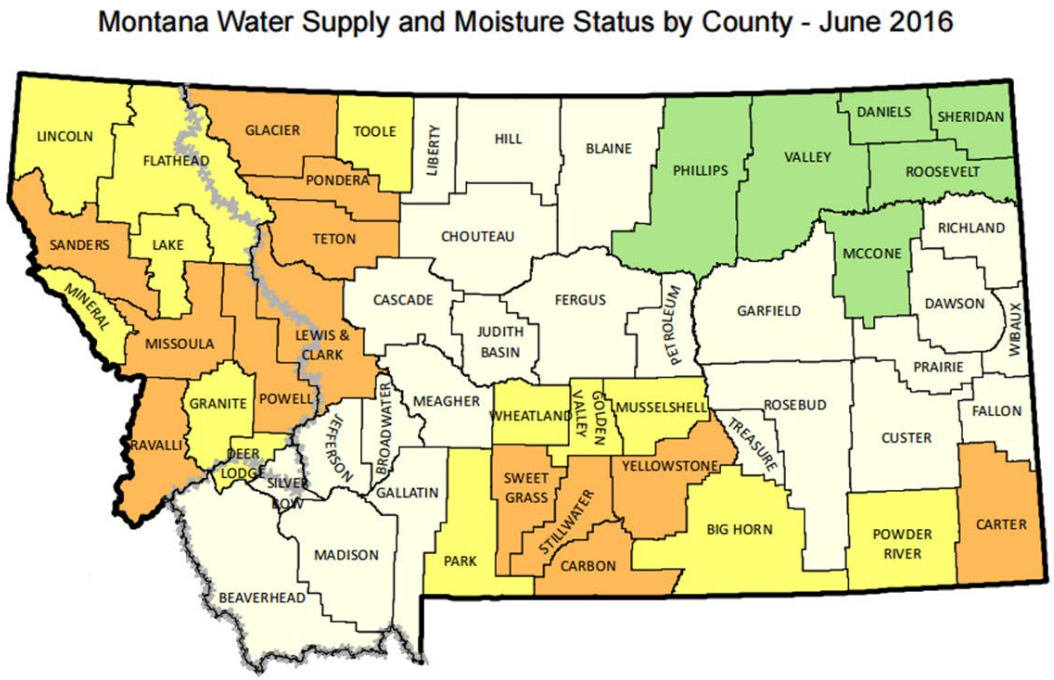
http://drought.mt.gov

http://nris.mt.gov/drought

Montana Drought Status

July vs June





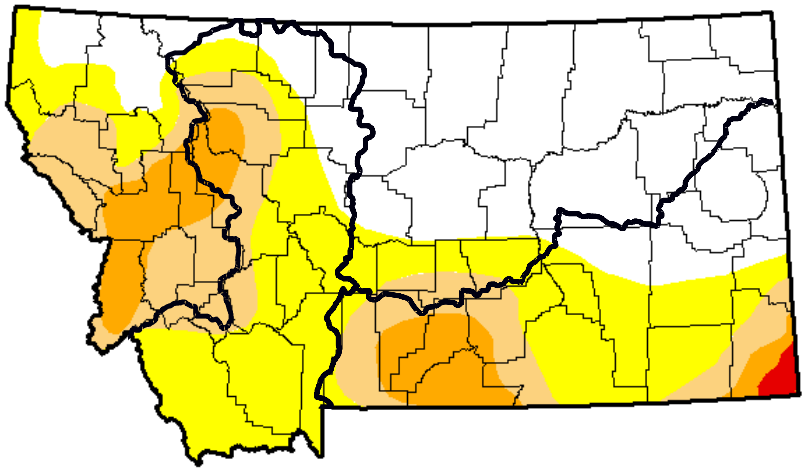
Moisture Status

Current Month

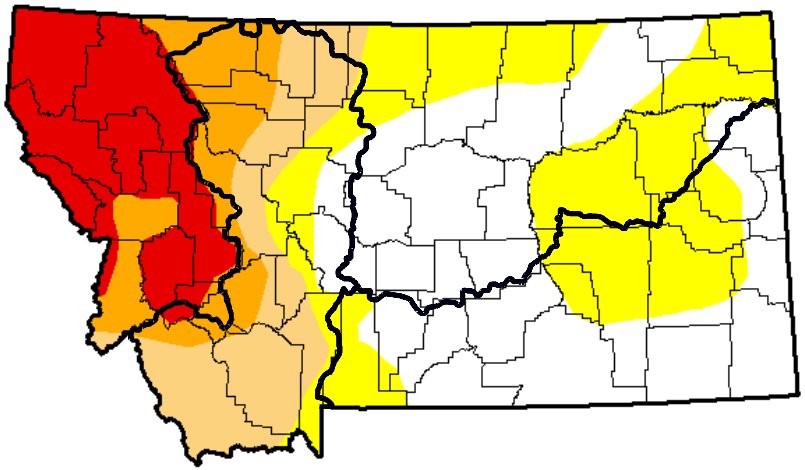
- Extremely Moist
- Moderately Moist
- Slightly Moist
- Near Average (Normal)
- Slightly Dry
- Moderately Dry **(Drought Alert)**
- Extremely Dry **(Severe Drought)**

DM - Montana

12-month Δ



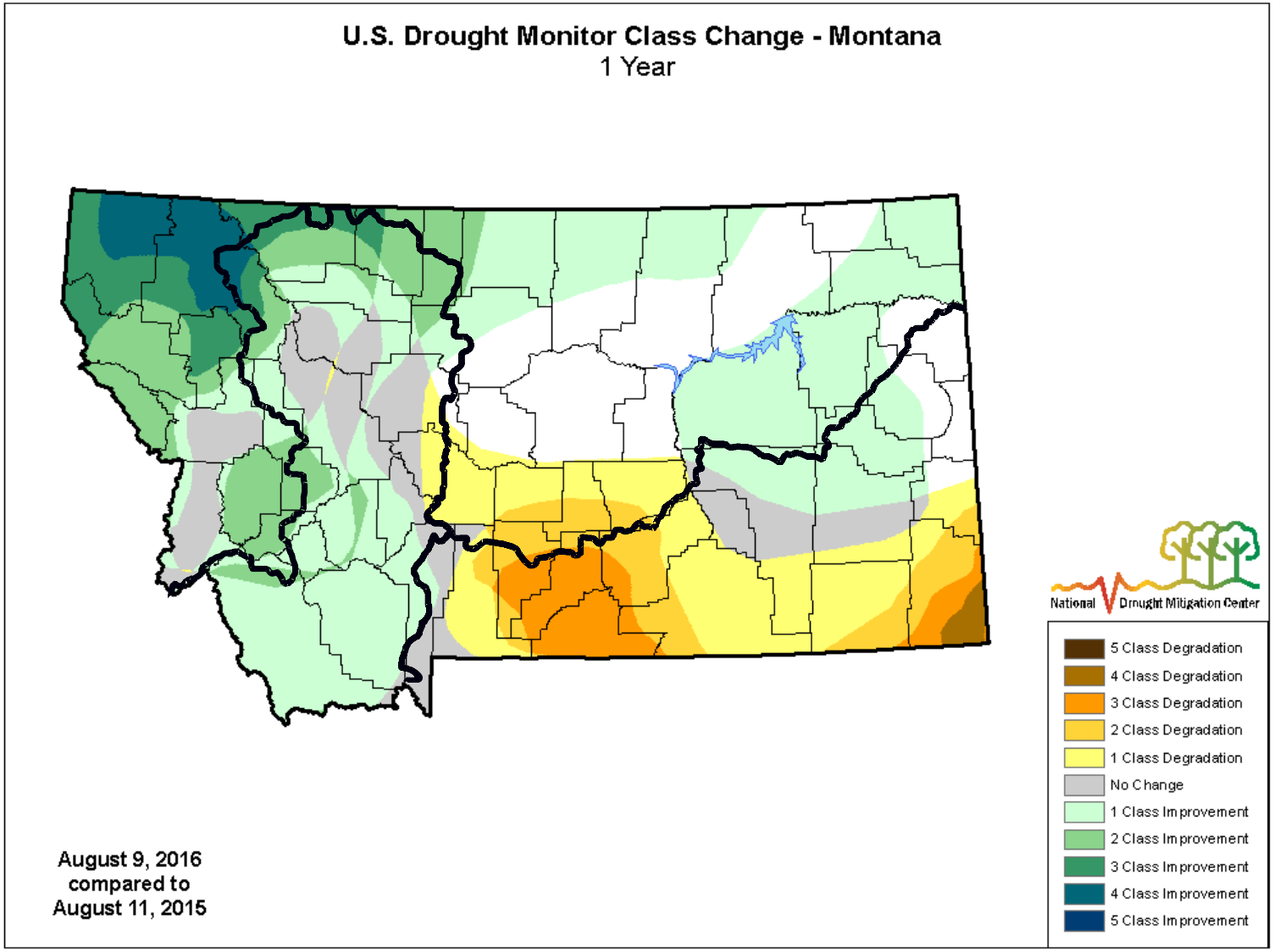
August 9, 2016



August 11, 2015

Week	None	D0	D1	D2	D3	D4
2016-08-09	42.70	30.73	16.83	9.27	0.47	0.00
2015-08-11	36.94	27.36	12.20	9.14	14.36	0.00

U.S. DM Montana - 12-month Δ

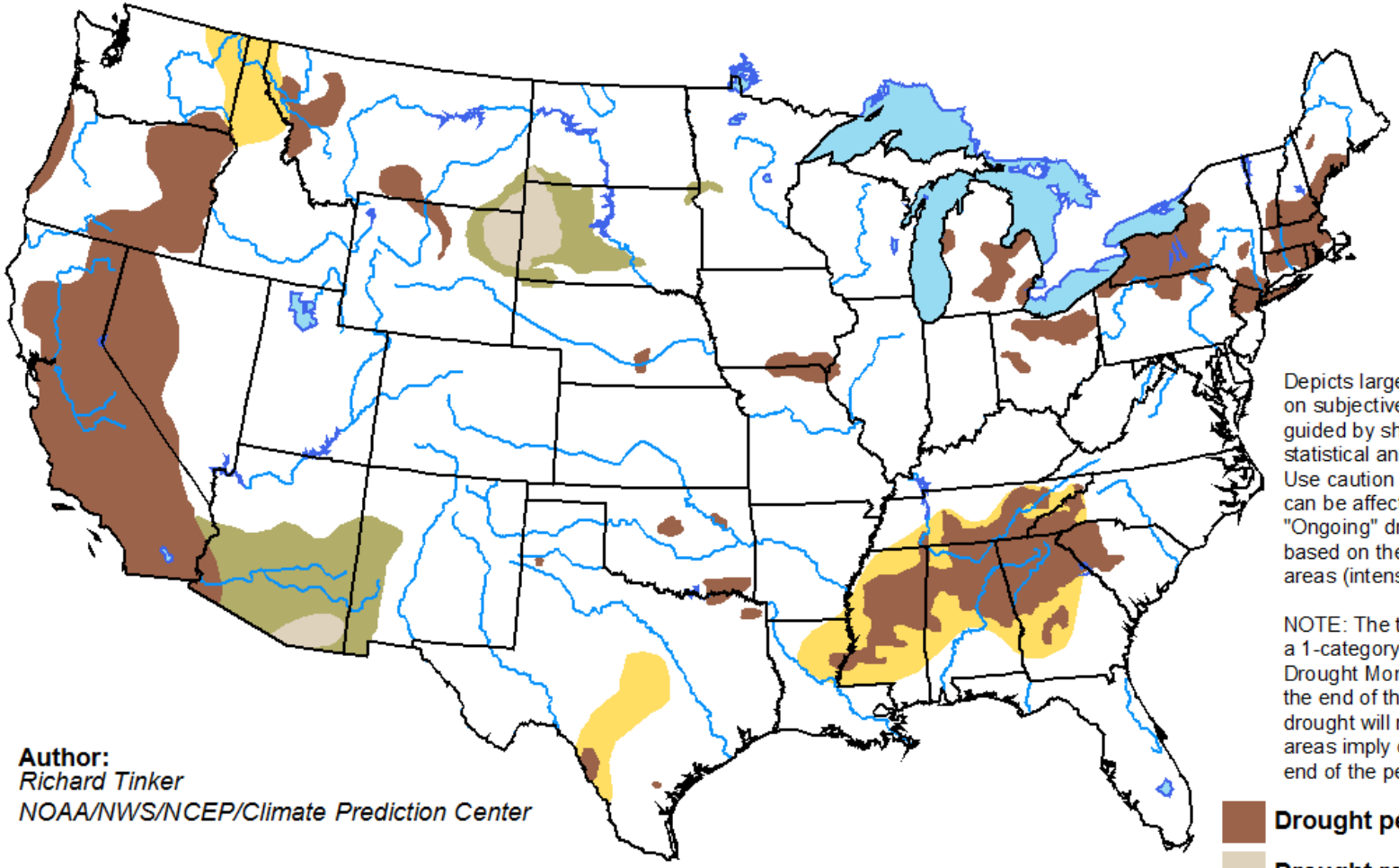


http://droughtmonitor.unl.edu

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

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



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas 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).

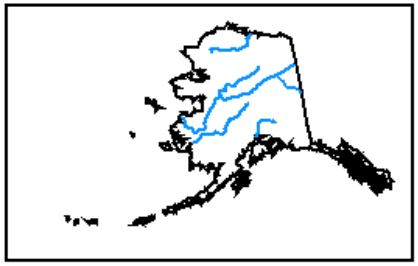
Drought persists

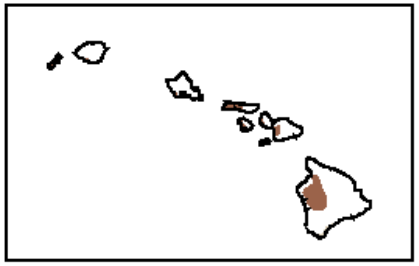
Drought remains but improves

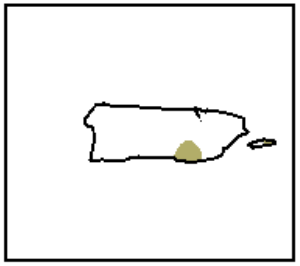
Drought removal likely

Drought development likely

Author:
Richard Tinker
NOAA/NWS/NCEP/Climate Prediction Center







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

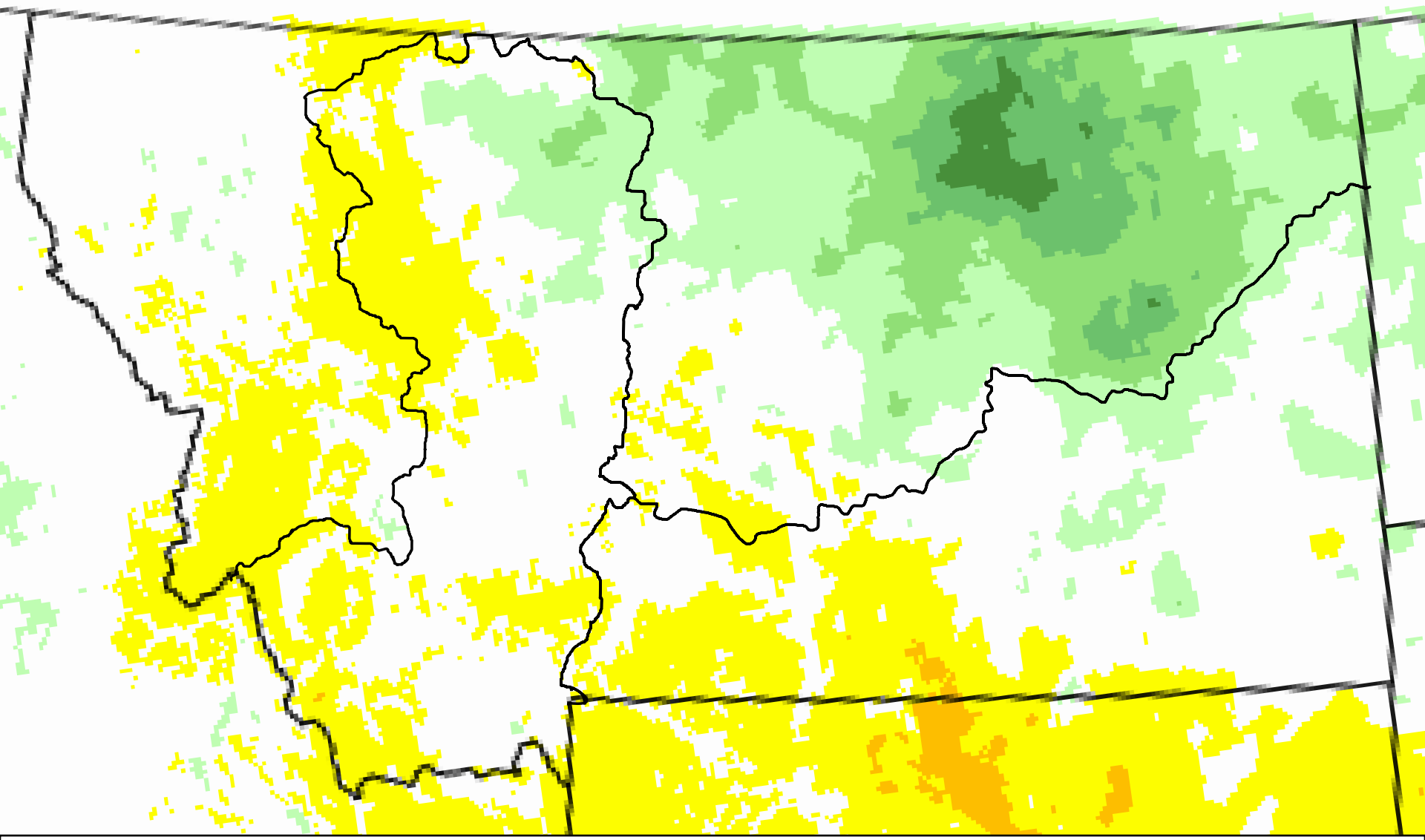
Montana
Drought & Water Supply Advisory Committee

August 18, 2016

National Weather Service

Donald Britton – Meteorologist-in-Charge

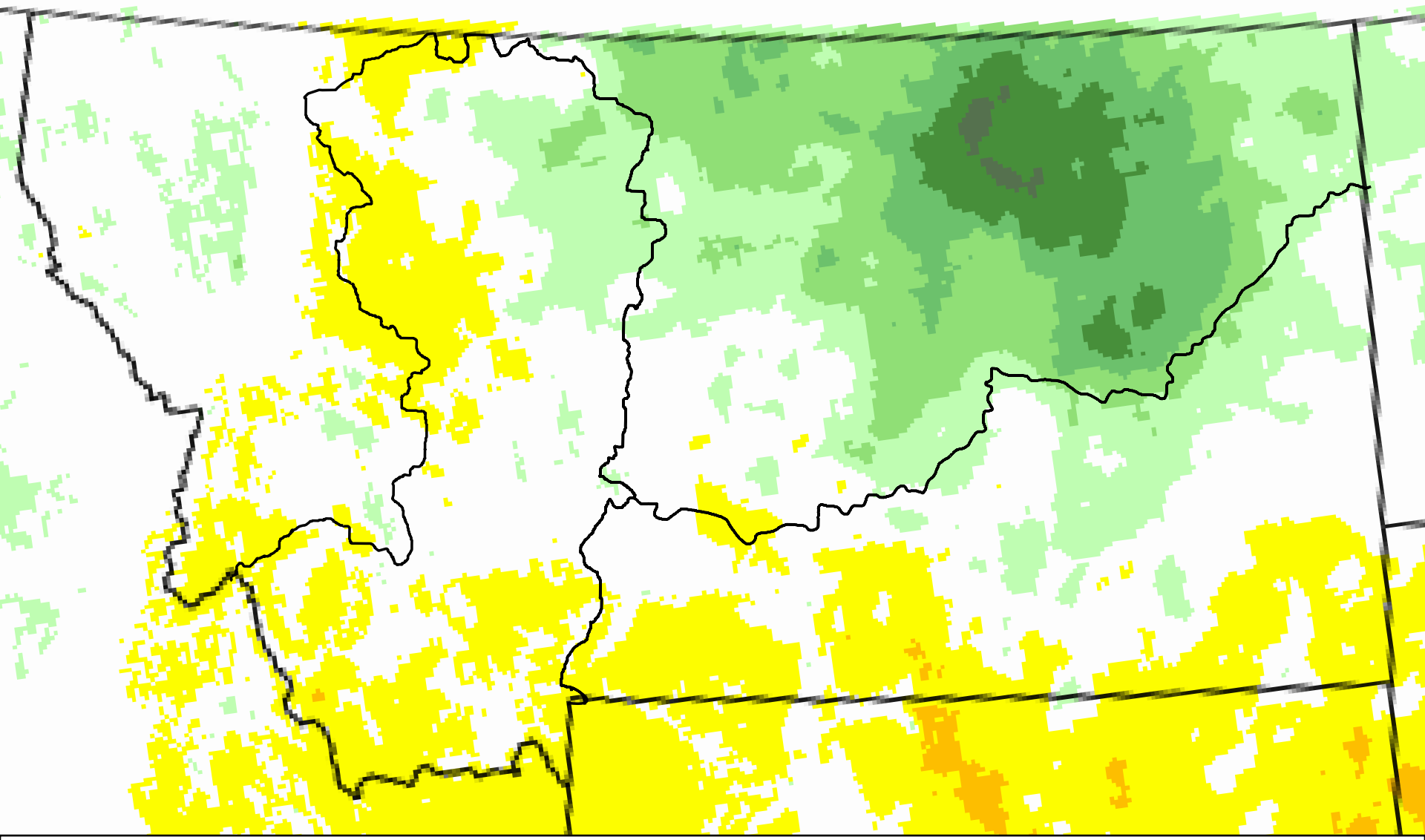
MOISTURE...



12-Month Precipitation Anomaly
Aug 15 – Jul 16

% of Average Precipitation

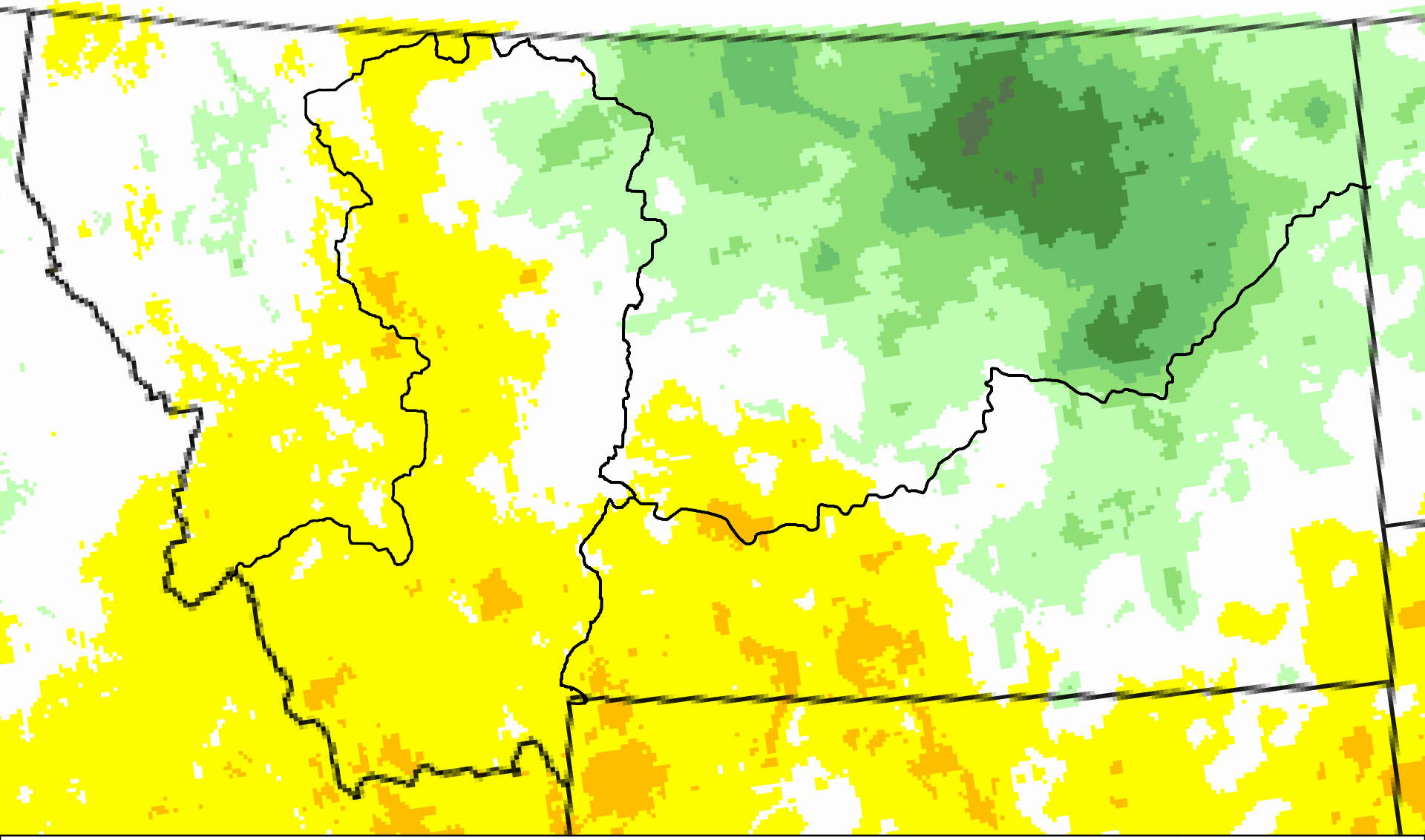
0	50 - 70	150 - 170
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400



Water Year Precip Anomaly
Oct 15 – Jul 16

% of Average Precipitation

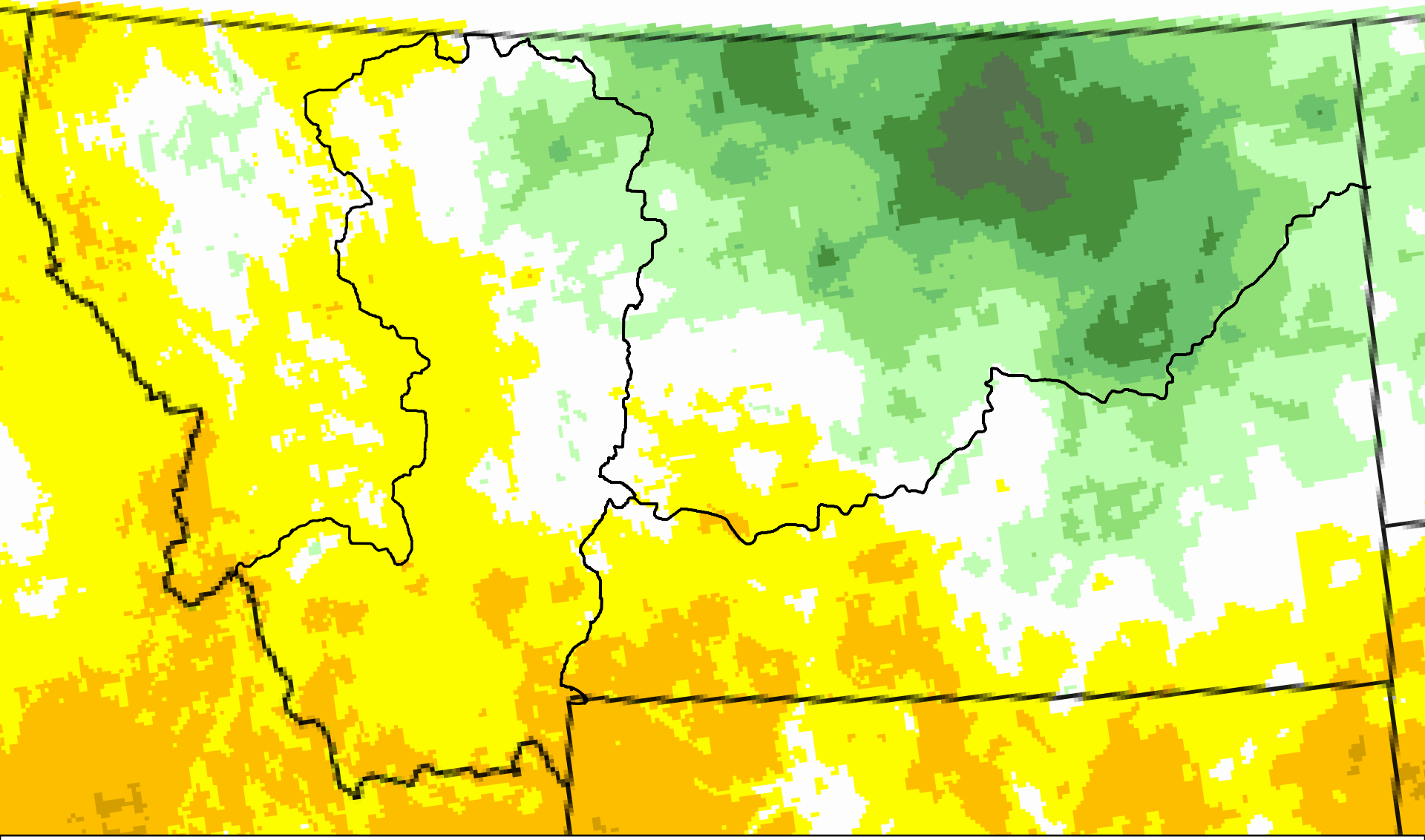
0	50 - 70	150 - 170
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400



Calendar Year Precip Anomaly
Jan - Jul

% of Average Precipitation

0	50 - 70	150 - 170
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400



Crop Year Precip Anomaly
Apr - Jul

% of Average Precipitation

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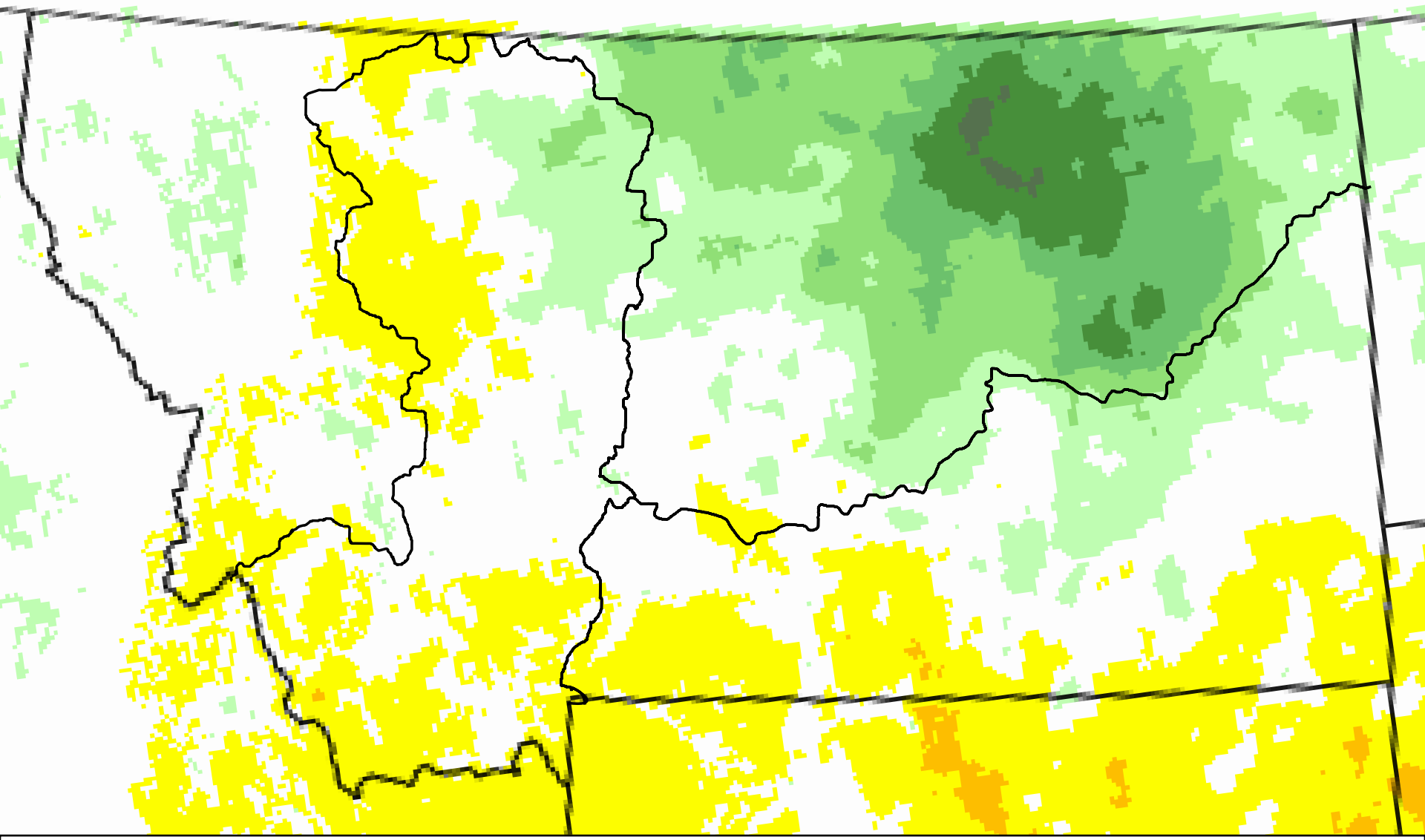
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400



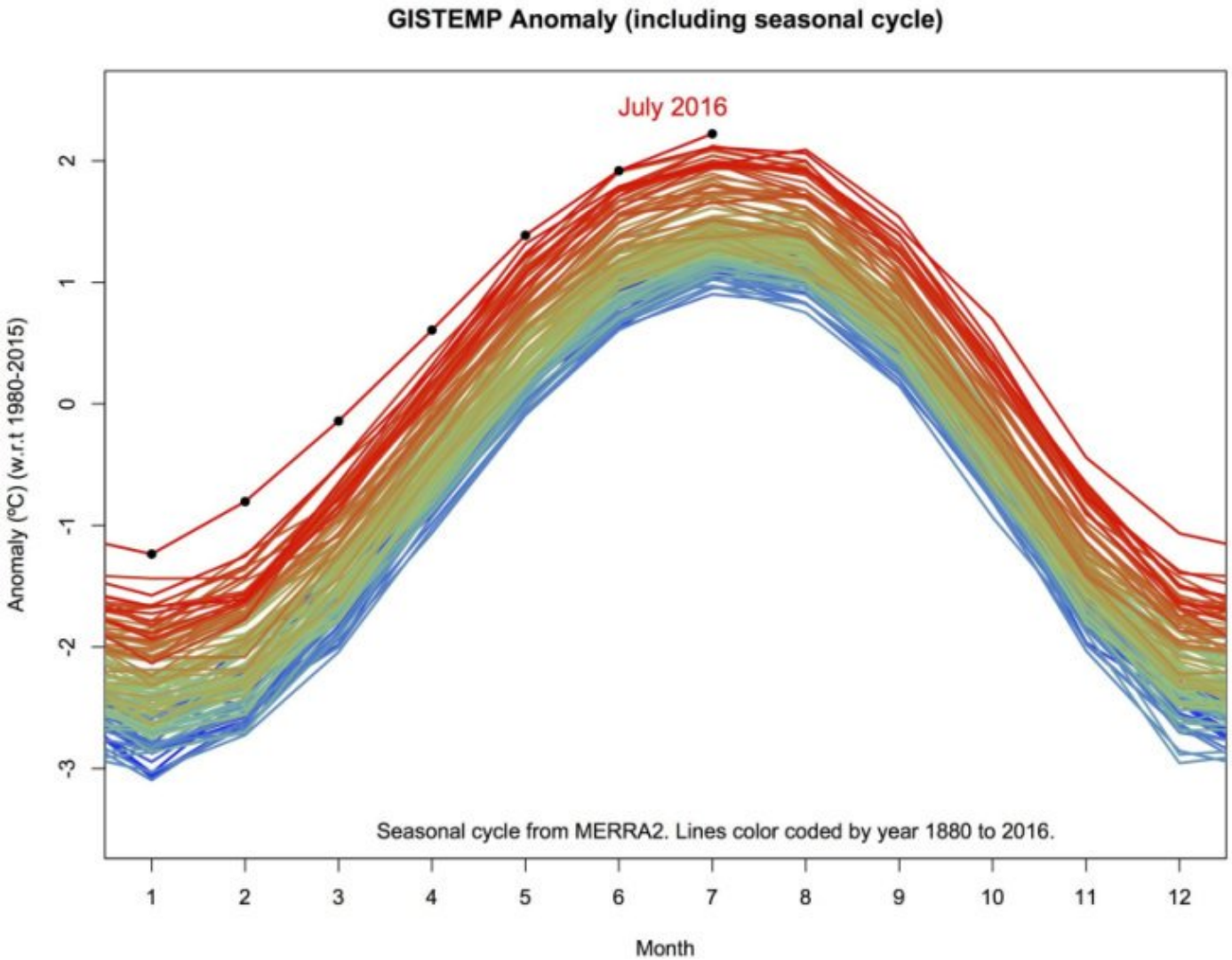
Monthly Precipitation Anomaly
July 2016

% of Average Precipitation

0	50 - 70	150 - 170
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400

TEMPERATURE...

NASA: July Warmest on Record



Montana: Aug 2015 – Jul 2016

Warmest on Record

Avg Temp	20th Century Average	Departure
45.3°F	41.1°F	4.2°F

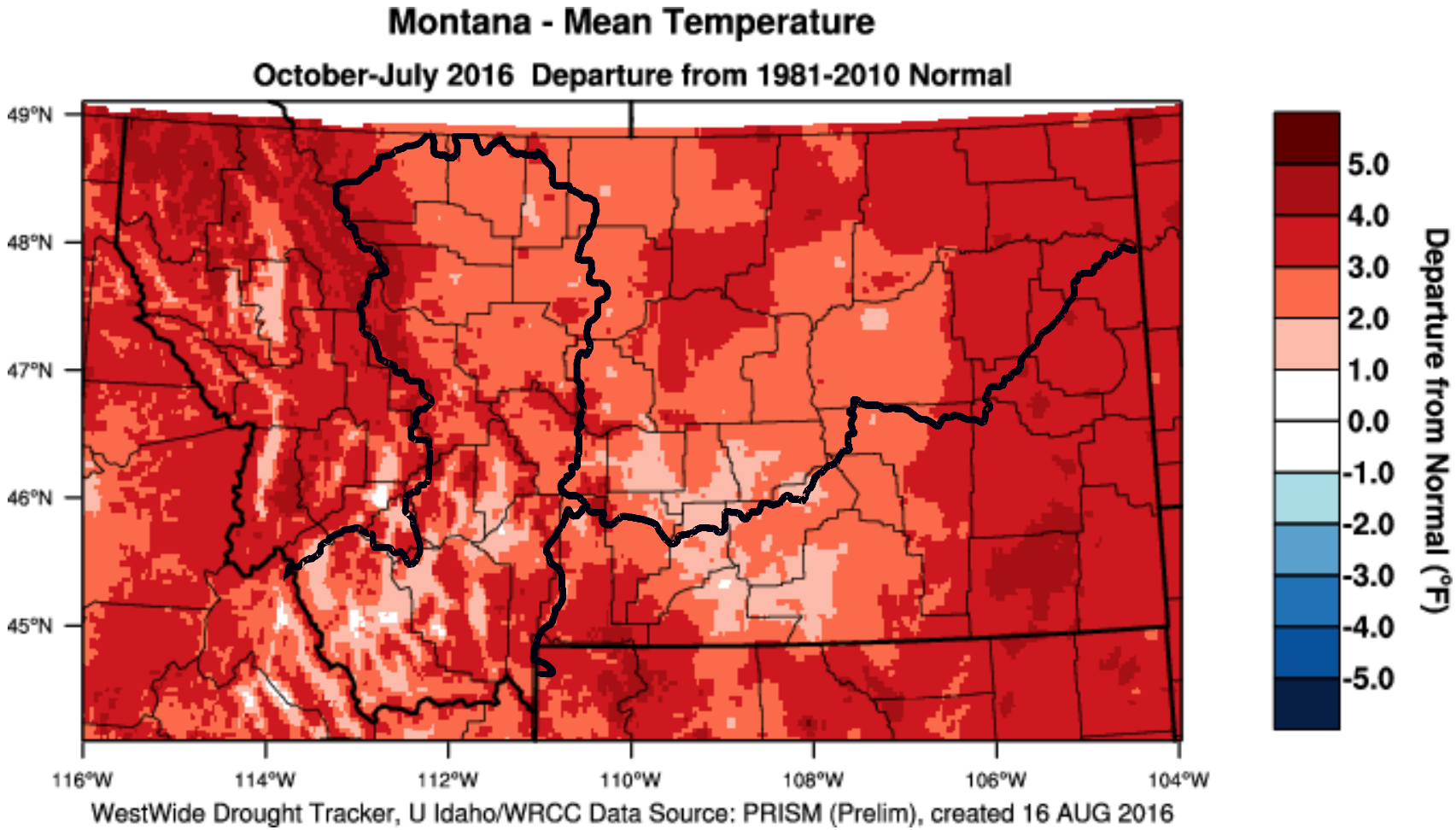
Precipitation Just Above Normal (56th Wettest)

Precip	20th Century Average	Departure
18.73”	18.66”	0.07”

Water Year: 16.43” received vs 15.88” normal

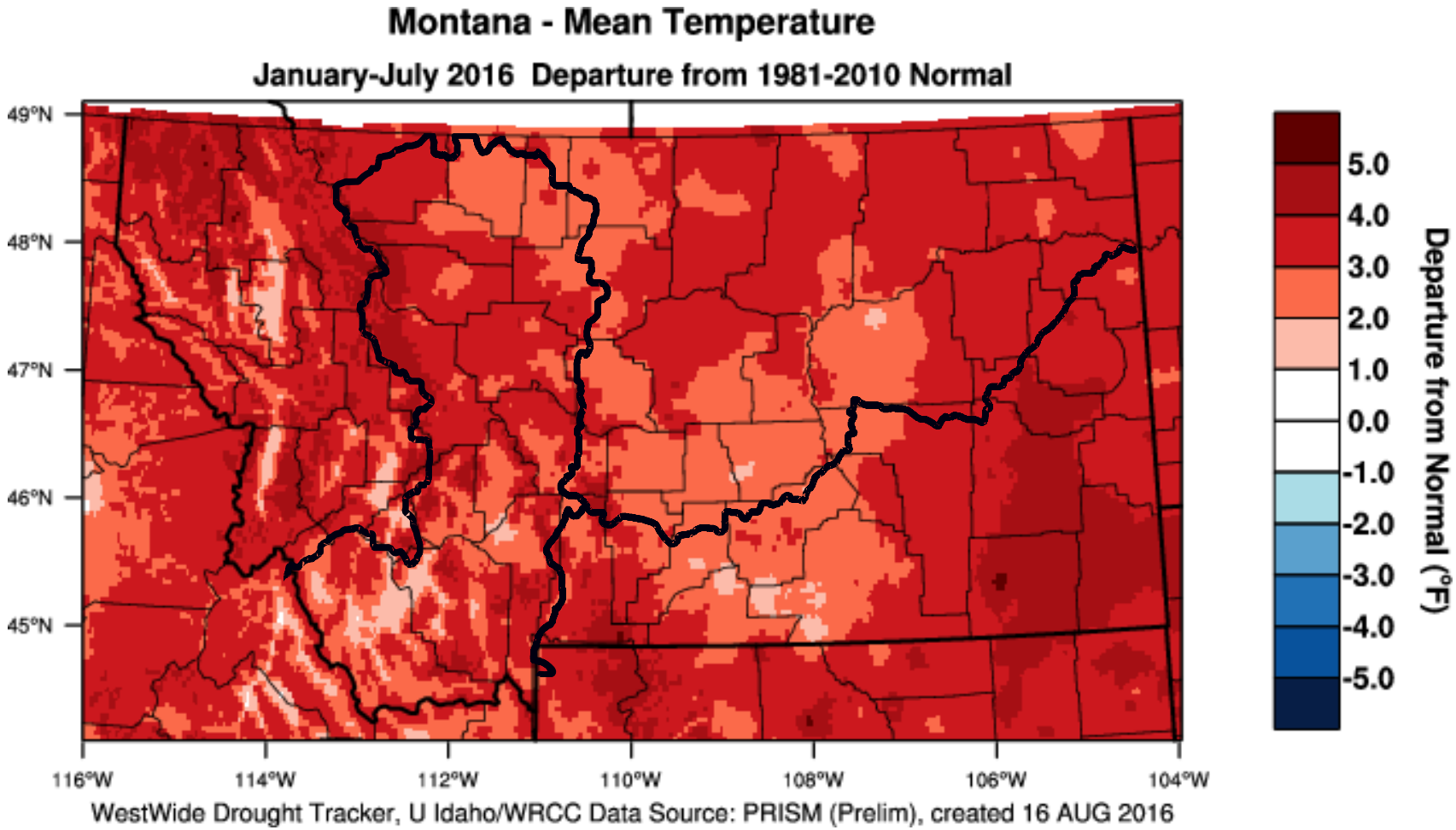
Mean Temperature

Water Year 2016



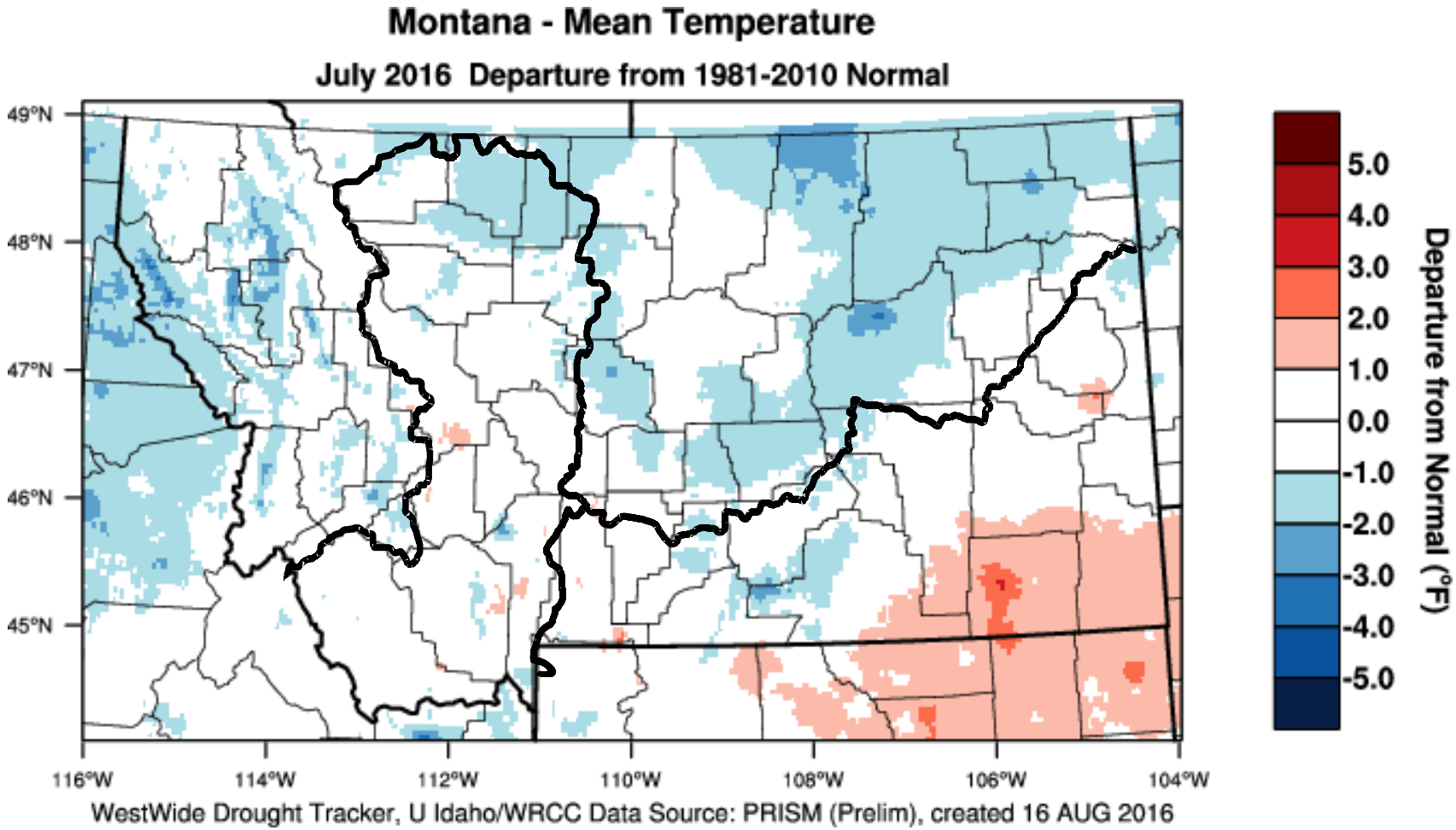
Mean Temperature

Calendar Year 2016



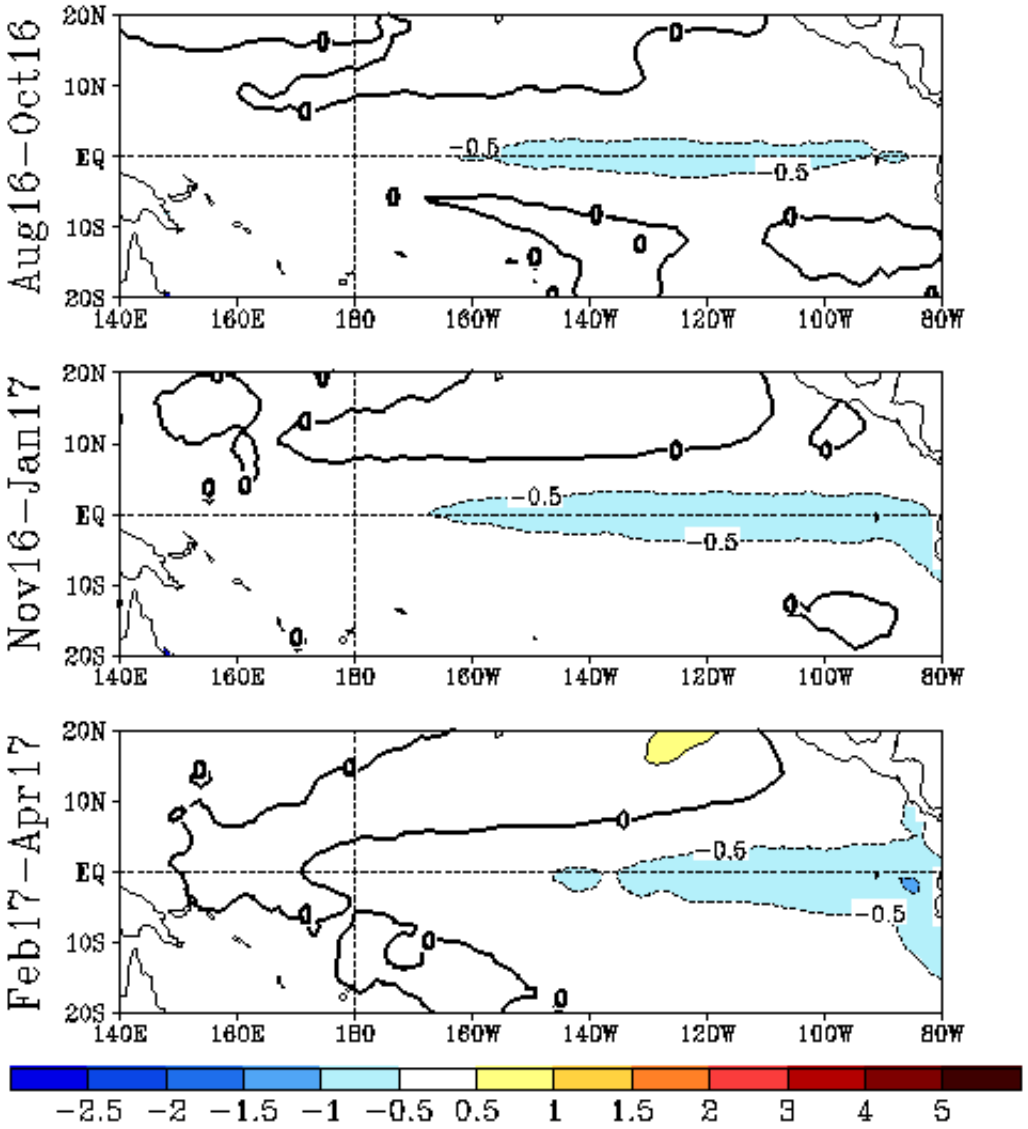
Mean Temperature

July 2016

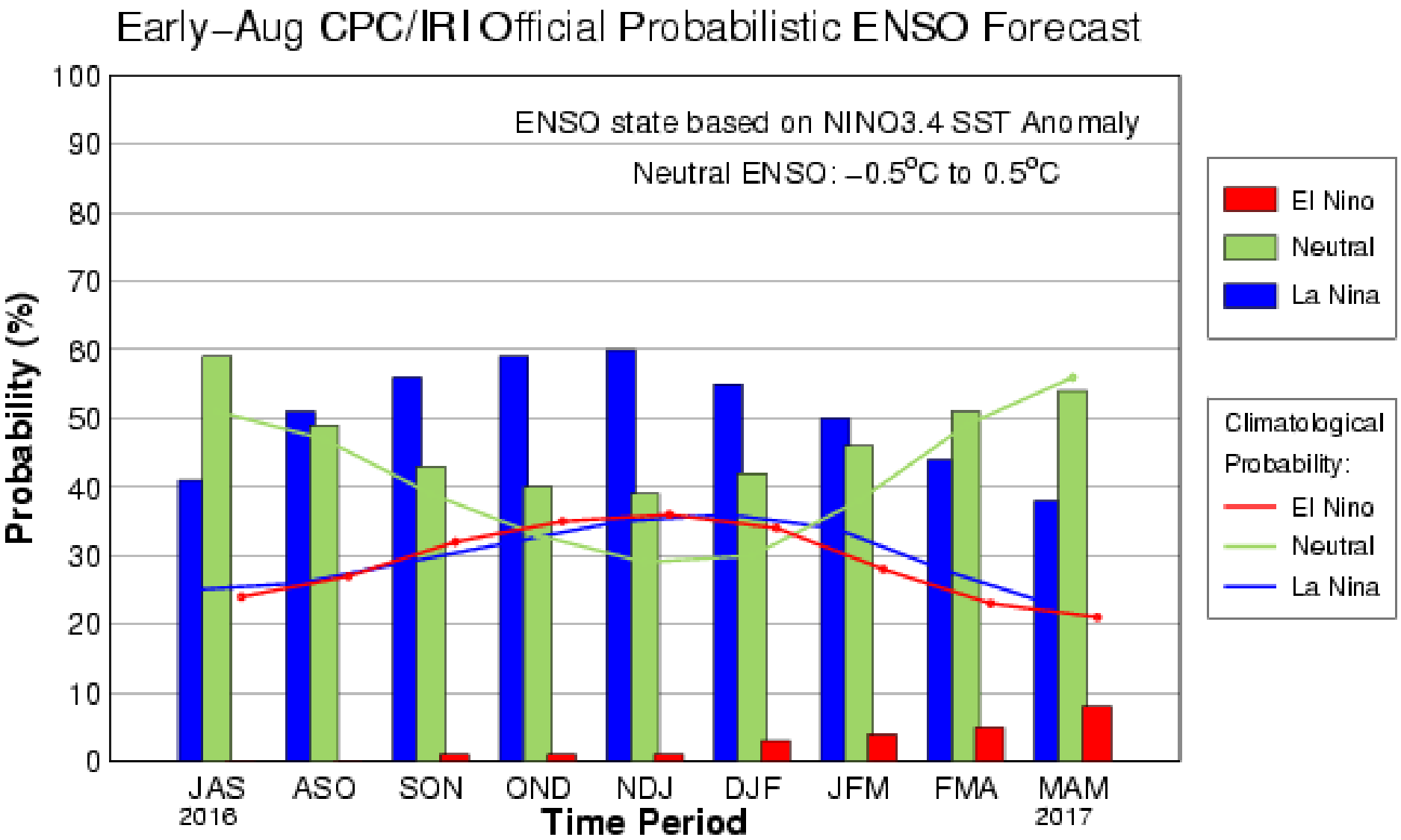


CLIMATE…

El Niño / La Niña

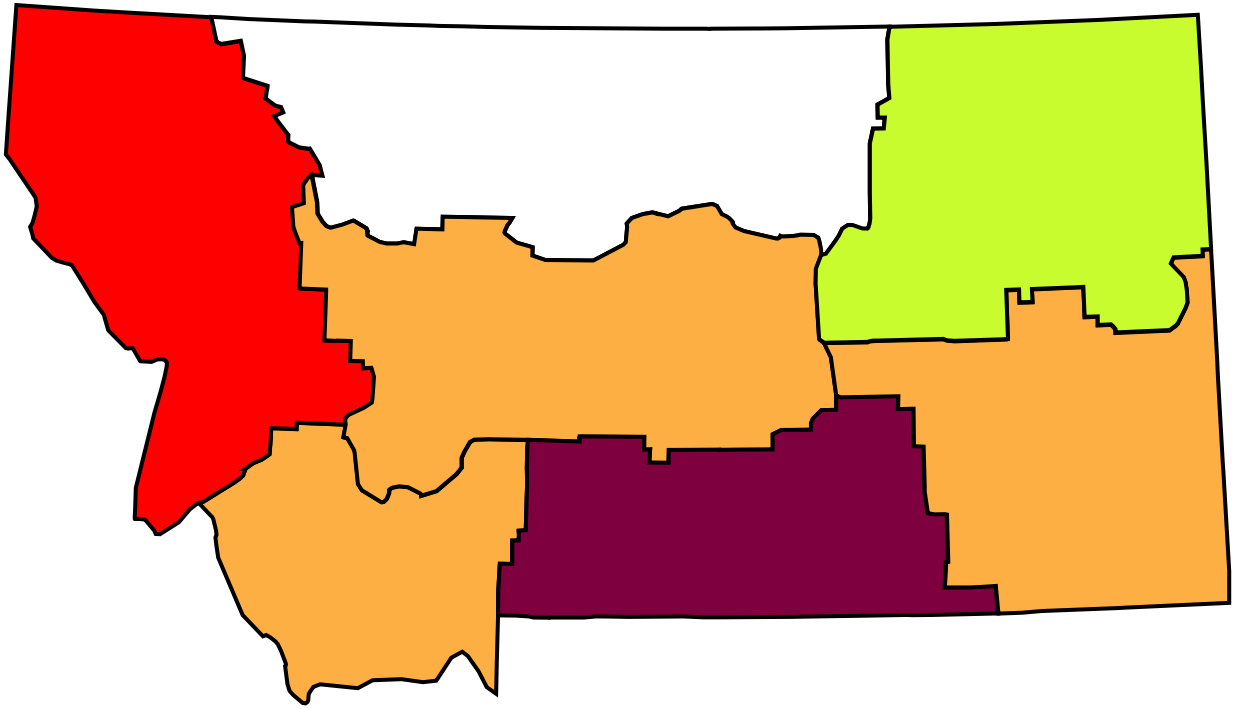


El Niño / La Niña

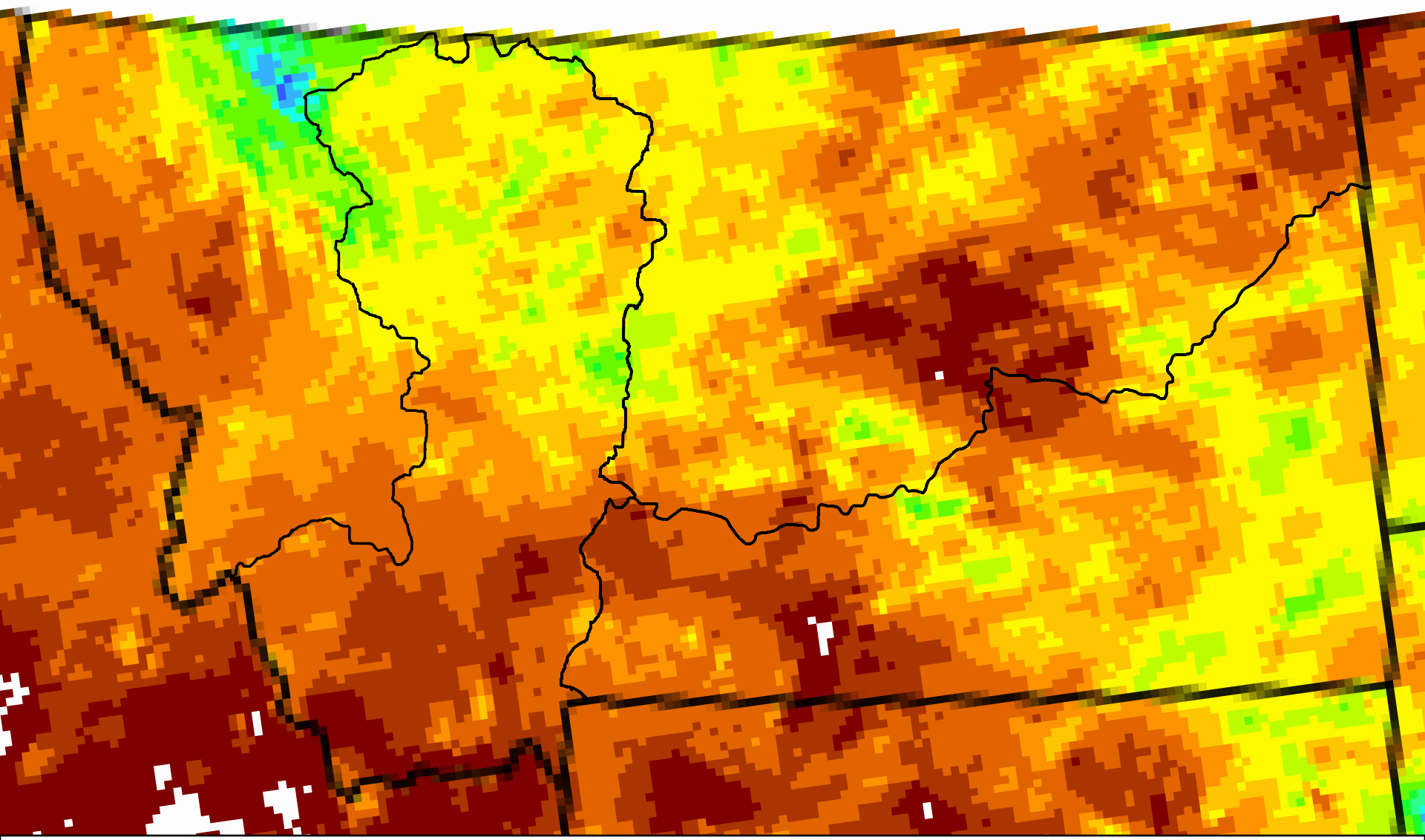


Latest Palmer Drought Severity Index

July 2016



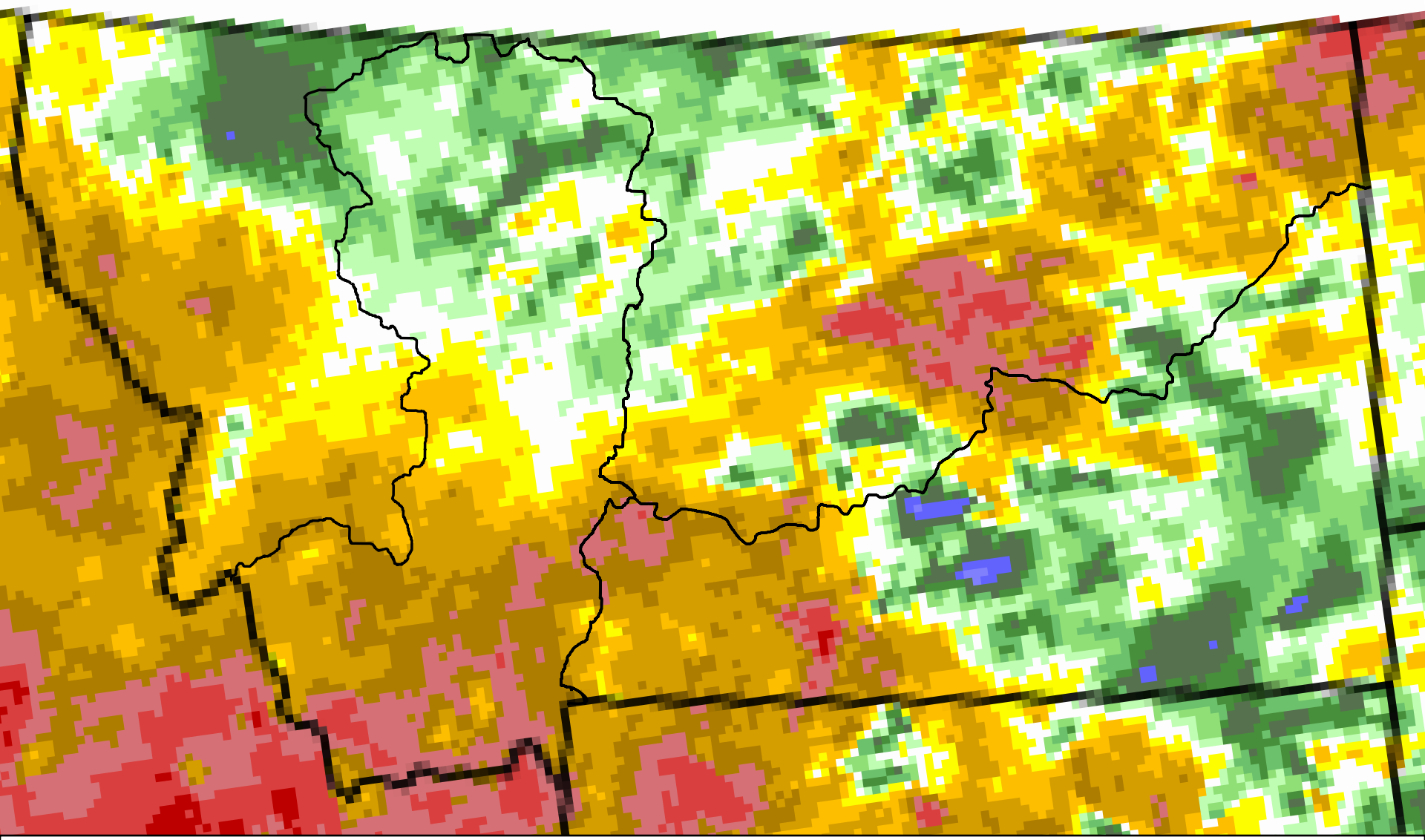
THIS MONTH SO FAR…



Monthly Precipitation
August 2016

Monthly Precipitation (in.)

< 0.01	0.6 - 0.8	2.4 - 2.8	6 - 8
.01 - 0.1	0.8 - 1.2	2.8 - 3.2	8 - 12
0.1 - 0.2	1.2 - 1.6	3.2 - 4	12 - 16
0.2 - 0.4	1.6 - 2	4 - 5	16 - 20
0.4 - 0.6	2 - 2.4	5 - 6	> 20



Monthly Precip Anomaly
August 2016

% of Average Precipitation

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1 - 10	70 - 90	170 - 200
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20 - 30	110 - 130	300 - 400
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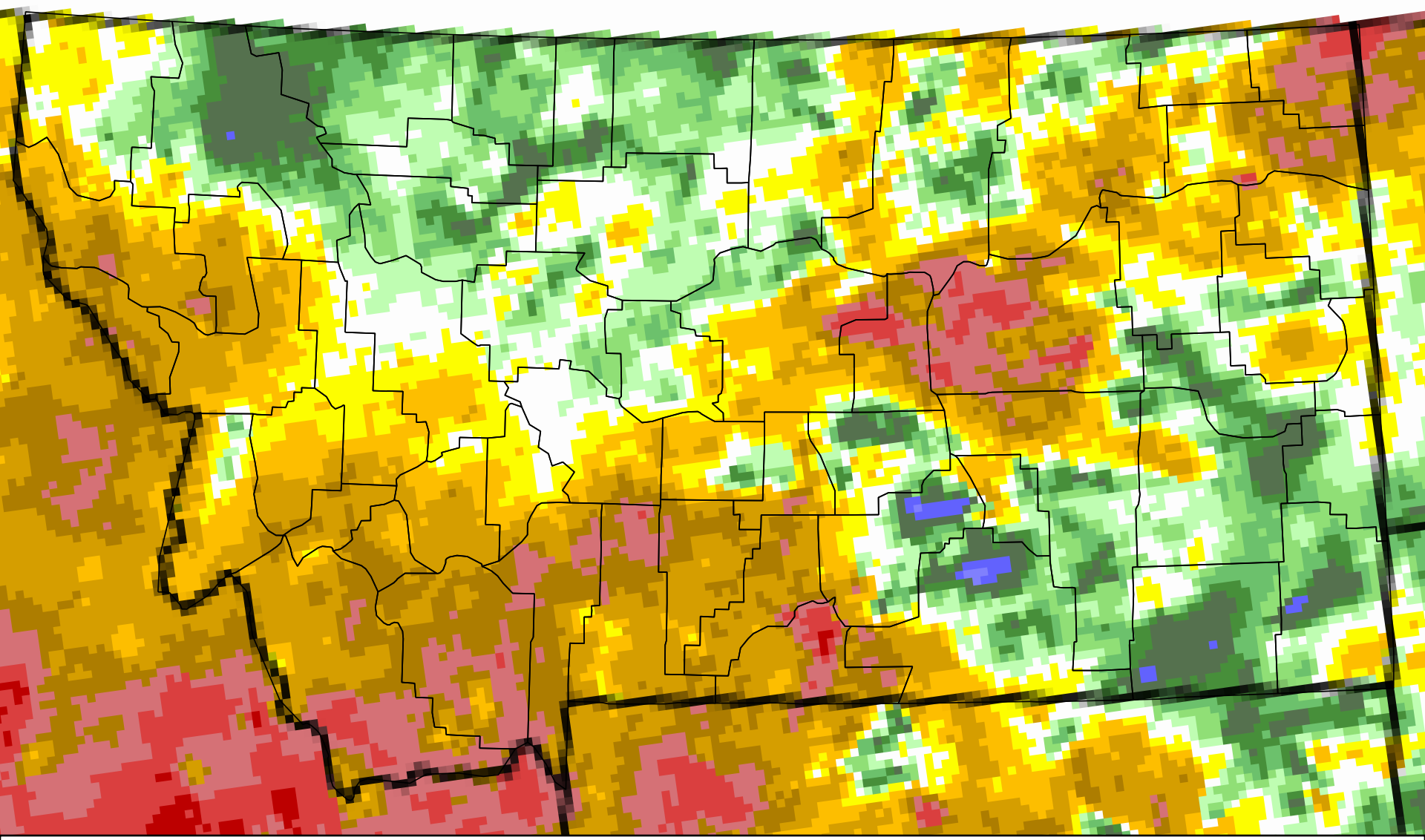
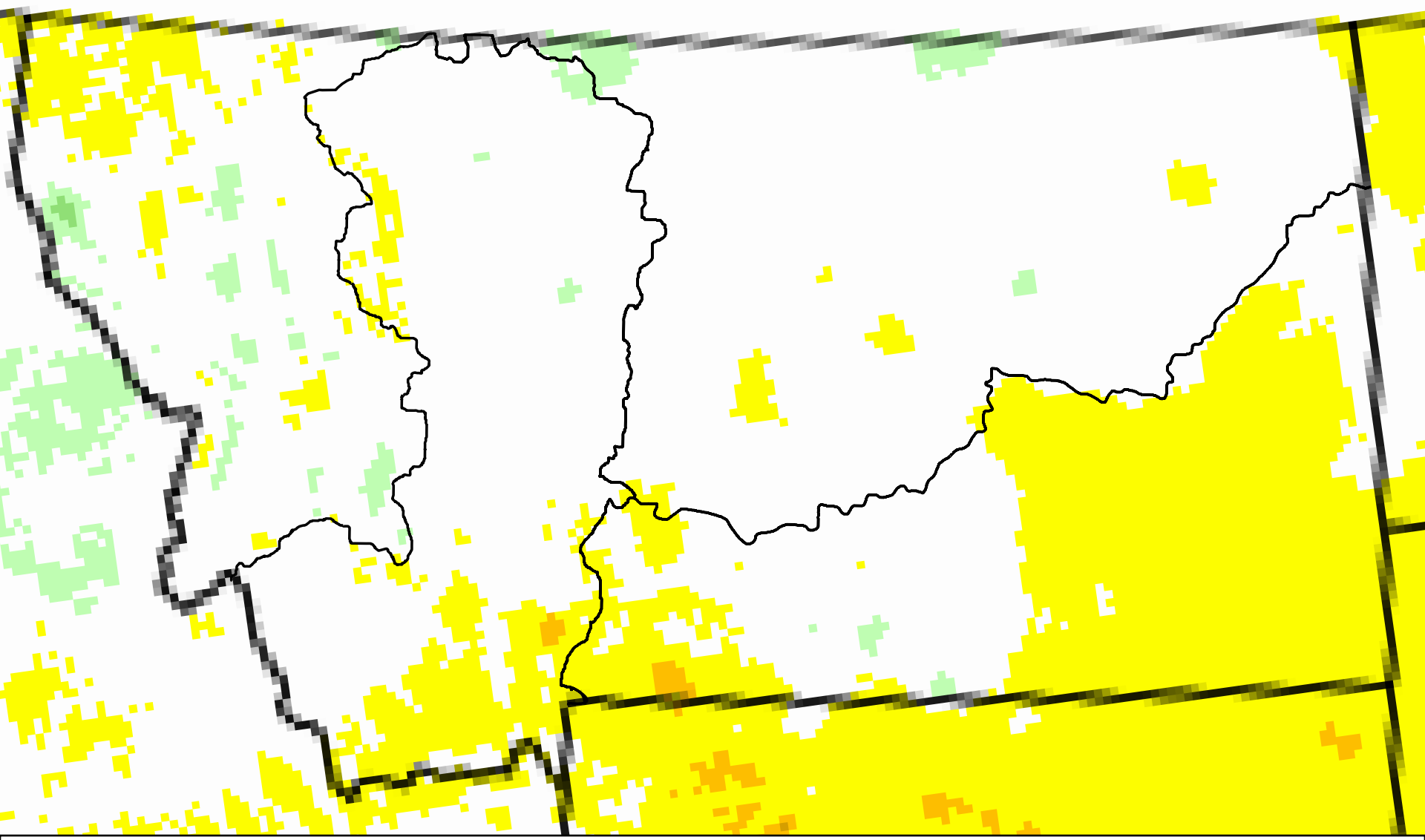


Monthly Precip Anomaly August 2016

% of Average Precipitation

0	50 - 70	150 - 170
1 - 10	70 - 90	170 - 200
11 - 20	90 - 110	200 - 300
20 - 30	110 - 130	300 - 400
30 - 50	130 - 150	> 400



Monthly Temp Anomaly
August 2016

Temperature Anomaly (°F)

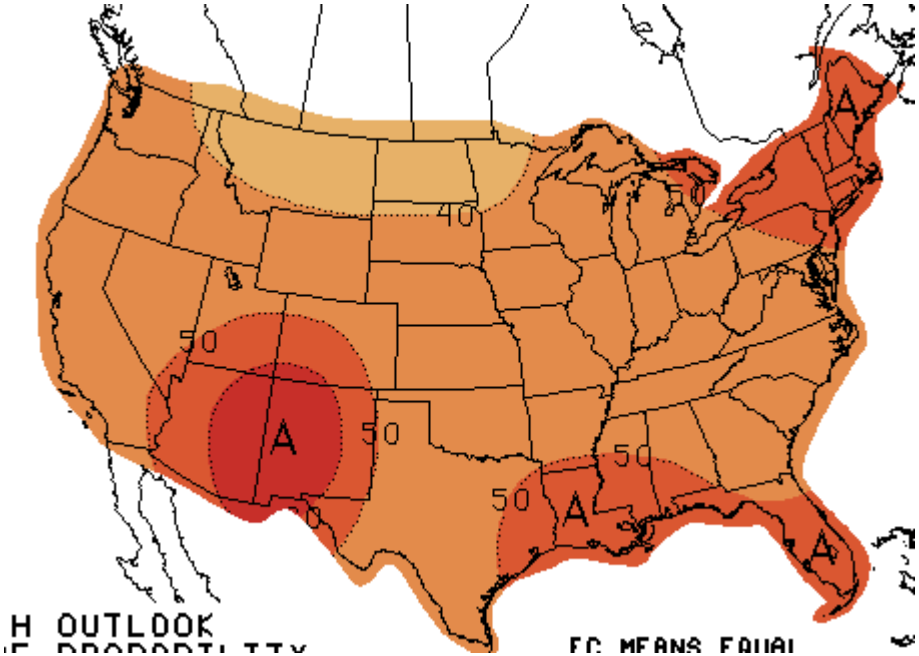
< -16	-5 - -3	5 - 7
-16 - -13	-3 - -1	7 - 10
-13 - -10	-1 - 1	10 - 13
-10 - -7	1 - 3	13 - 16
-7 - -5	3 - 5	> 16

FORECAST…

September – November Outlook

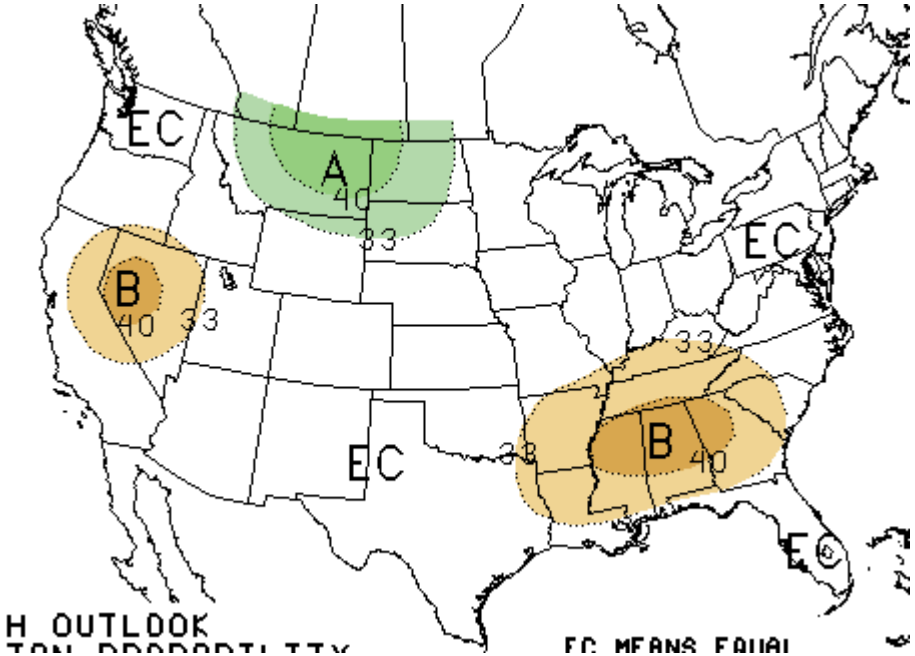
Created August 18

Temperature



33% chance of above normal temperatures over most of Montana

Precipitation

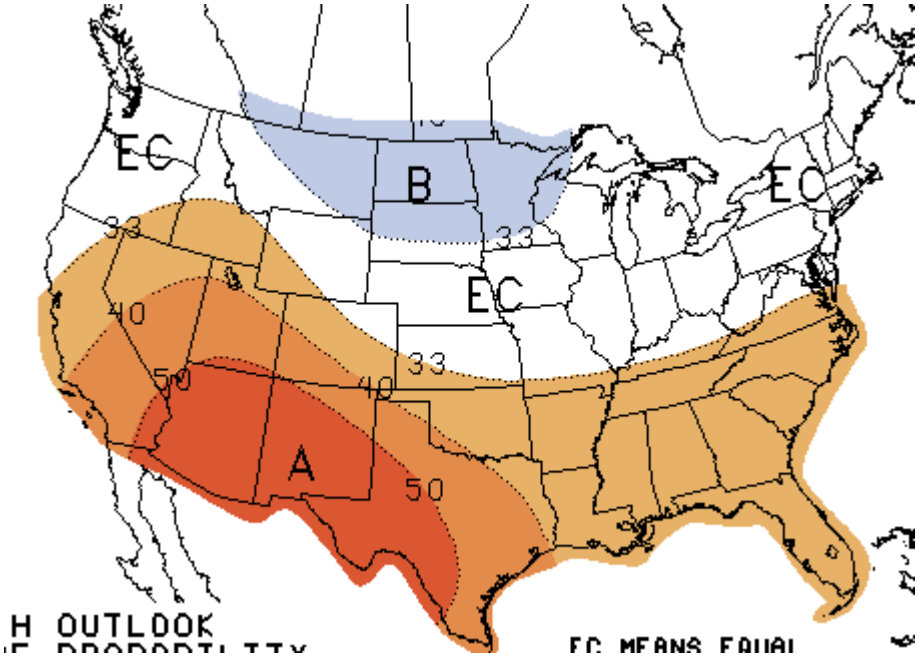


> 33% chance of above normal precipitation over most of Montana, but equal chances of above or below normal precipitation extreme western Montana

December - February Outlook

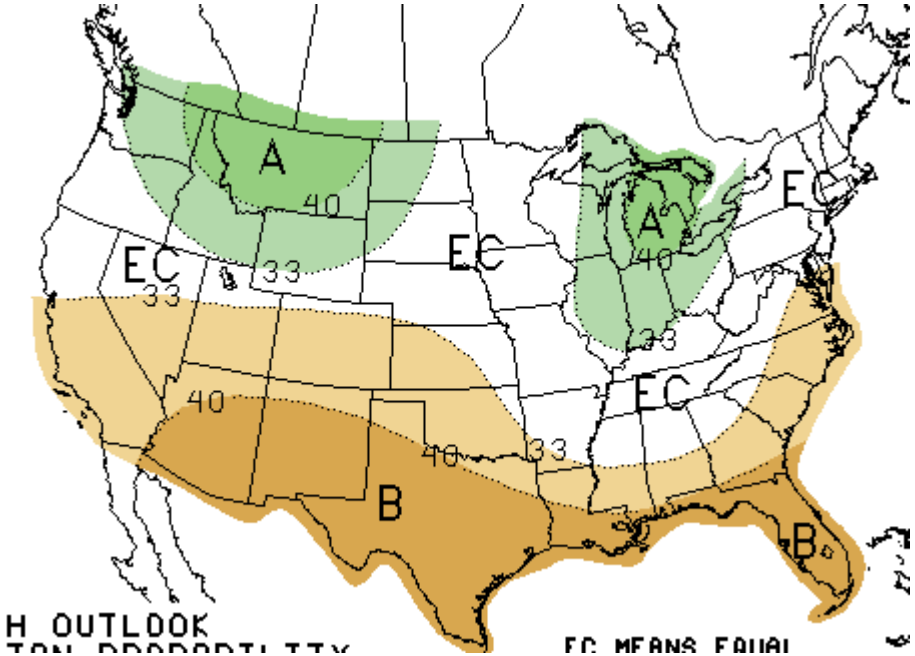
Created August 18

Temperature



33% chance of below normal temperatures across northeast half of Montana, equal chances of above or below elsewhere

Precipitation

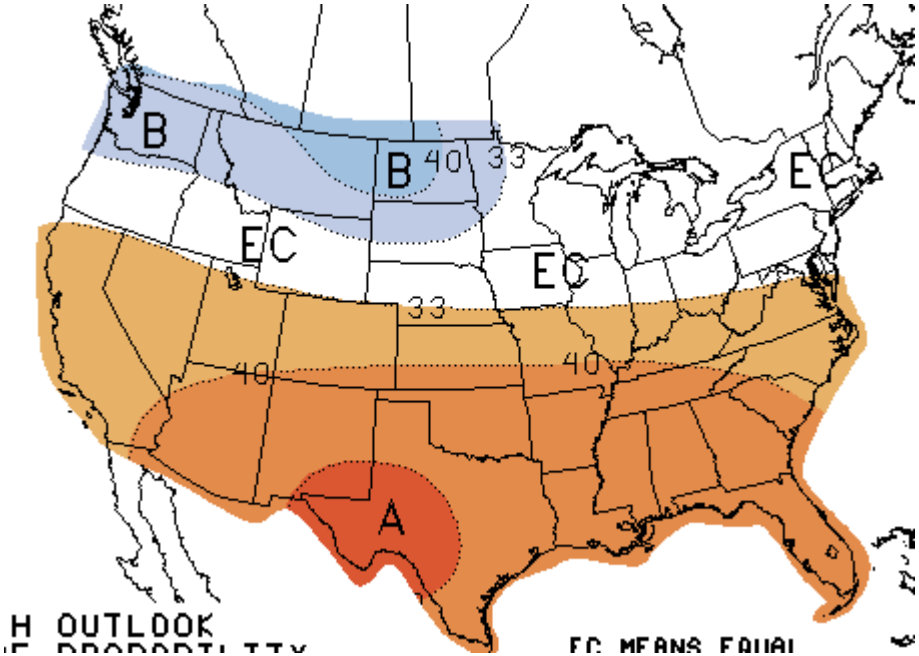


40% chance of above normal precipitation over most of Montana

Mar - May Outlook

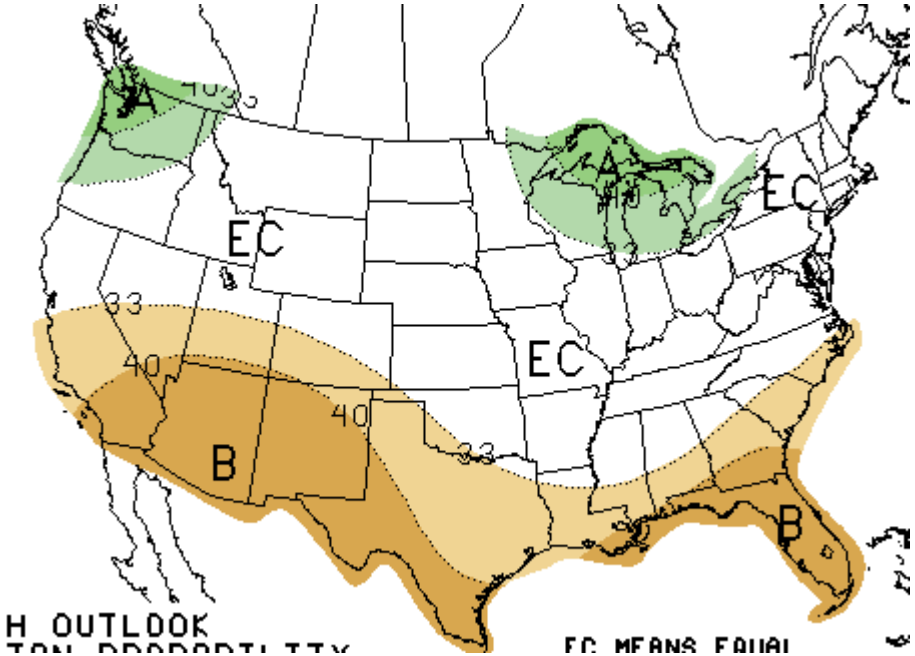
Created August 18

Temperature



33% to 40% chance of below normal temperatures statewide

Precipitation

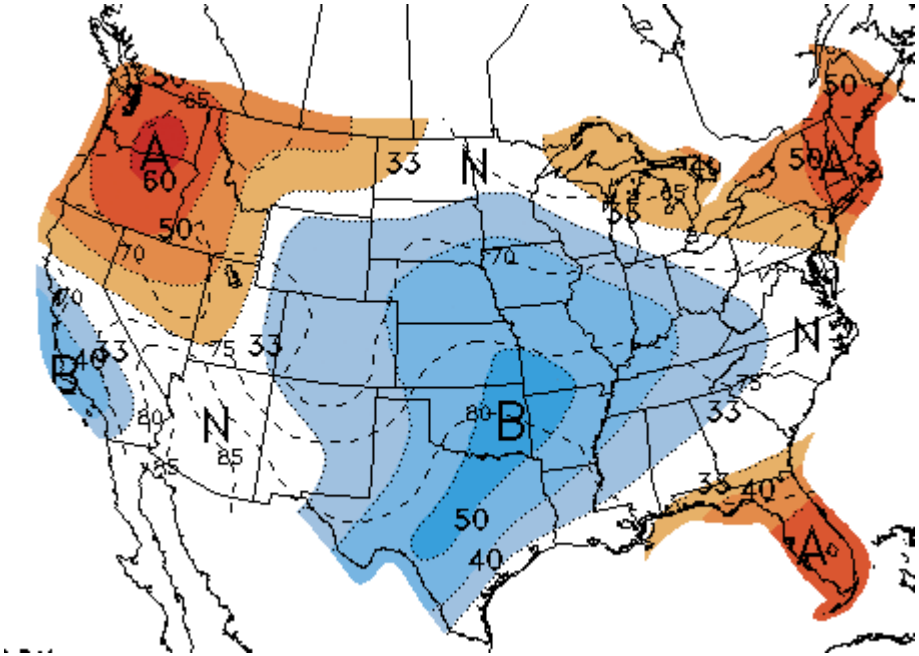


Equal chances of above, below or near normal precipitation statewide

8 – 14 Day Outlook

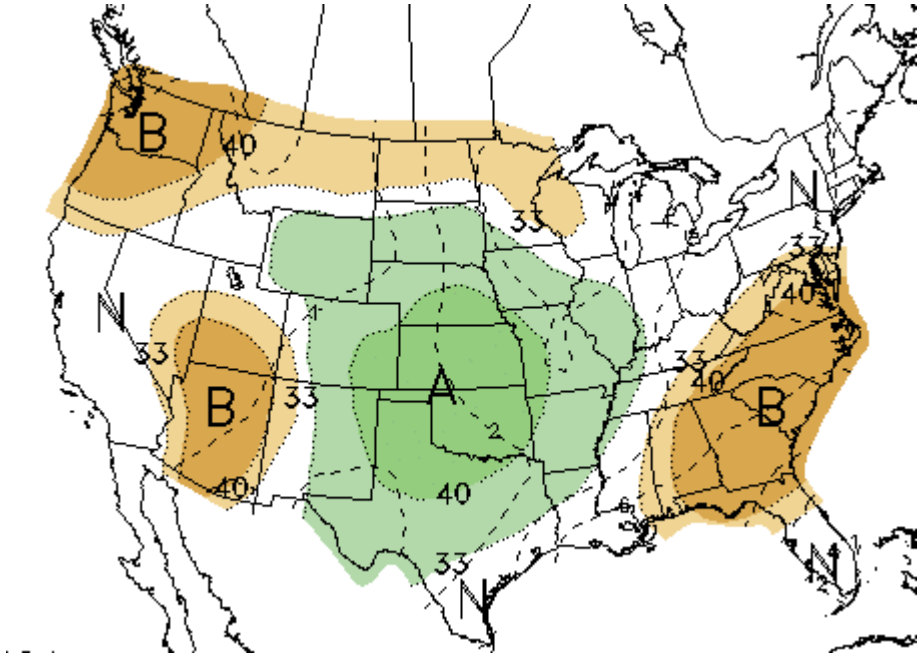
Created August 18

Temperature



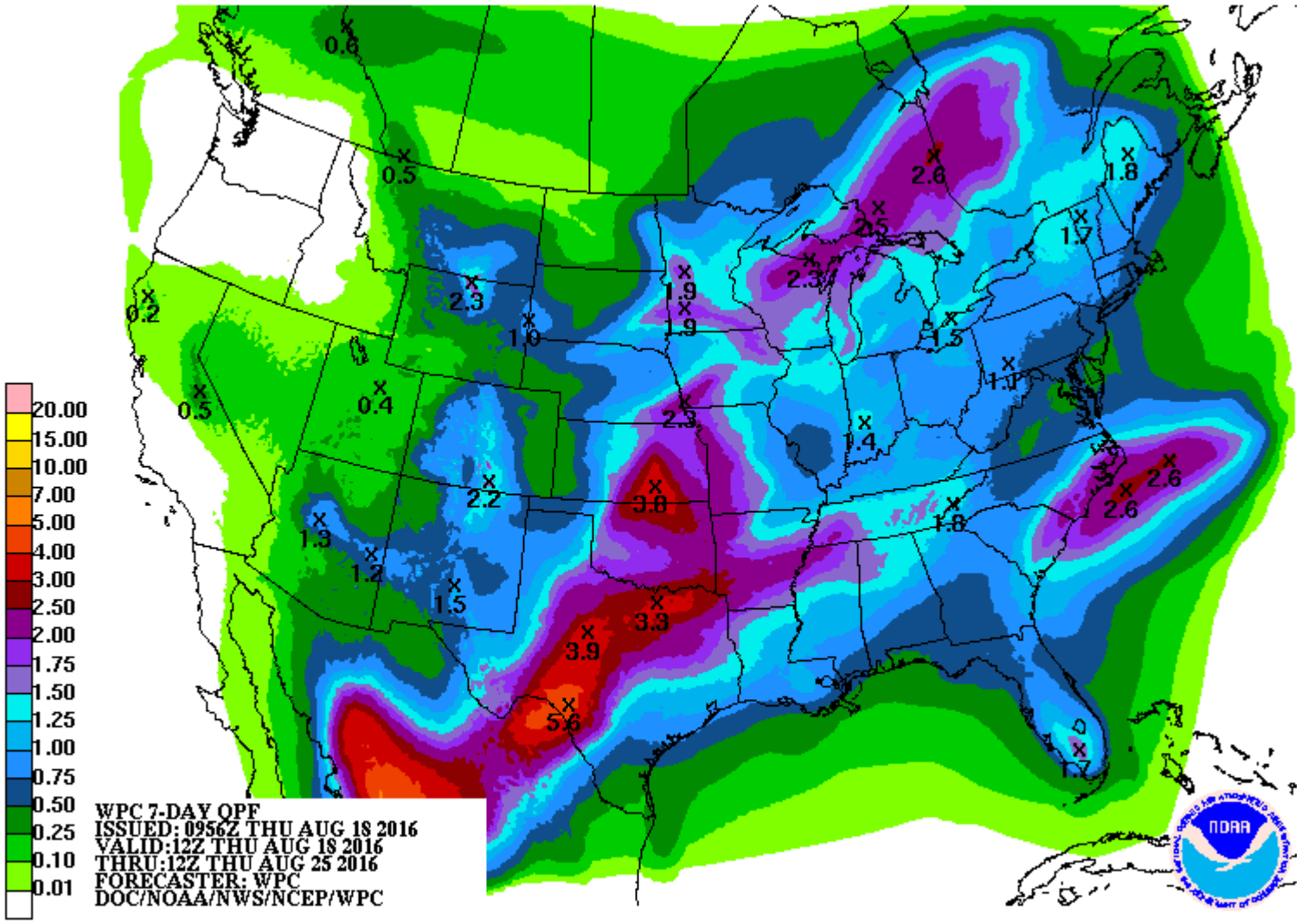
33% to 40% chance of above normal temperatures over most of Montana, equal chances of above or below normal temperatures southeast Montana

Precipitation

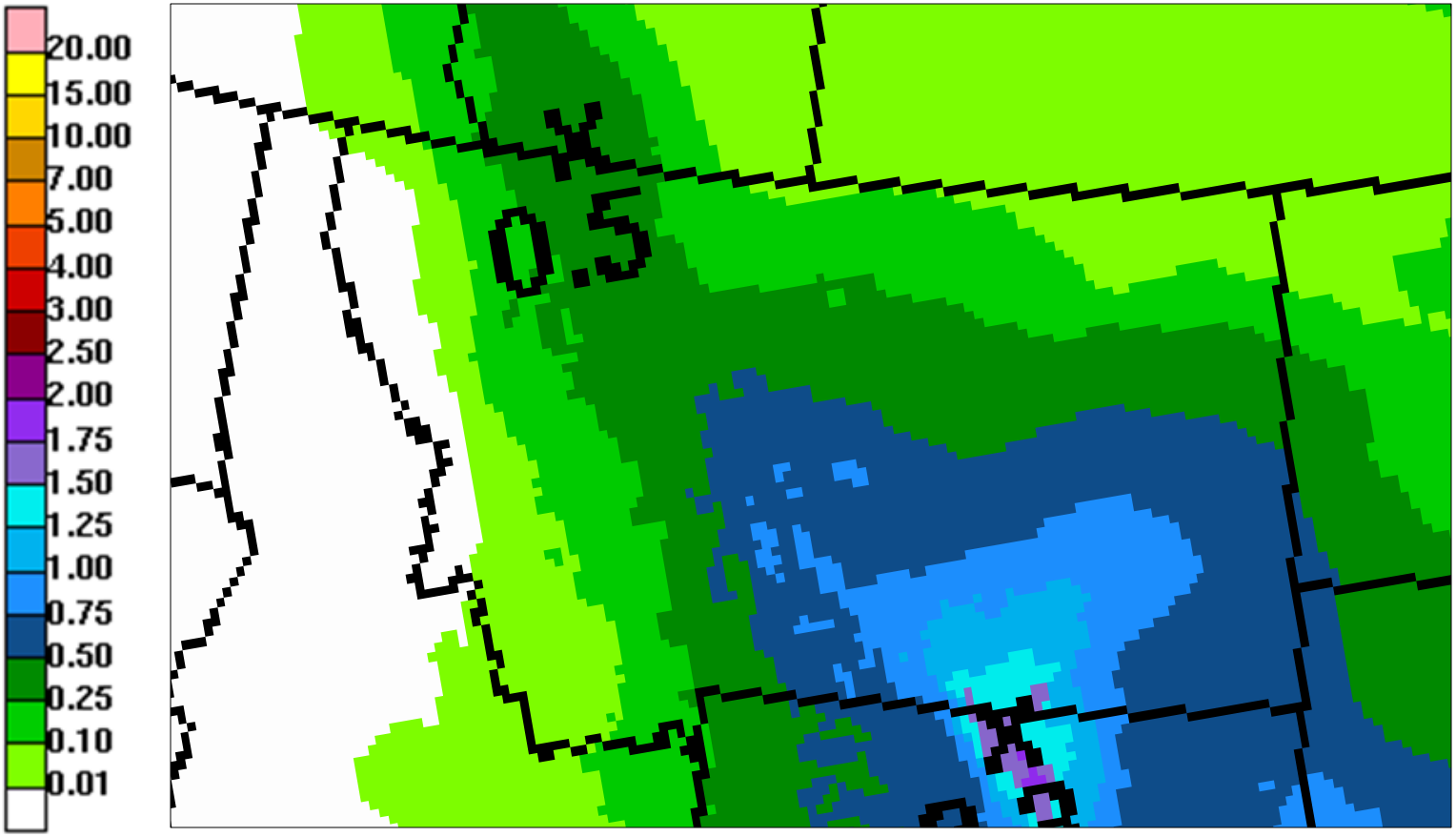


33% chance of below normal over most of Montana, but 40% extreme northwest, and equal chances of above or below normal precipitation over southern Montana

7-Day WPC Precipitation Forecast



7-Day WPC Precipitation Forecast



weather.gov

weather.gov/billings

weather.gov/glasgow

weather.gov/missoula

weather.gov/greatfalls

Governor's Drought Advisory Committee
Precipitation and Soil Moisture Update
August 18th, 2016

Lucas Zukiewicz
Water Supply Specialist (Snow Hydrologist)
USDA-NRCS
Montana Snow Surveys
Lucas.Zukiewicz@mt.usda.gov
406-587-6843

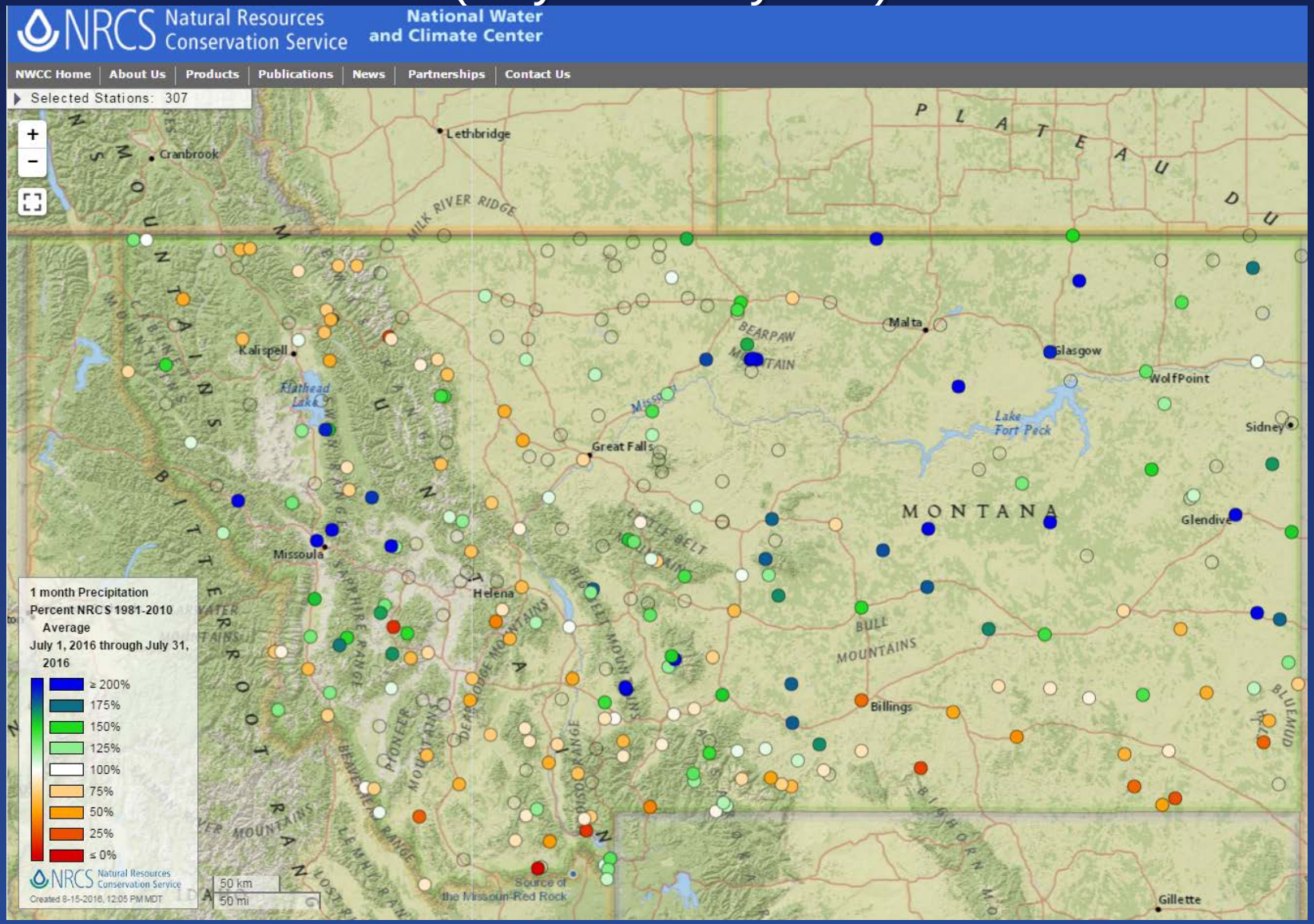
http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/

Matt Norberg, Montana DNRC, scouts a potential stream gage location on the Red Rocks River above Clark Canyon Reservoir. Chris Carparelli from the Beaverhead Conservation District joined.

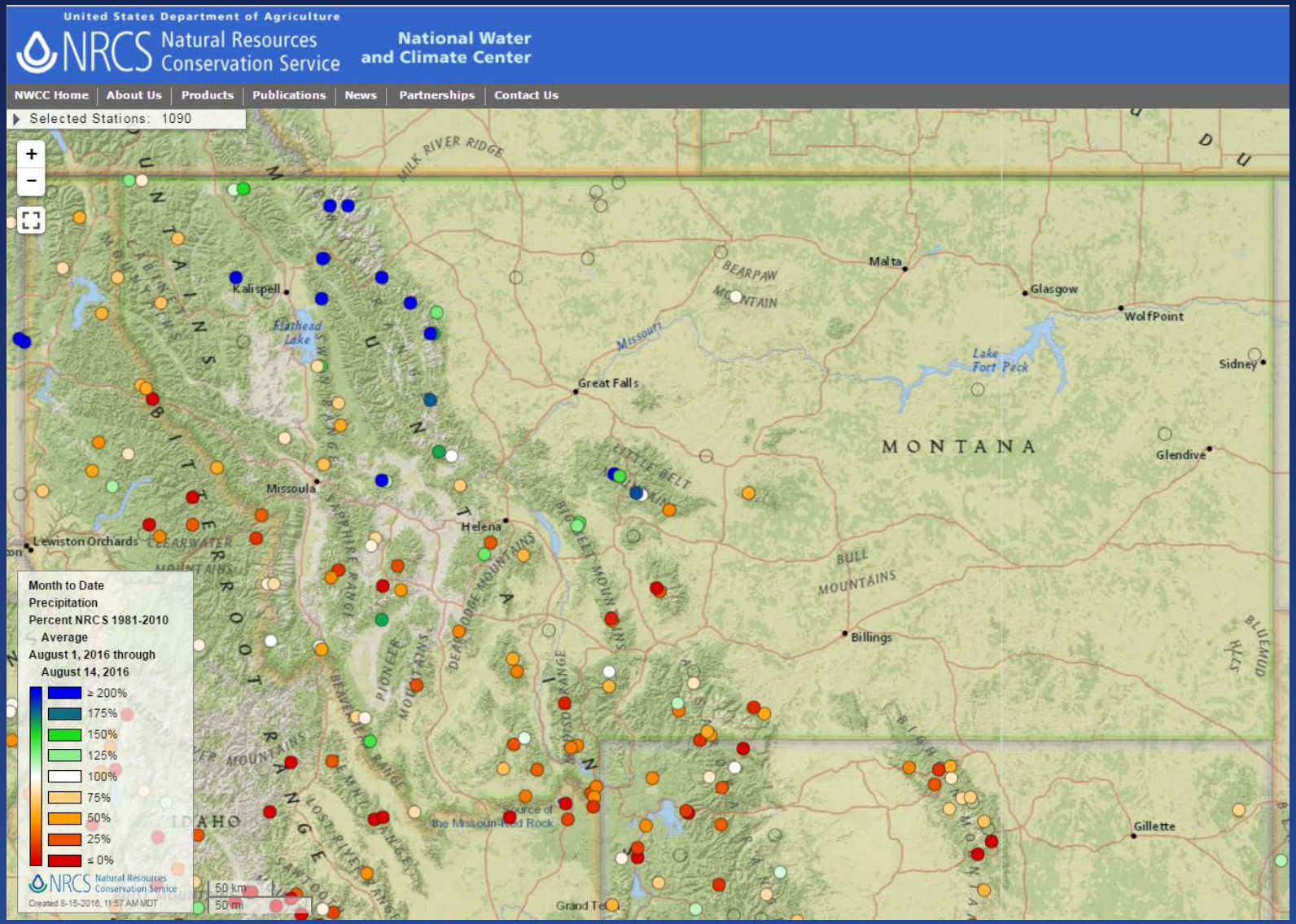
Mountain Precipitation

Montana Snow Survey

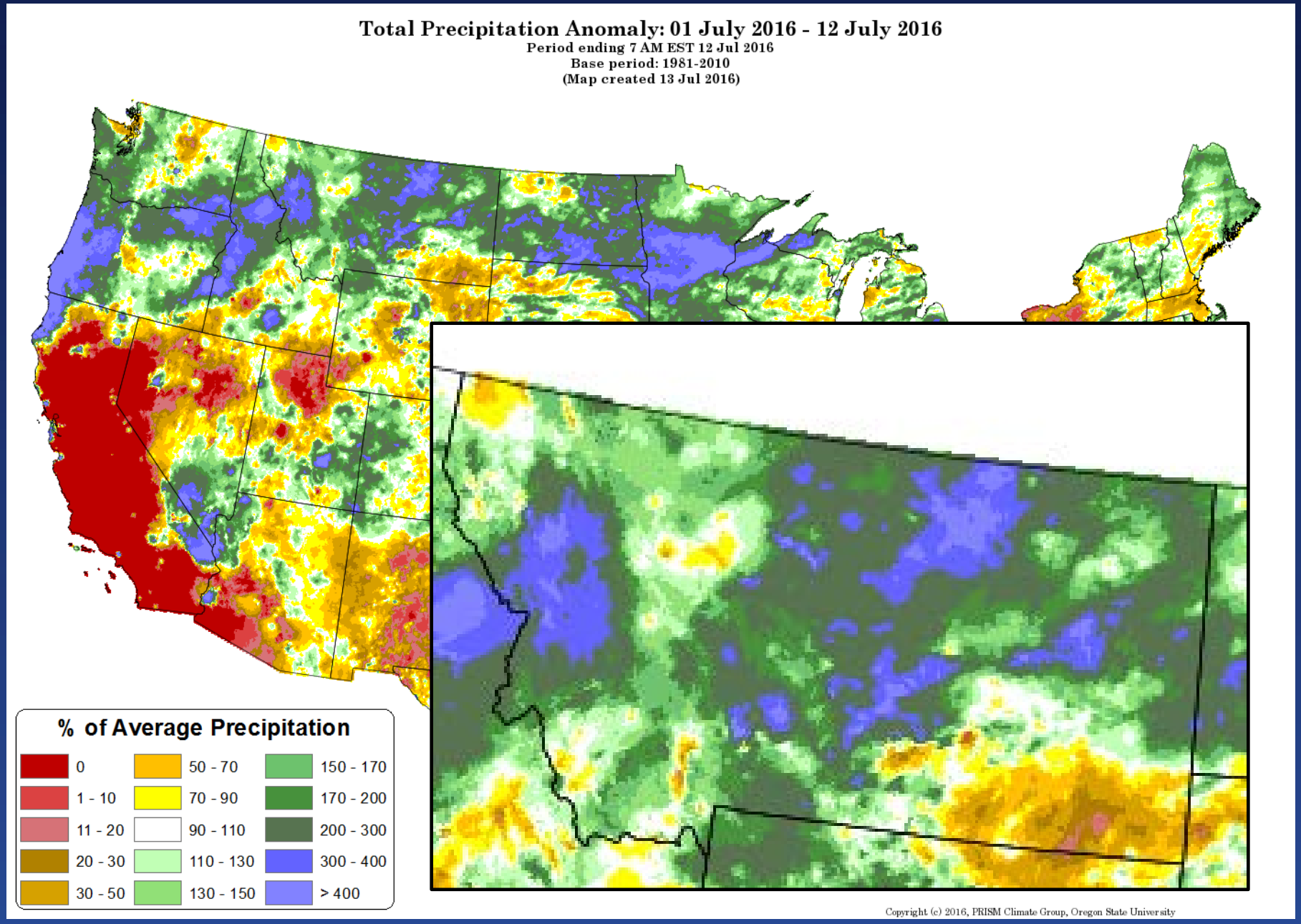
July 2016 Precipitation
(July 1st – July 31th)



August 2016 Mountain SNOTEL Precipitation (Aug 1st – Aug 15th)

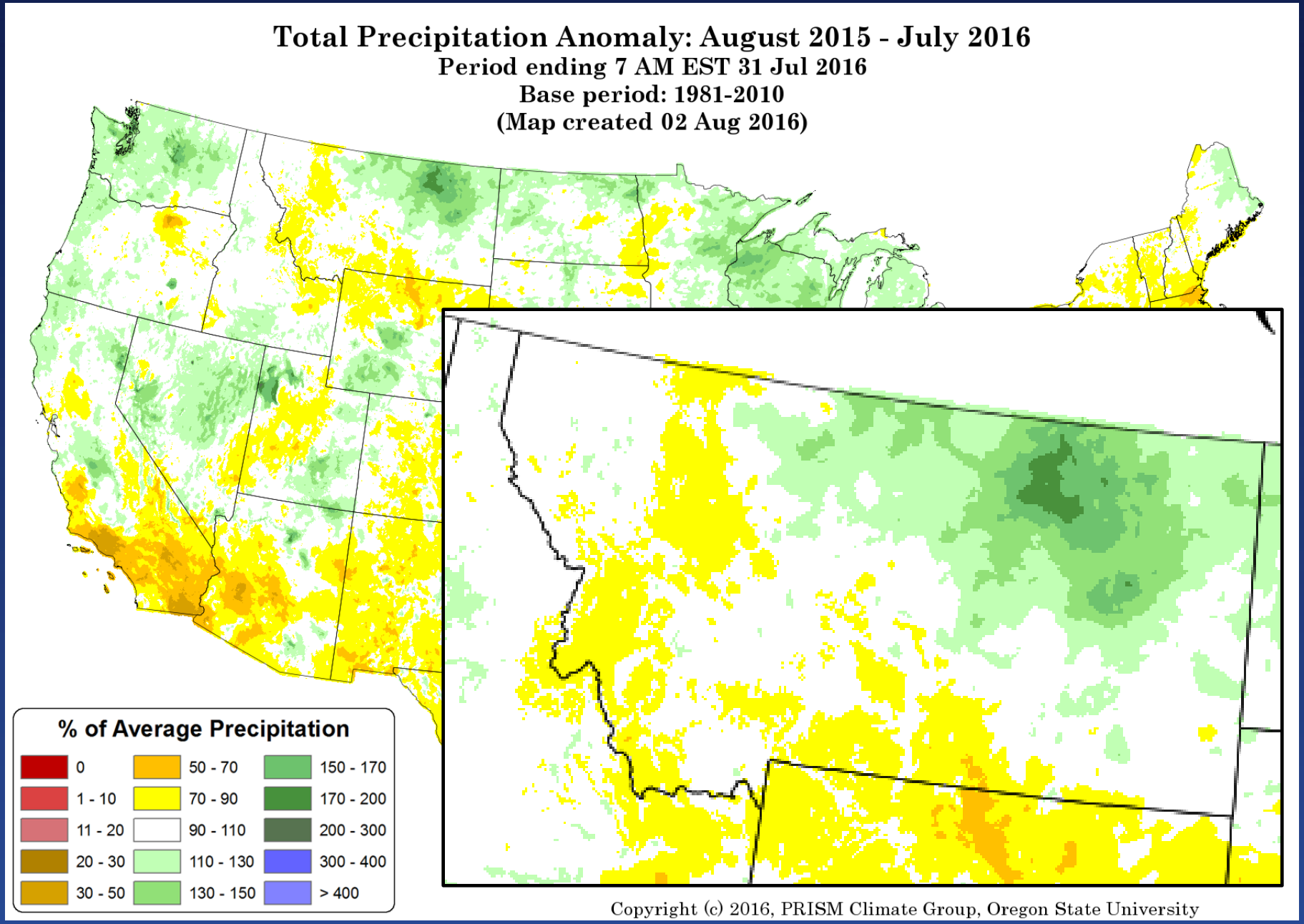


Montana Snow Survey

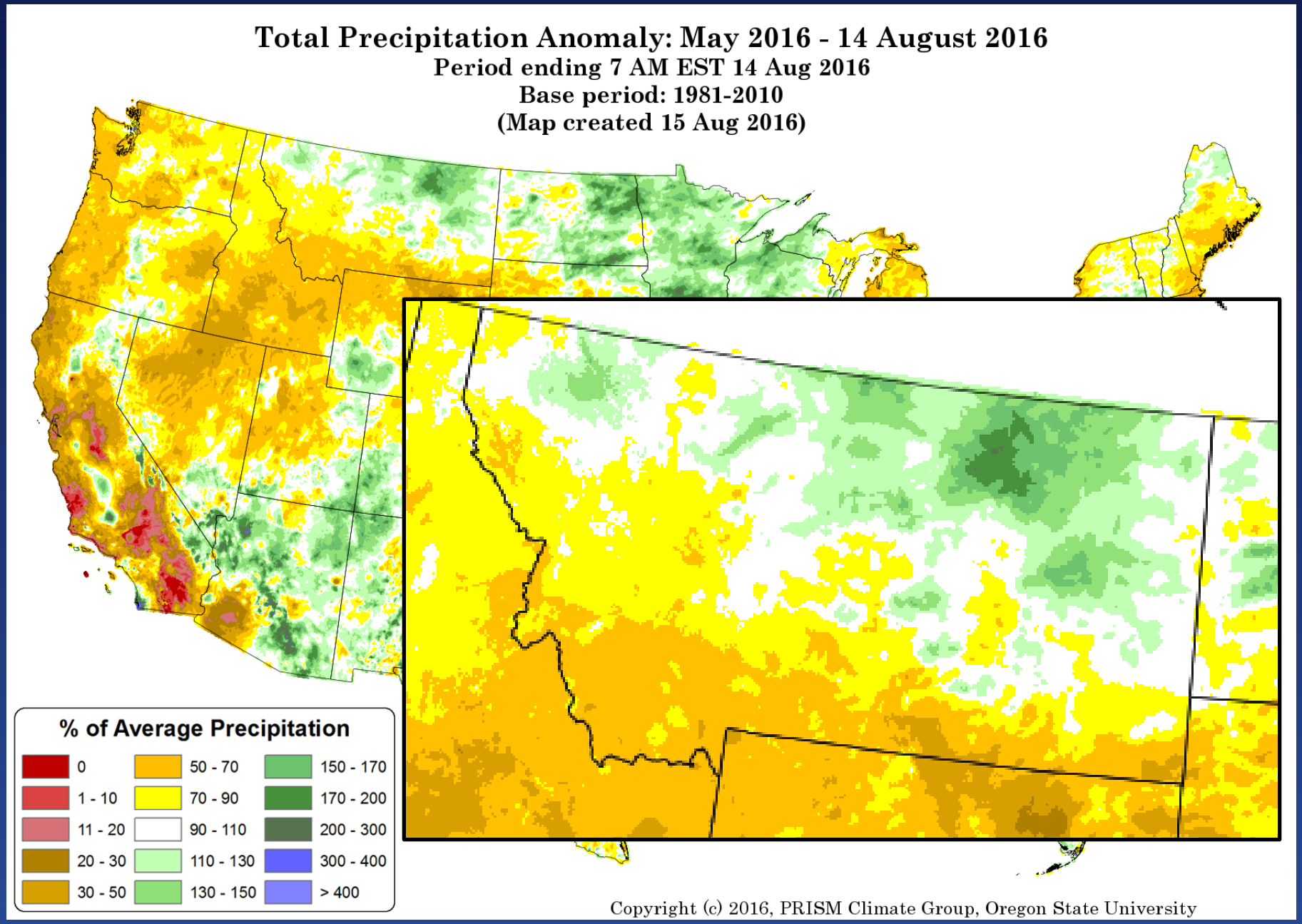


Montana Snow Survey

USDA NRCS

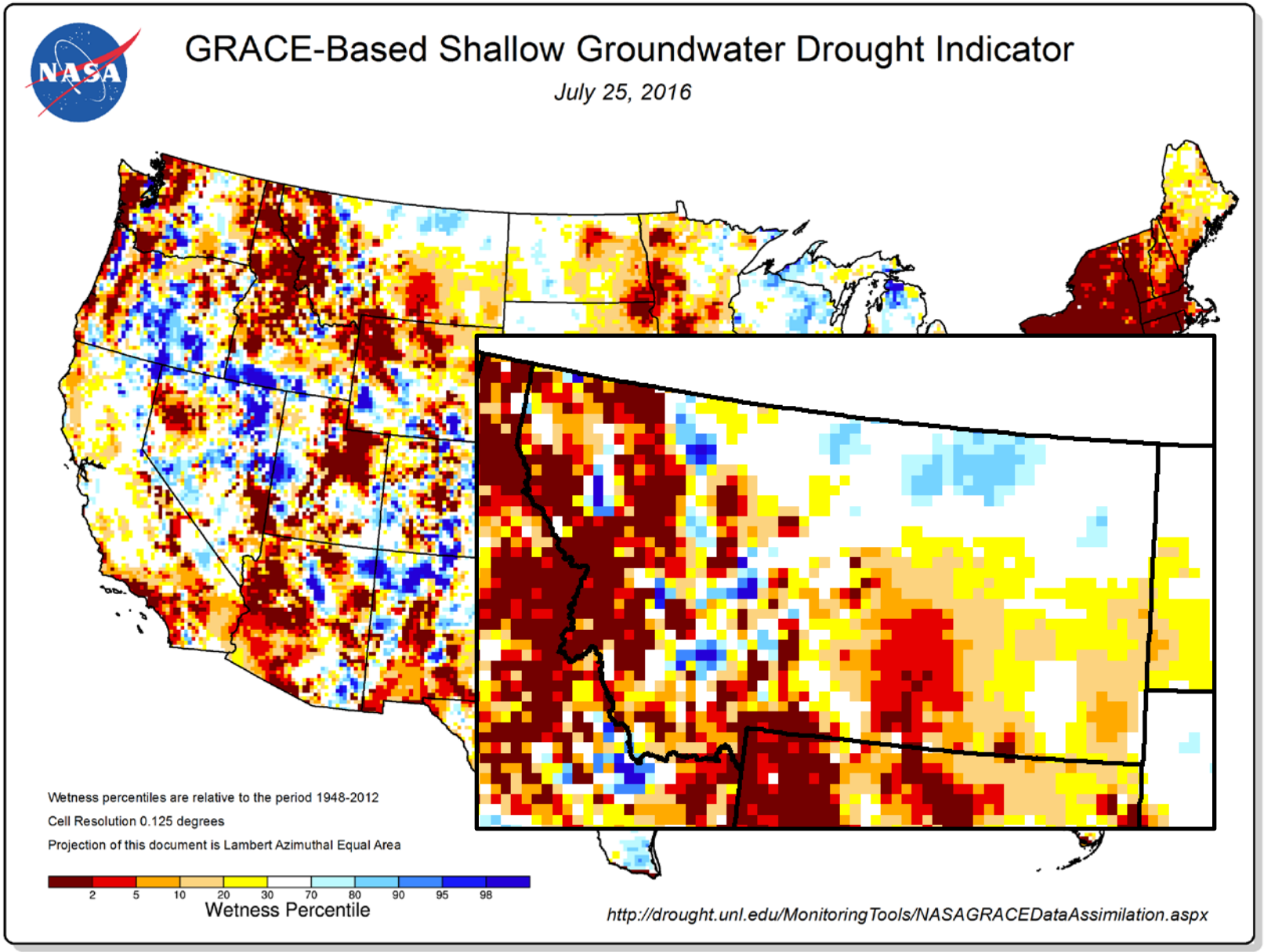


Montana Snow Survey



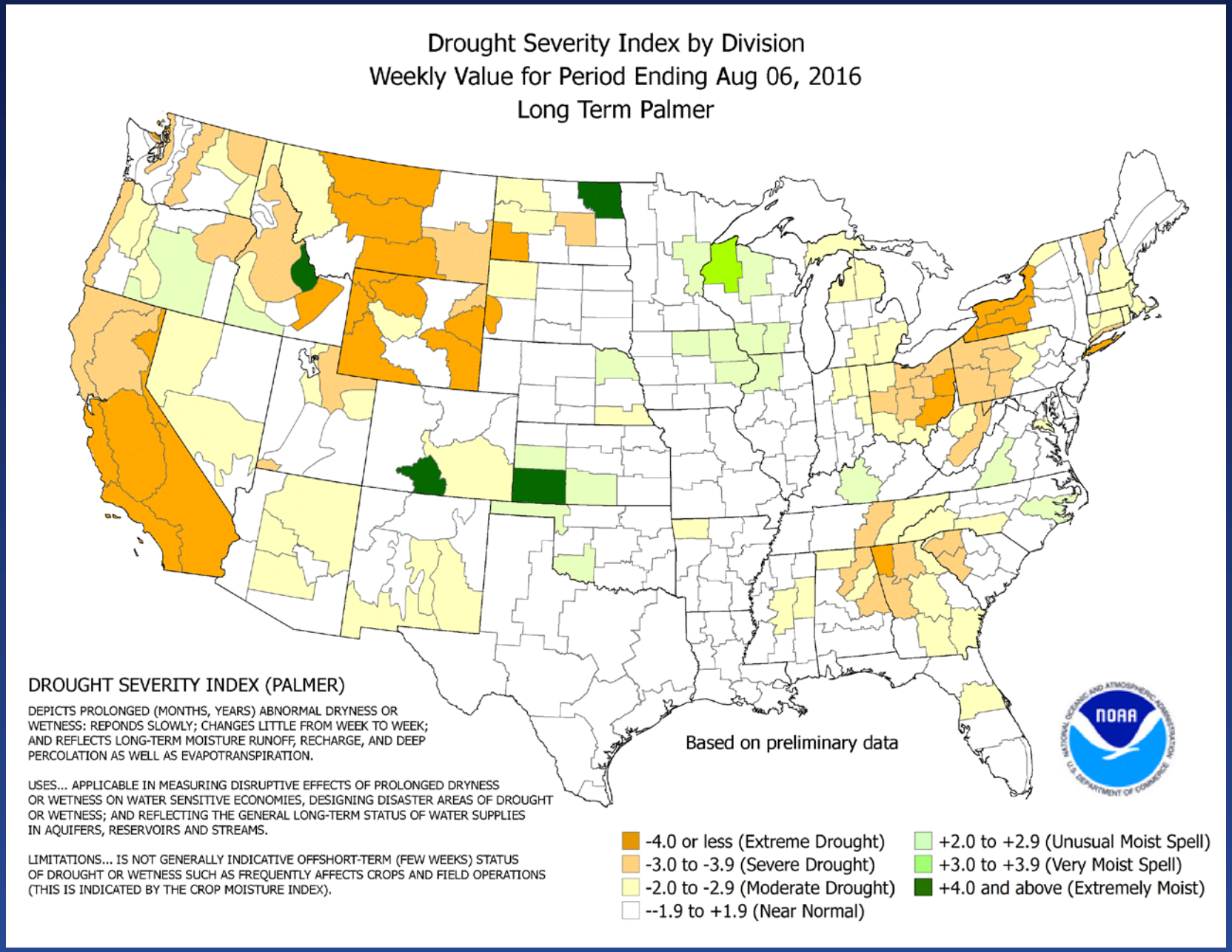
Soil Moisture

Montana Snow Survey

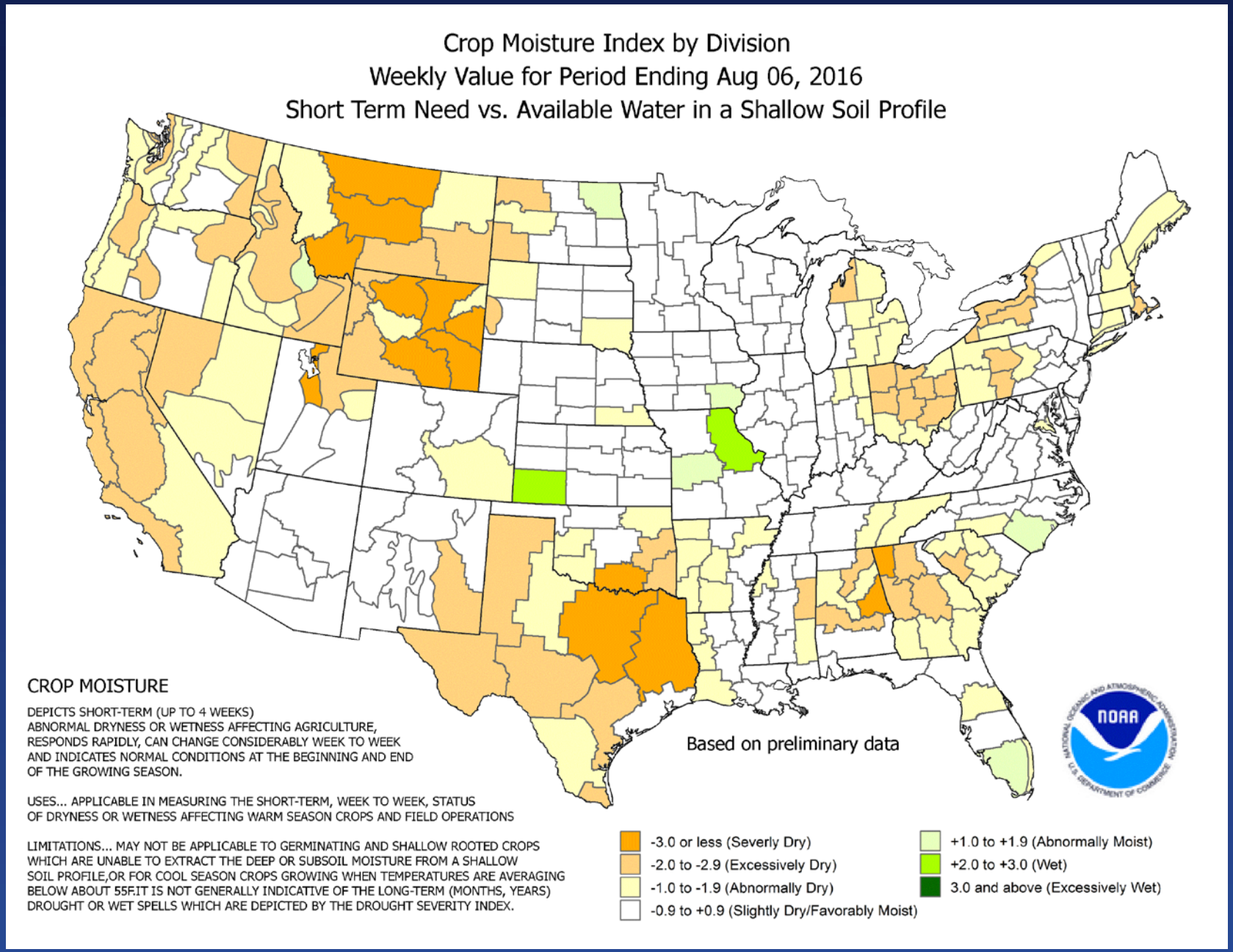


Surface Water Supply Index

Montana Snow Survey



Montana Snow Survey

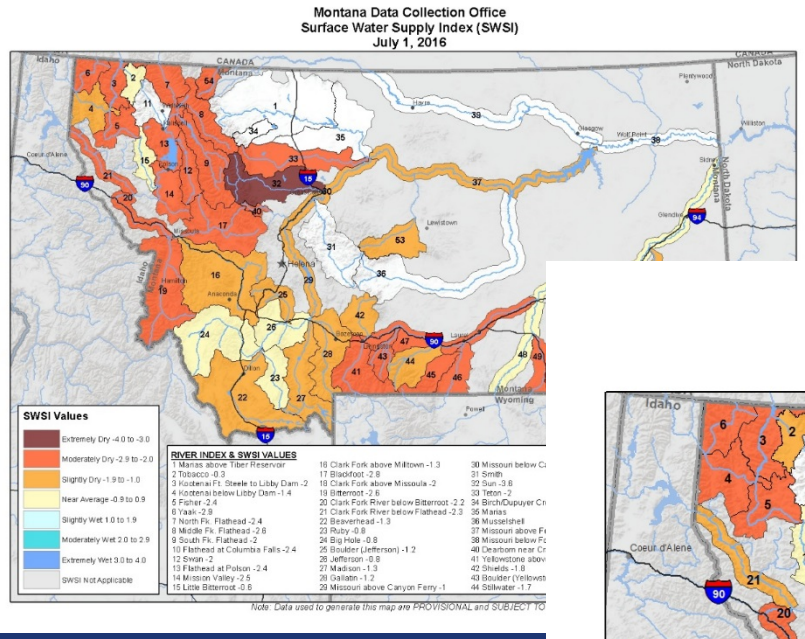


Montana Snow Survey

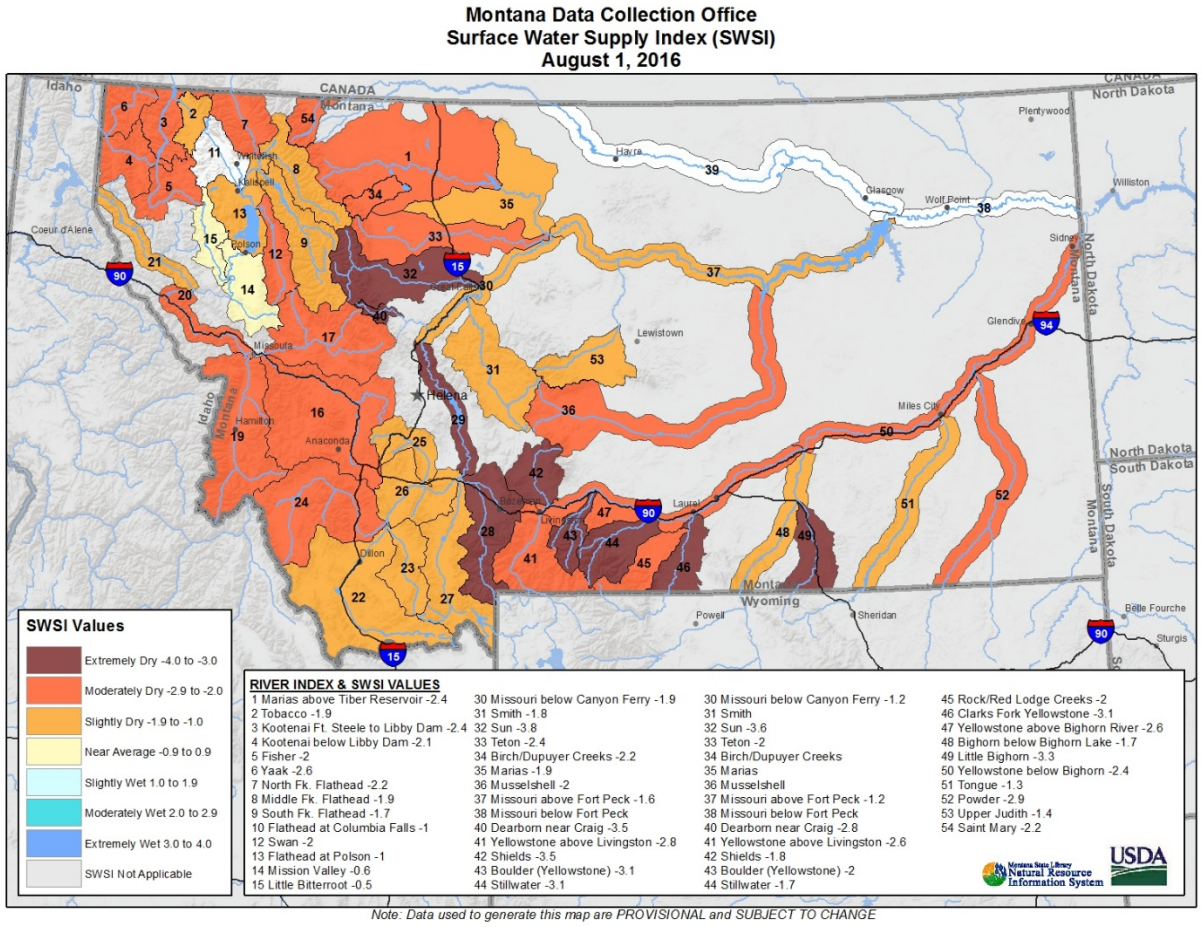
USDA NRCS

Surface Water Supply Index

Aug 2016



July 2016



Governor's Drought Advisory Committee
Precipitation and Soil Moisture Update
August 18th, 2016

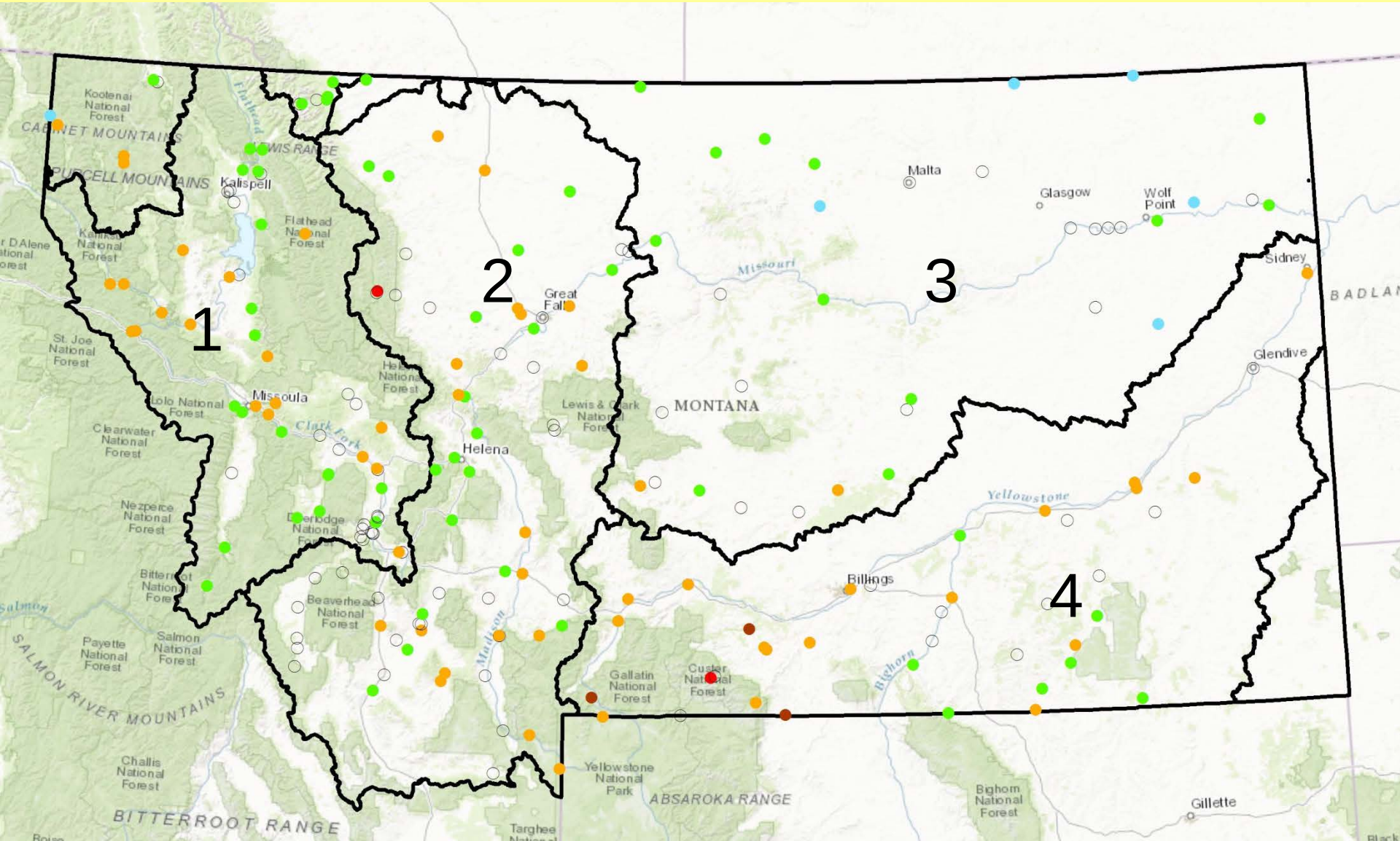
Lucas Zukiewicz
Water Supply Specialist (Snow Hydrologist)
USDA-NRCS
Montana Snow Surveys
Lucas.Zukiewicz@mt.usda.gov
406-587-6843

http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/

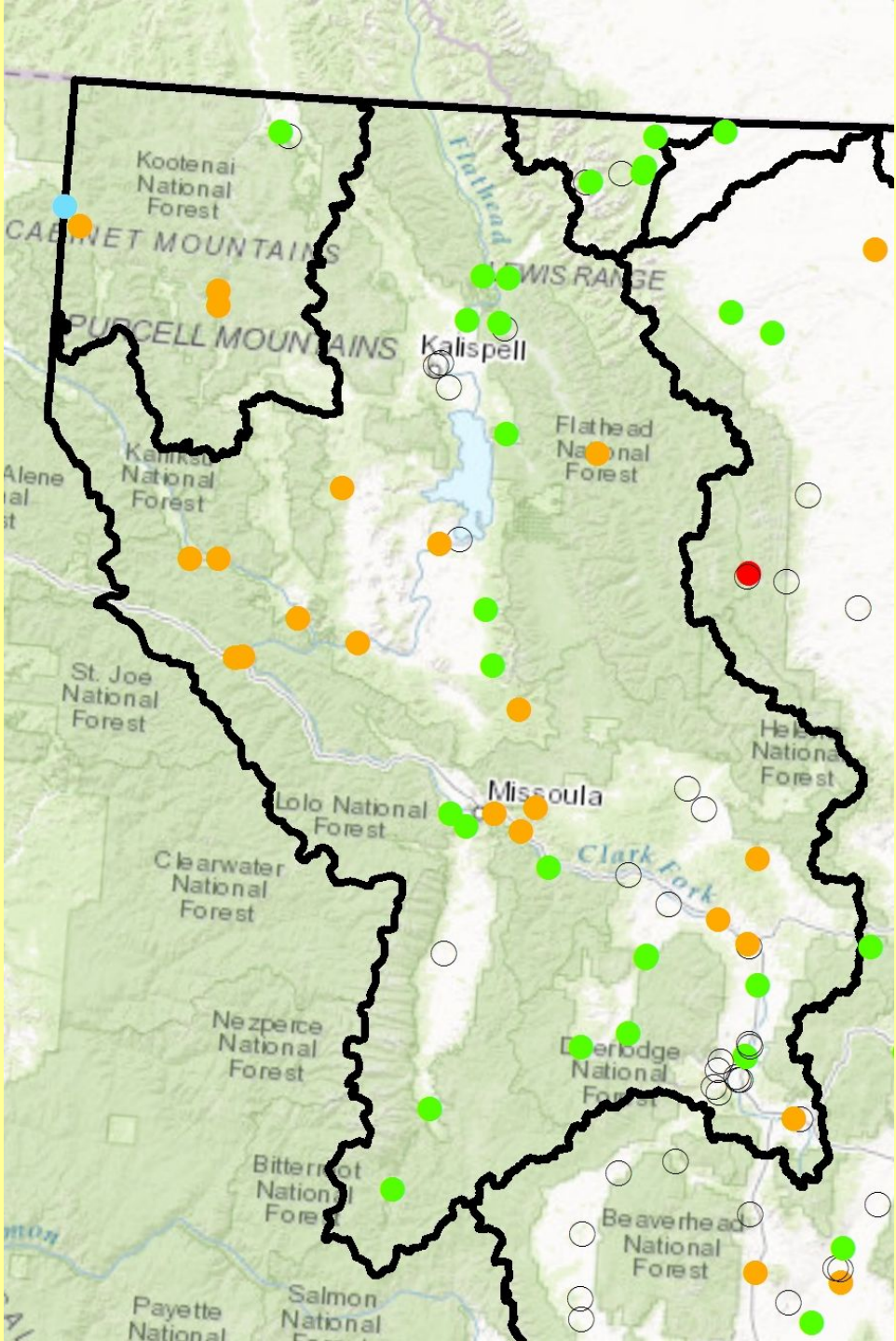
Matt Norberg, Montana DNRC, scouts a potential stream gage location on the Red Rocks River above Clark Canyon Reservoir. Chris Carparelli from the Beaverhead Conservation District joined.

USGS Streamflows August 16, 2016

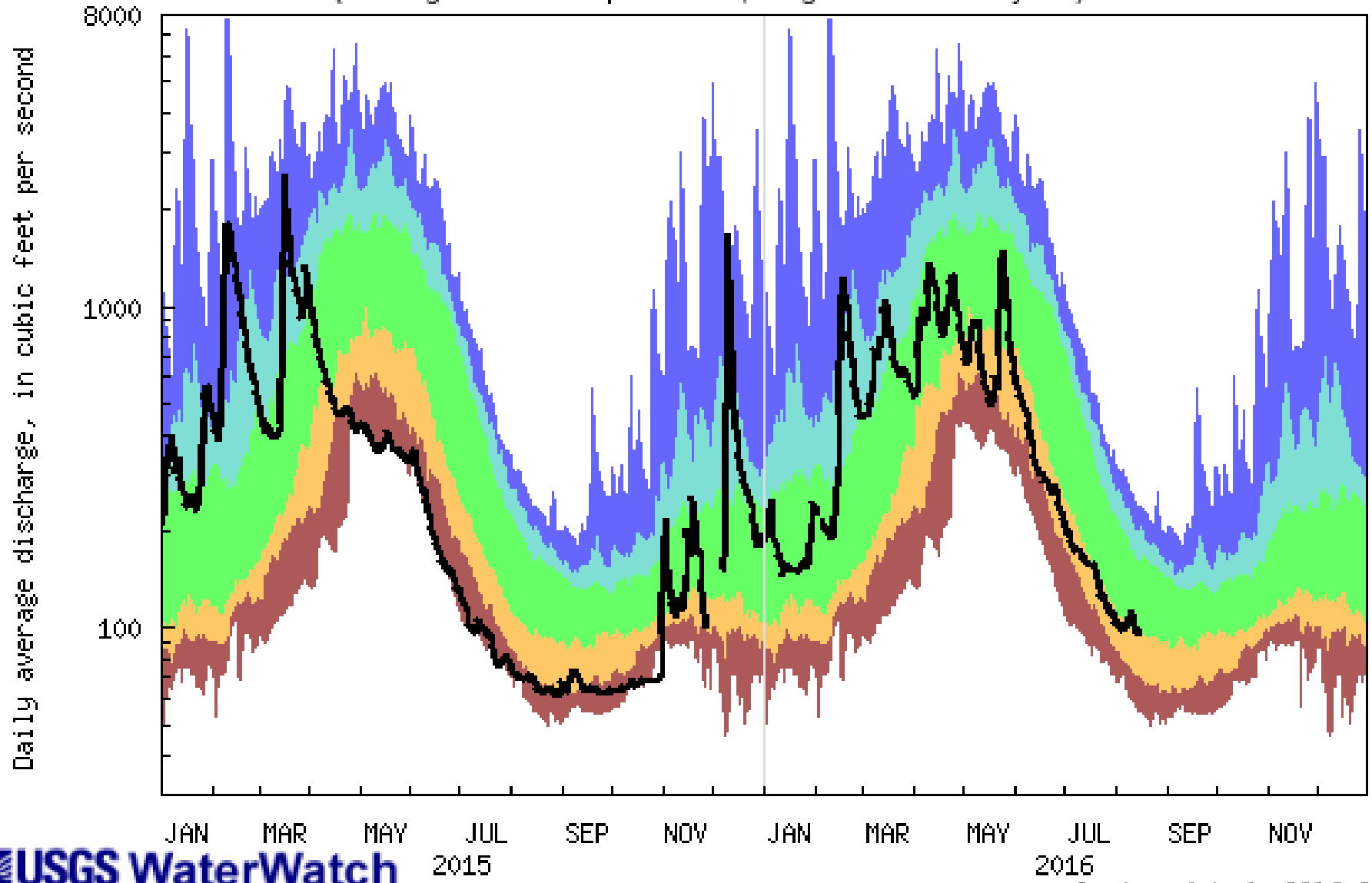
Major Drainage Basins



Kootenai – Clark Fork Basins



USGS 12302055 Fisher River near Libby MT
(Drainage Area: 842 square miles, Length of Record: 48 years)

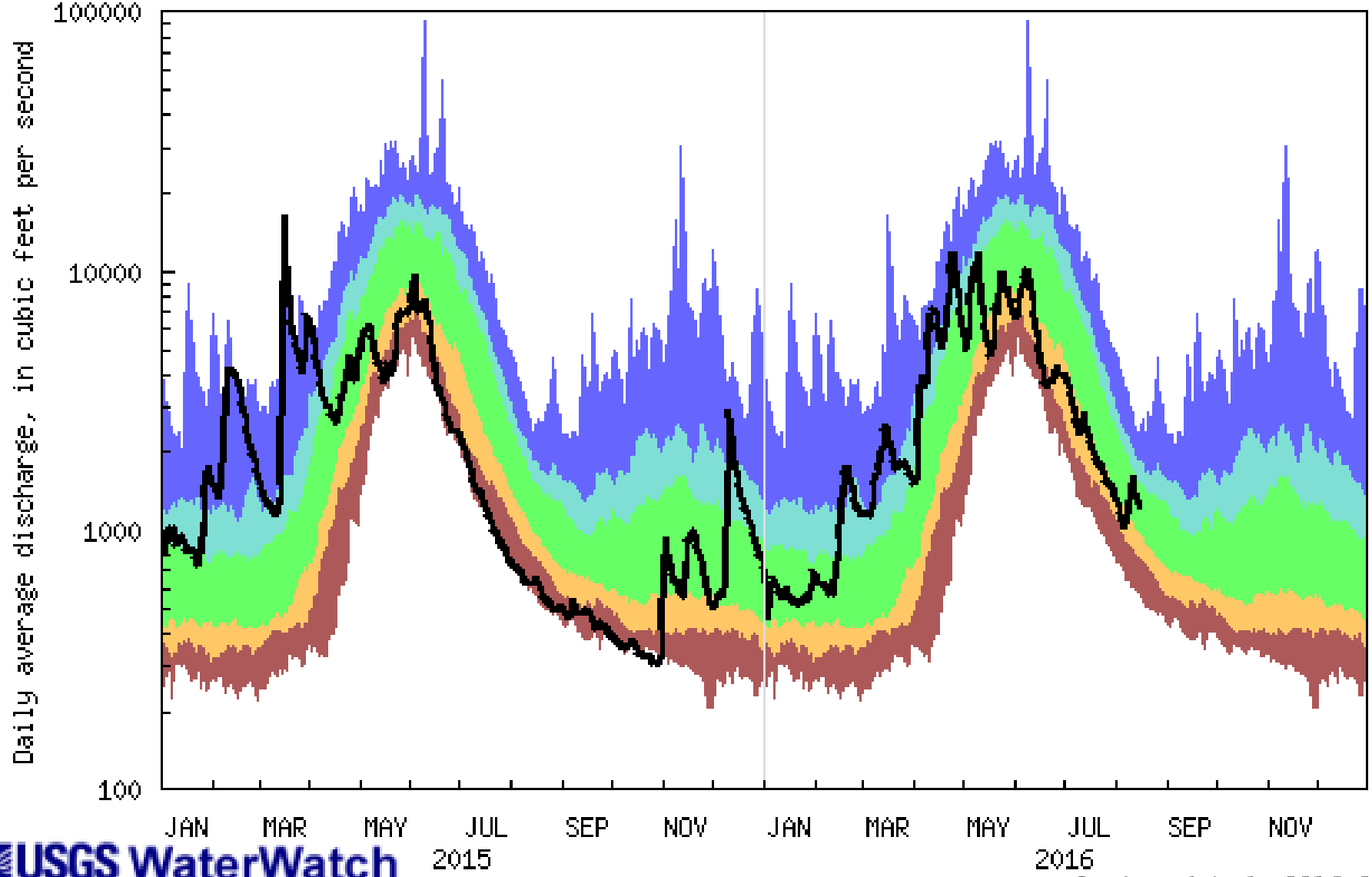


USGS WaterWatch

Last updated: 2016-08-16

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 12358500 M F Flathead River near West Glacier MT
(Drainage Area: 1125 square miles, Length of Record: 76 years)

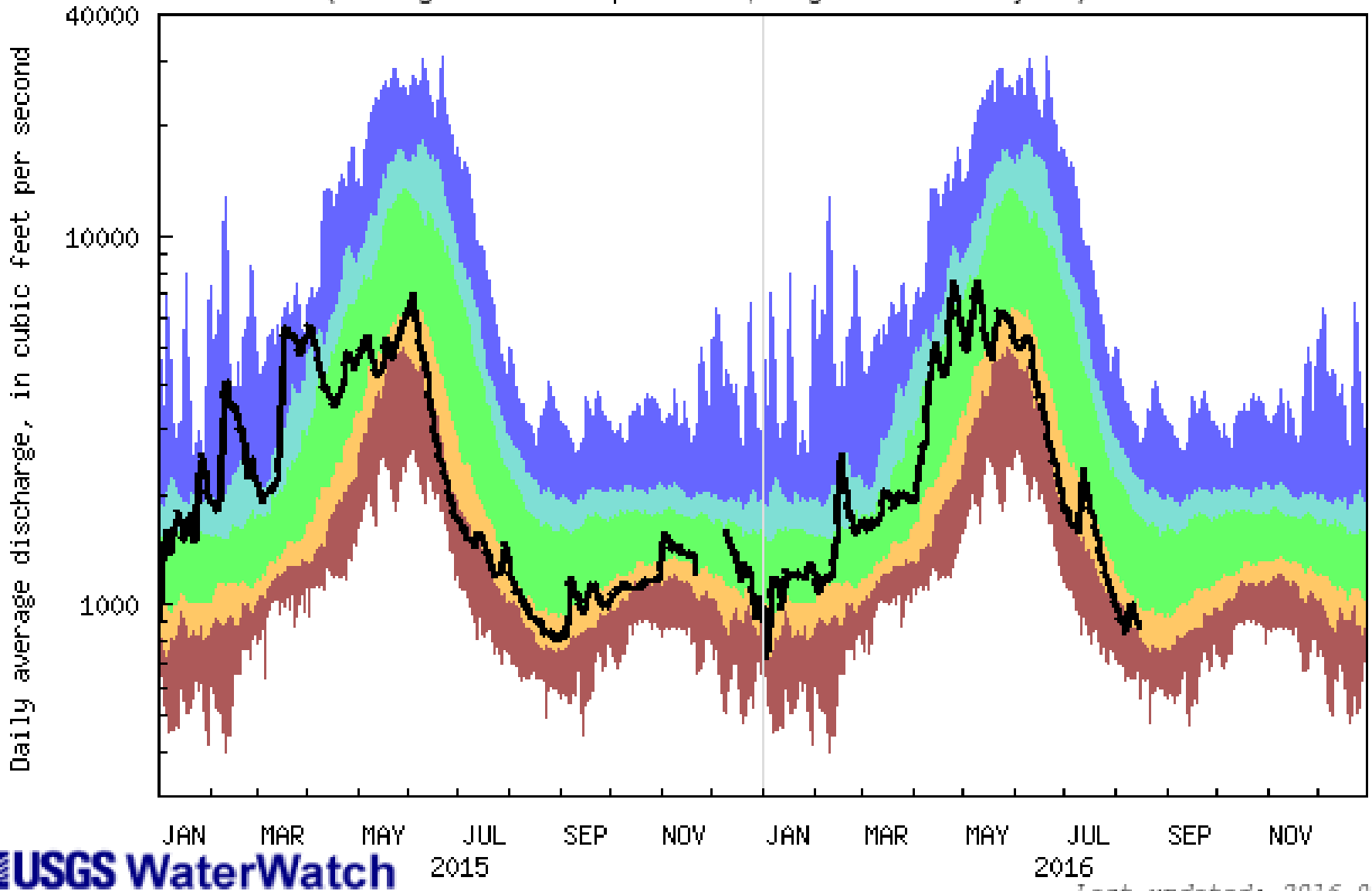


USGS WaterWatch

Last updated: 2016-08-16

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 12340500 Clark Fork above Missoula MT
(Drainage Area: 6021 square miles, Length of Record: 86 years)

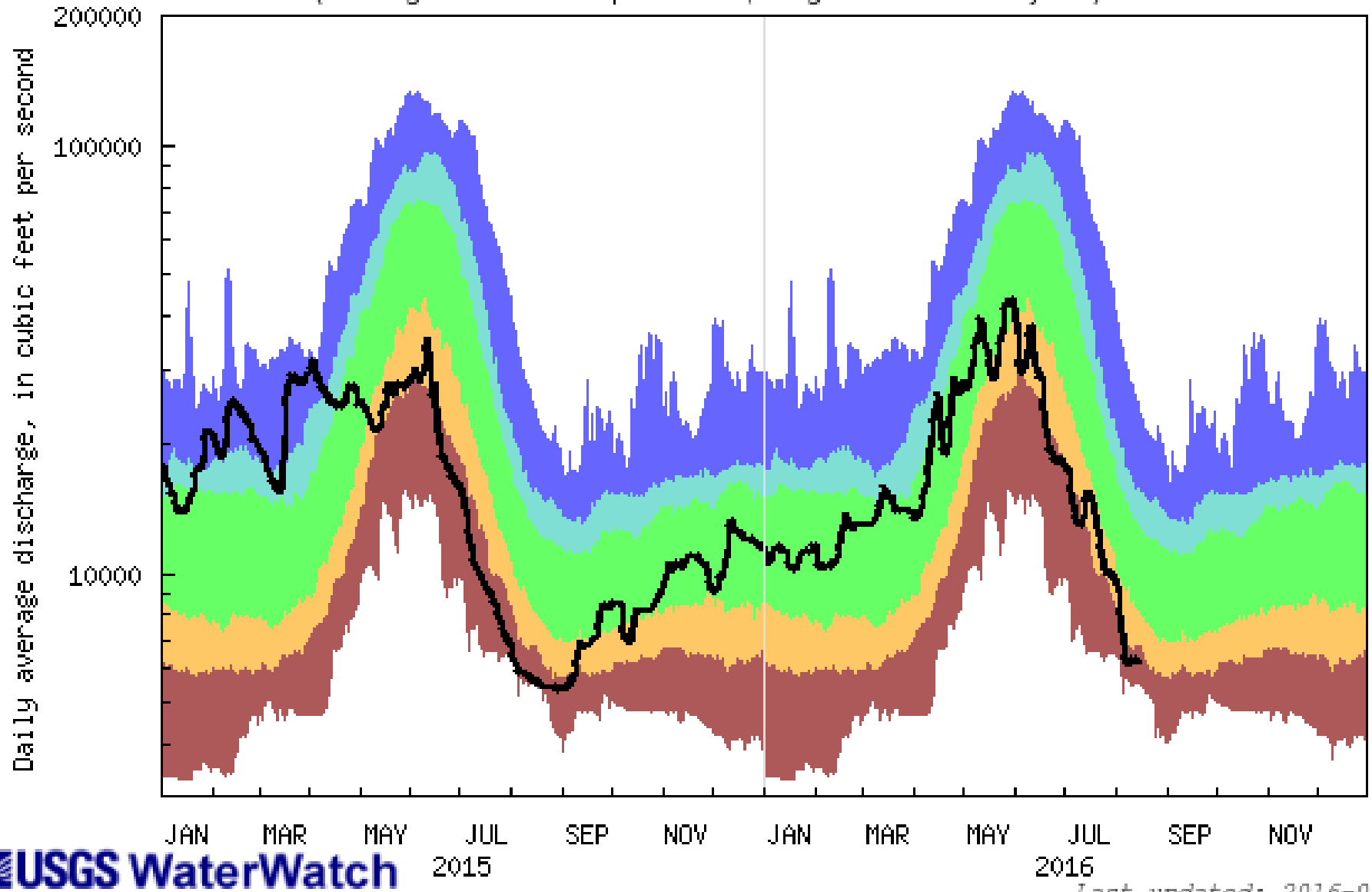


USGS WaterWatch

Last updated: 2016-08-16

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 12389000 Clark Fork near Plains MT
(Drainage Area: 19964 square miles, Length of Record: 105 years)

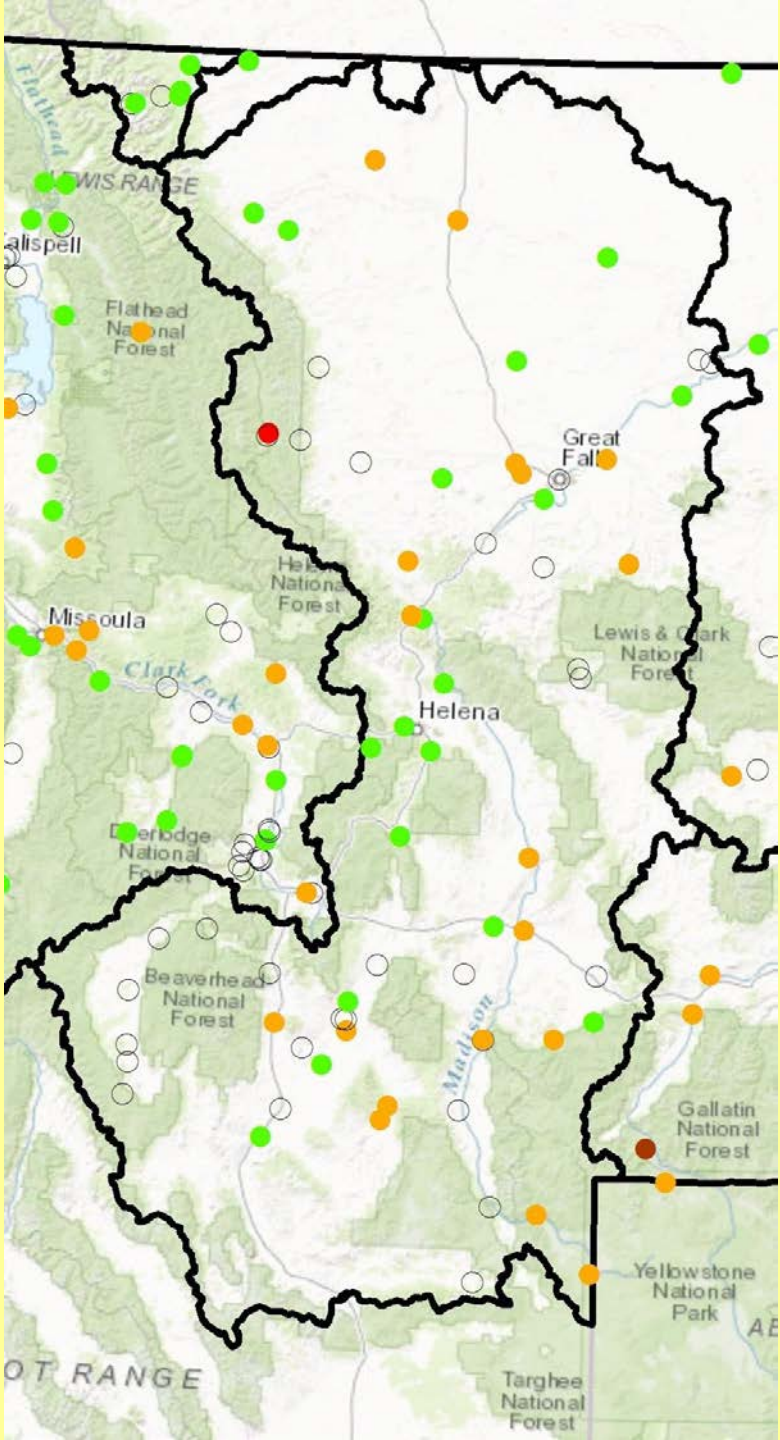


USGS WaterWatch

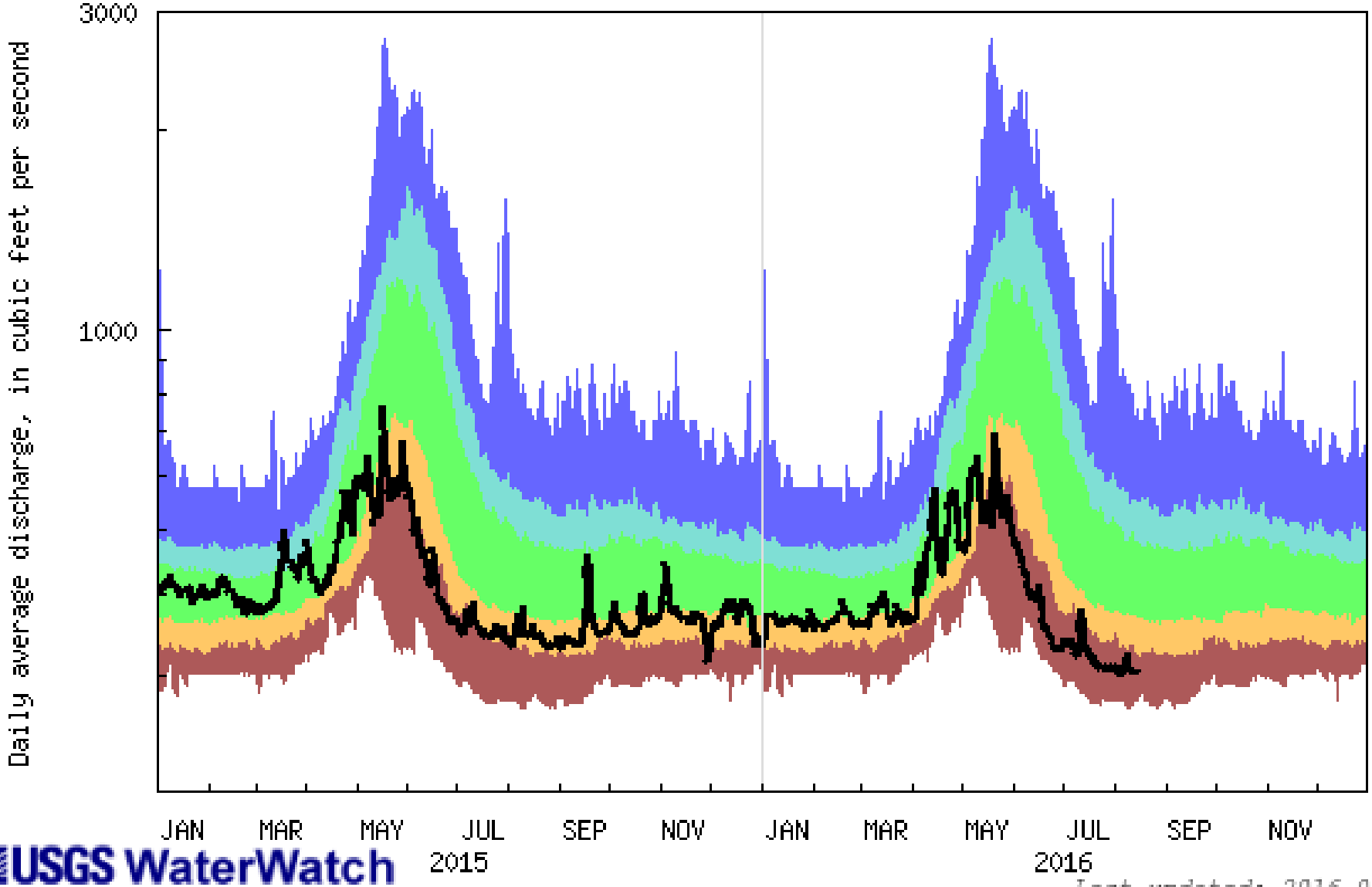
Last updated: 2016-08-16

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	

Upper
Missouri
River
Basin



USGS 06037500 Madison River near West Yellowstone, MT
(Drainage Area: 435 square miles, Length of Record: 102 years)

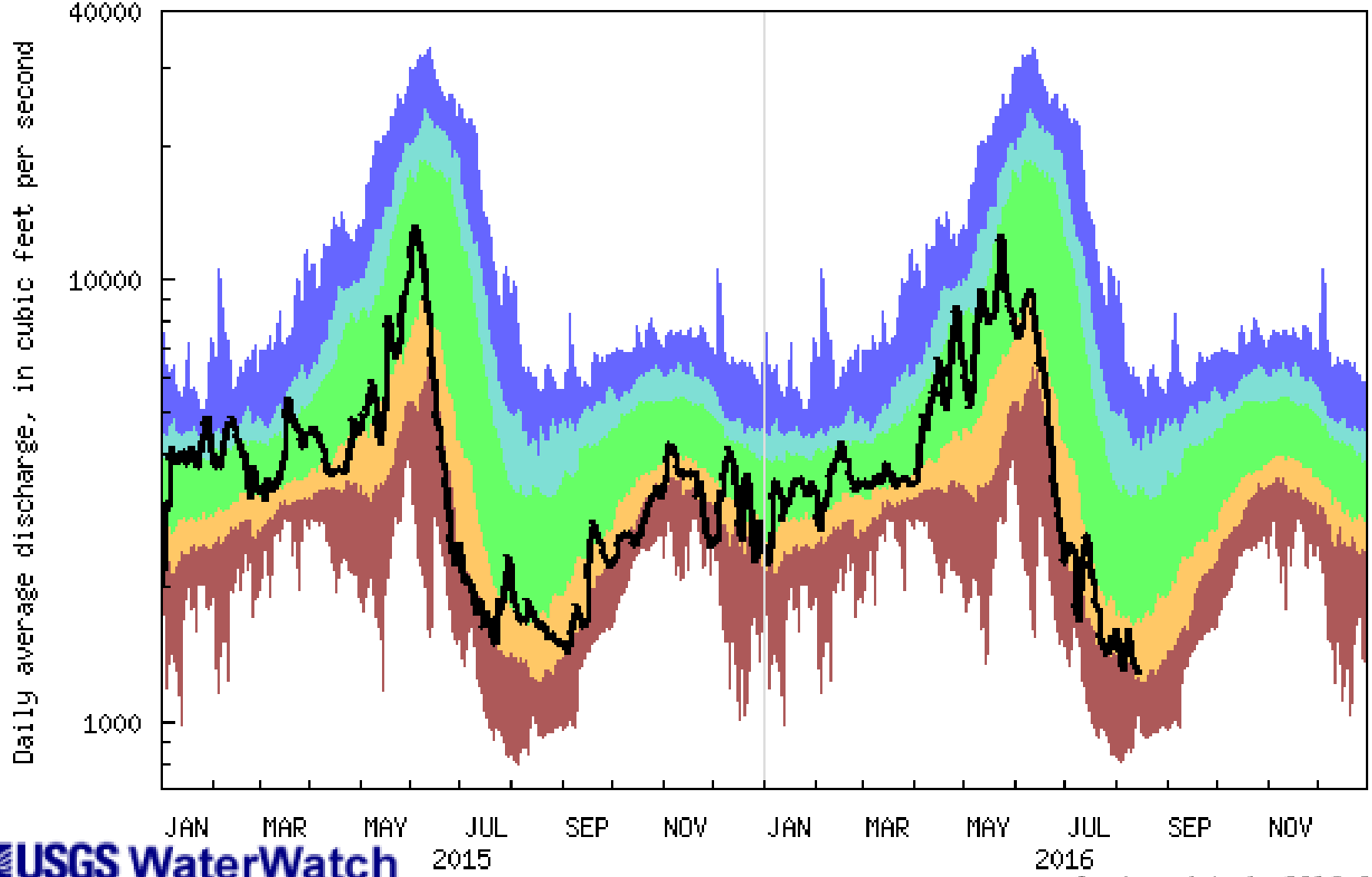


USGS WaterWatch

Last updated: 2016-08-16

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 06054500 Missouri River at Toston MT
(Drainage Area: 14641 square miles, Length of Record: 126 years)

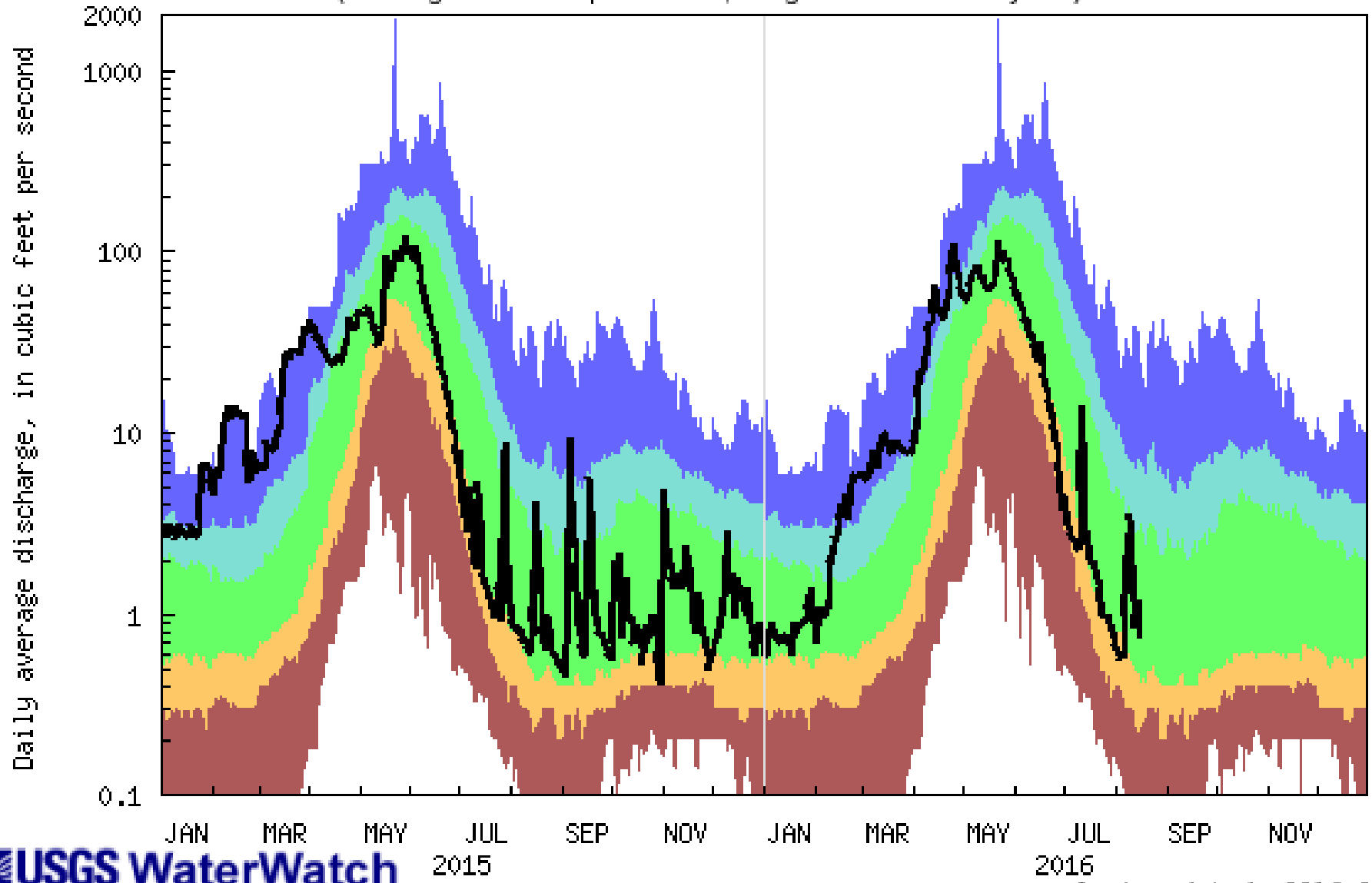


USGS WaterWatch

Last updated: 2016-08-16

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 06062500 Tenmile Creek near Rimini MT
(Drainage Area: 33 square miles, Length of Record: 101 years)

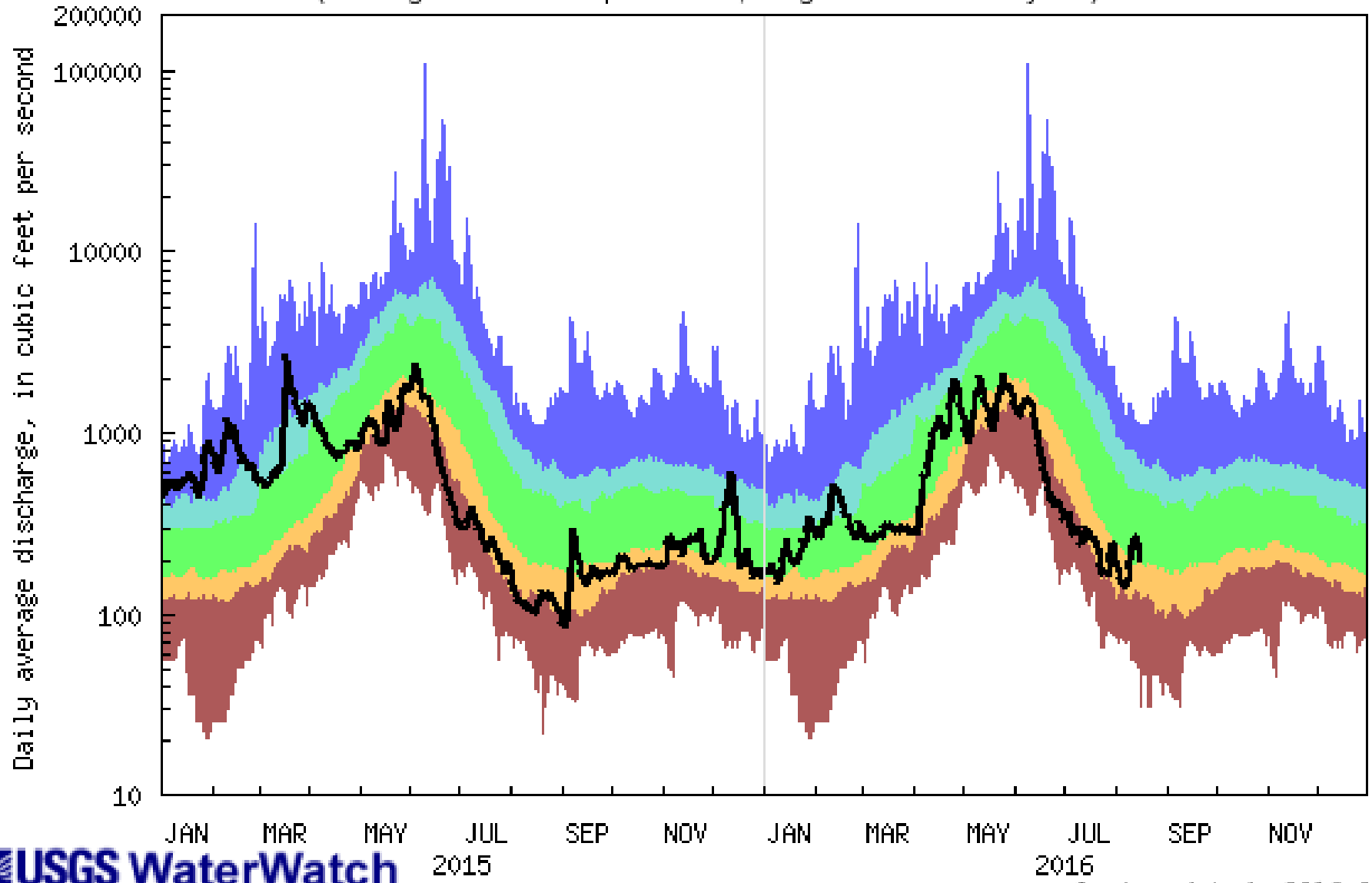


USGS WaterWatch

Last updated: 2016-08-16

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: 114 years)

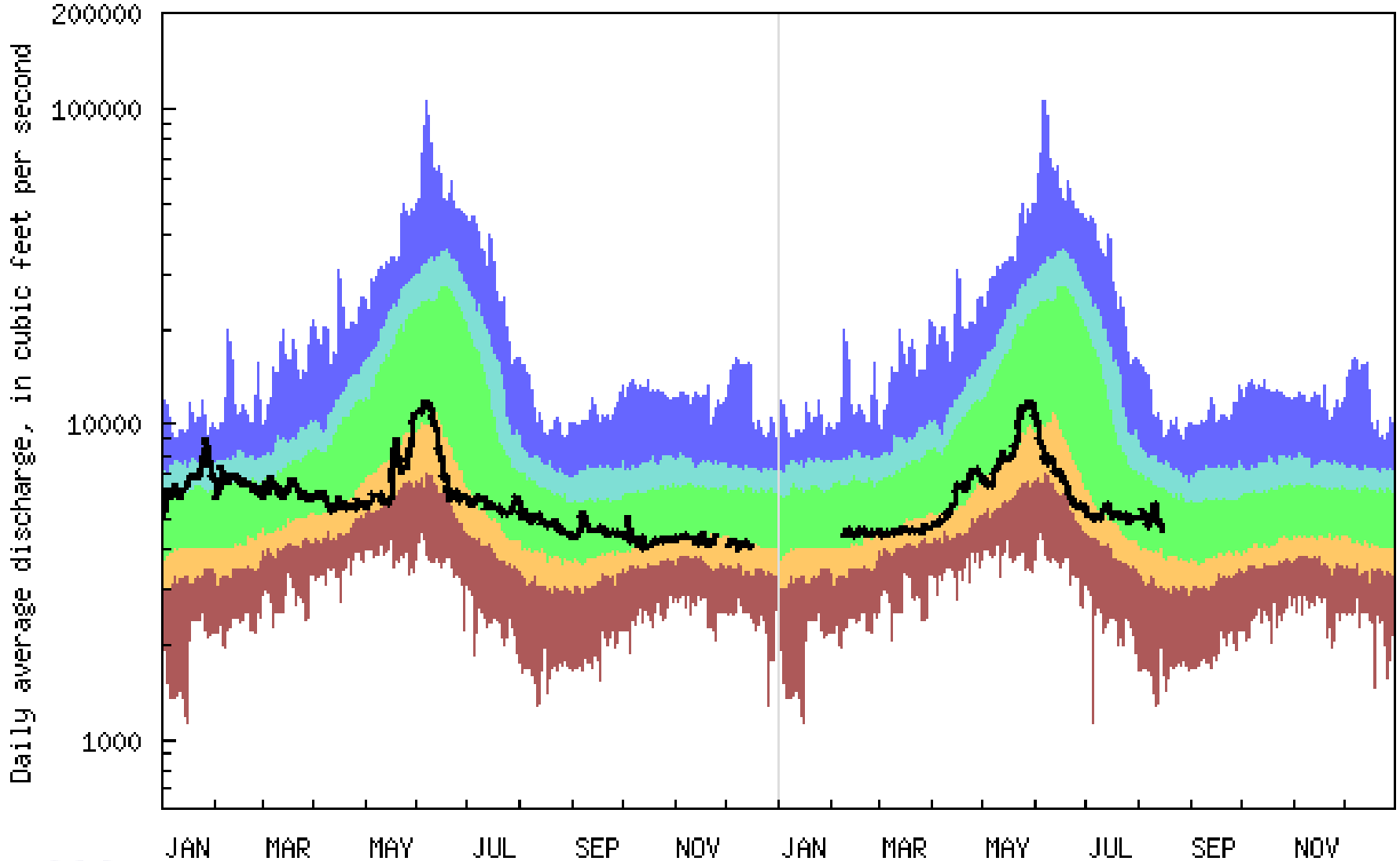


USGS WaterWatch

Last updated: 2016-08-16

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: 125 years)

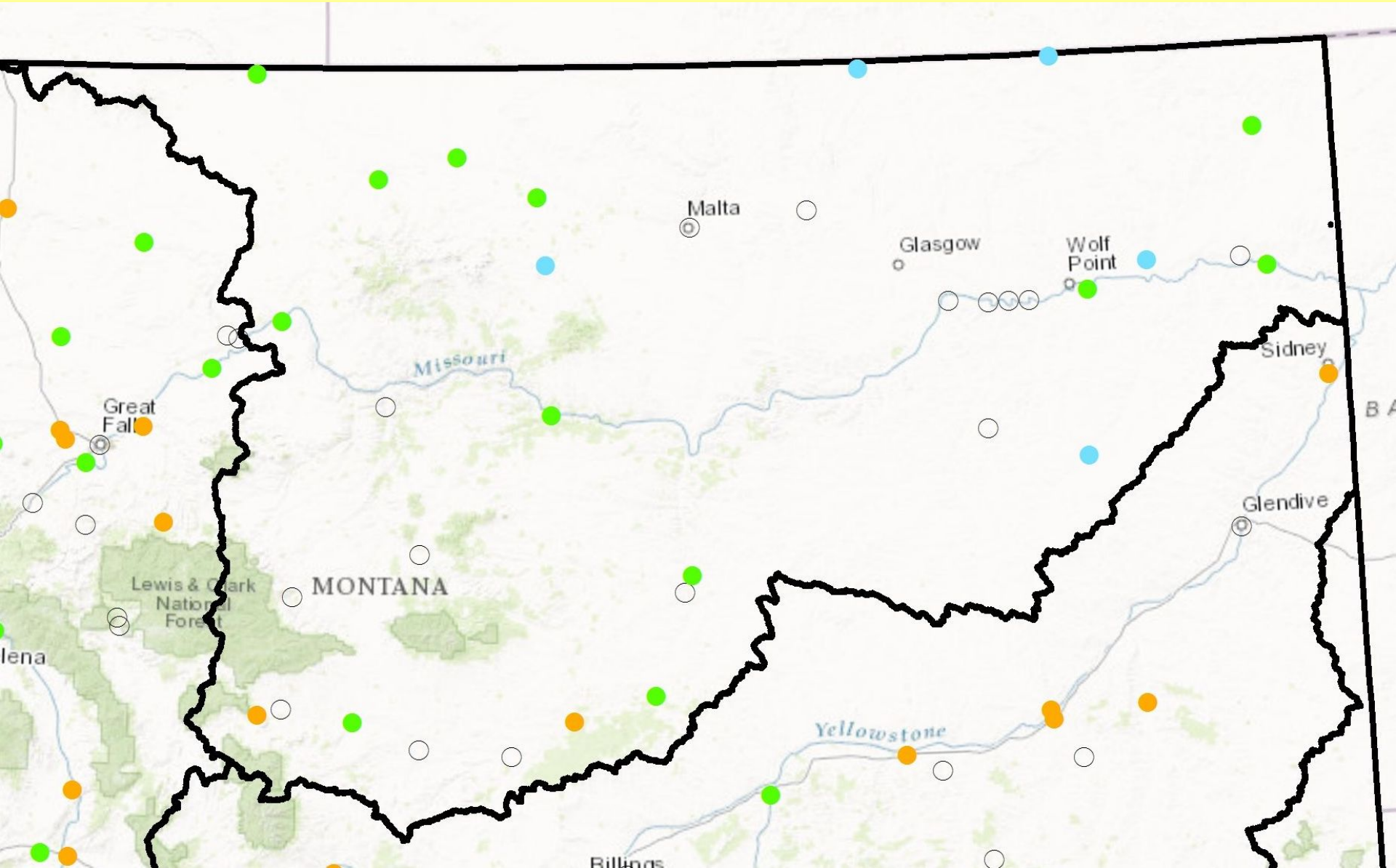


USGS WaterWatch

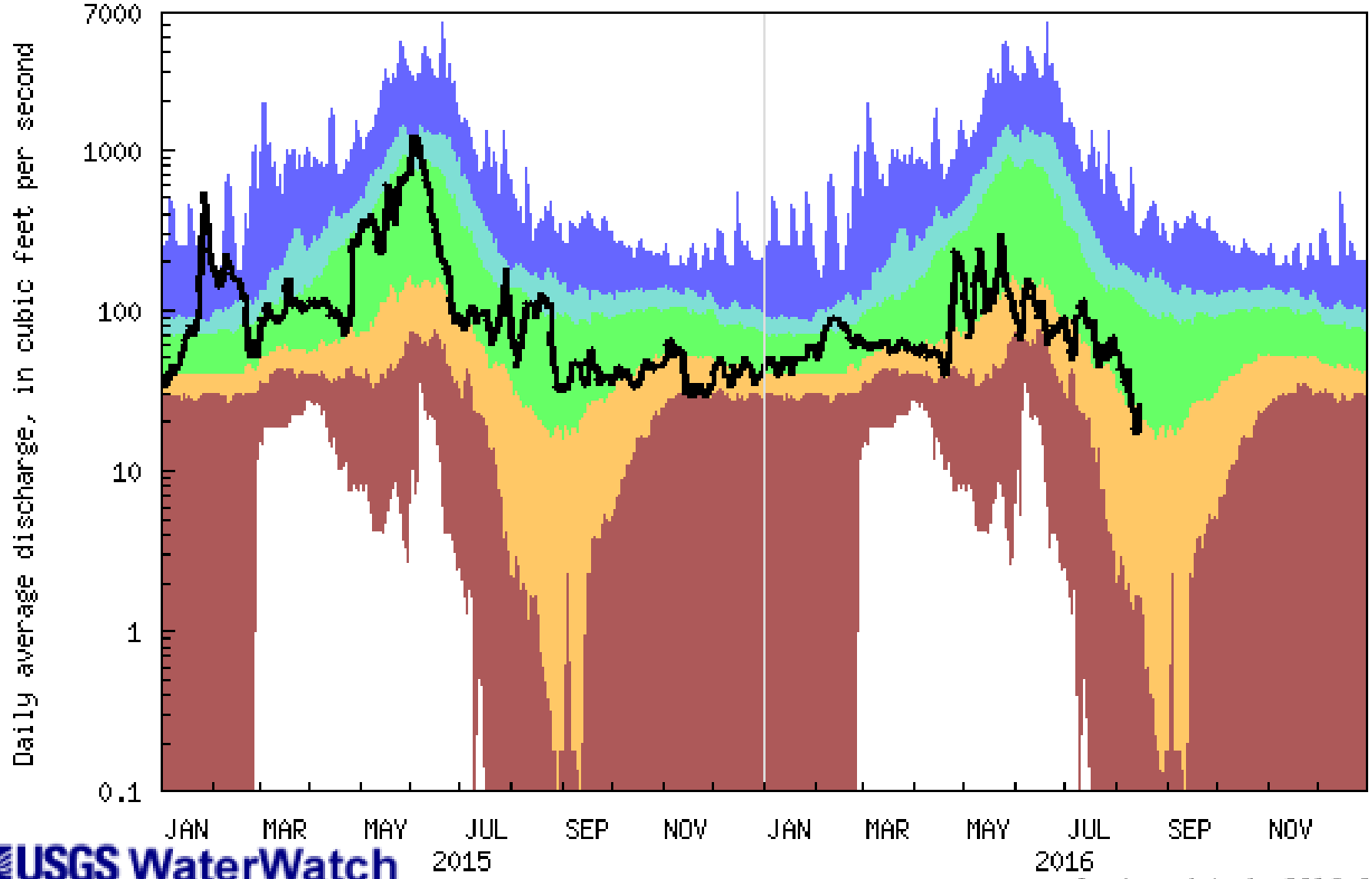
Last updated: 2016-08-16

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	

Lower Missouri River Basin



USGS 06120500 Musselshell River at Harlowton MT
(Drainage Area: 1108 square miles, Length of Record: 108 years)

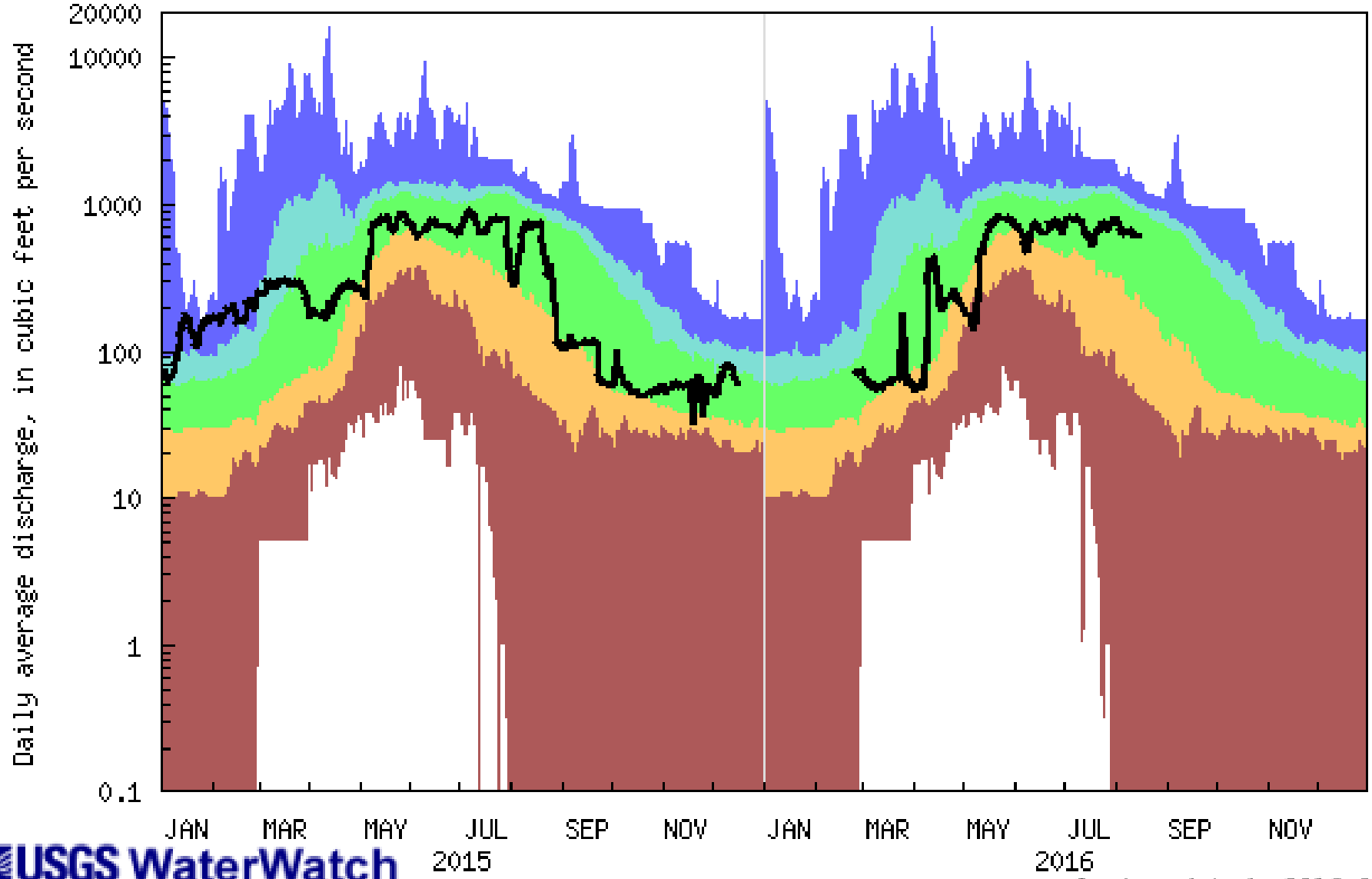


USGS WaterWatch

Last updated: 2016-08-16

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 06140500 Milk River at Havre MT
(Drainage Area: 5655 square miles, Length of Record: 117 years)

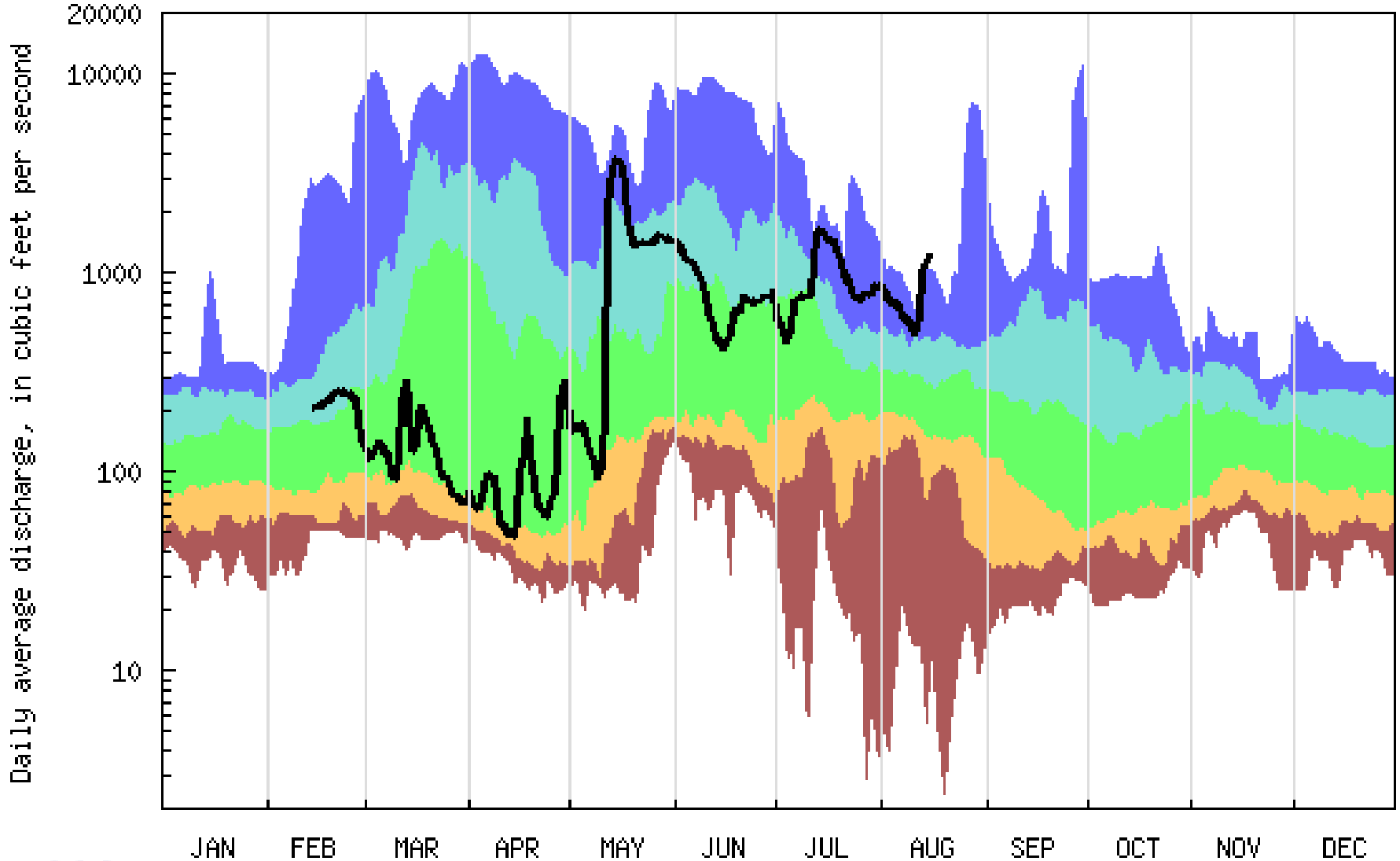


USGS WaterWatch

Last updated: 2016-08-16

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 06164510 Milk River at Juneberg Bridge nr Saco MT
(Drainage Area: 17691 square miles, Length of Record: 38 years)

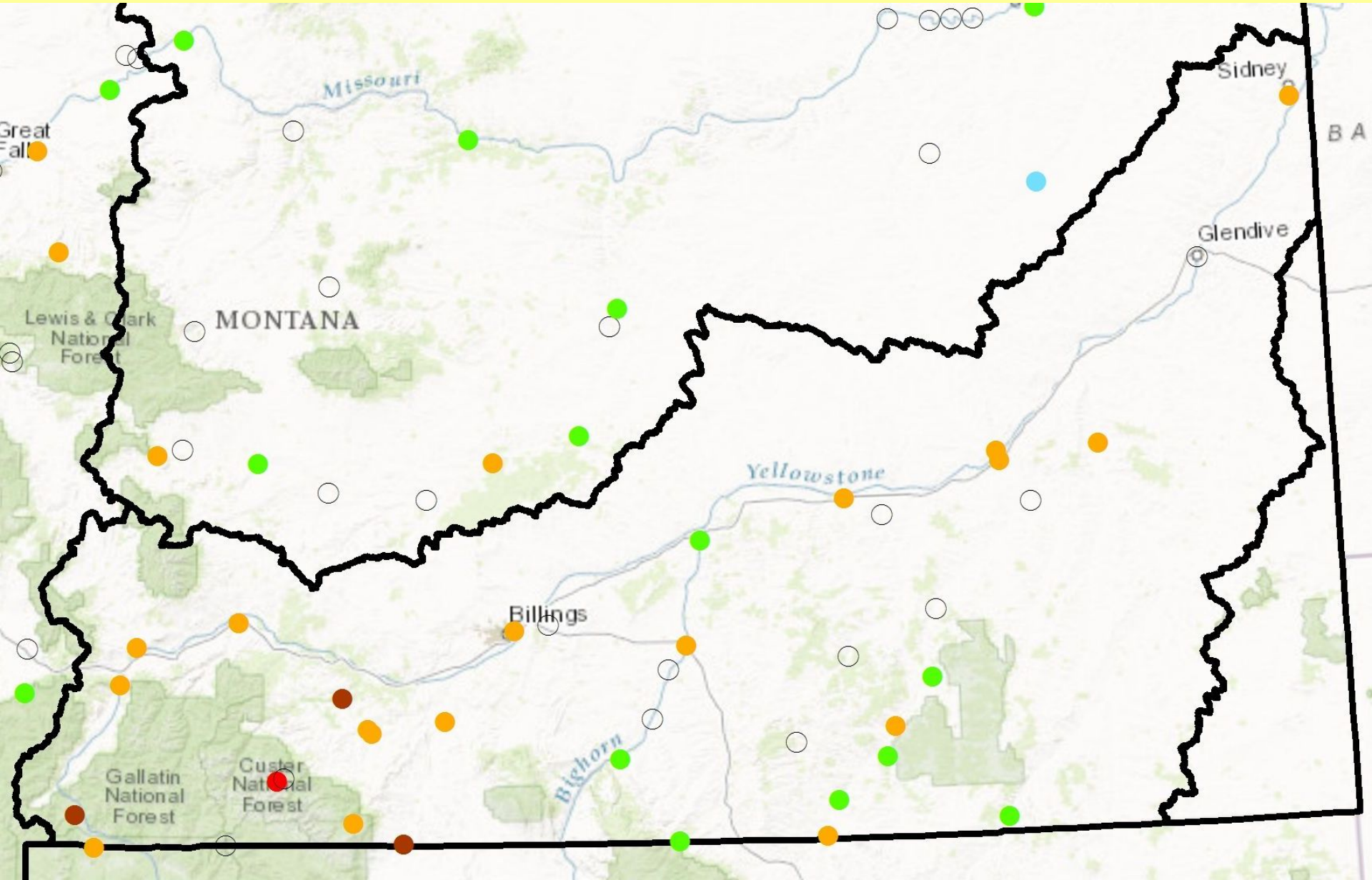


USGS WaterWatch

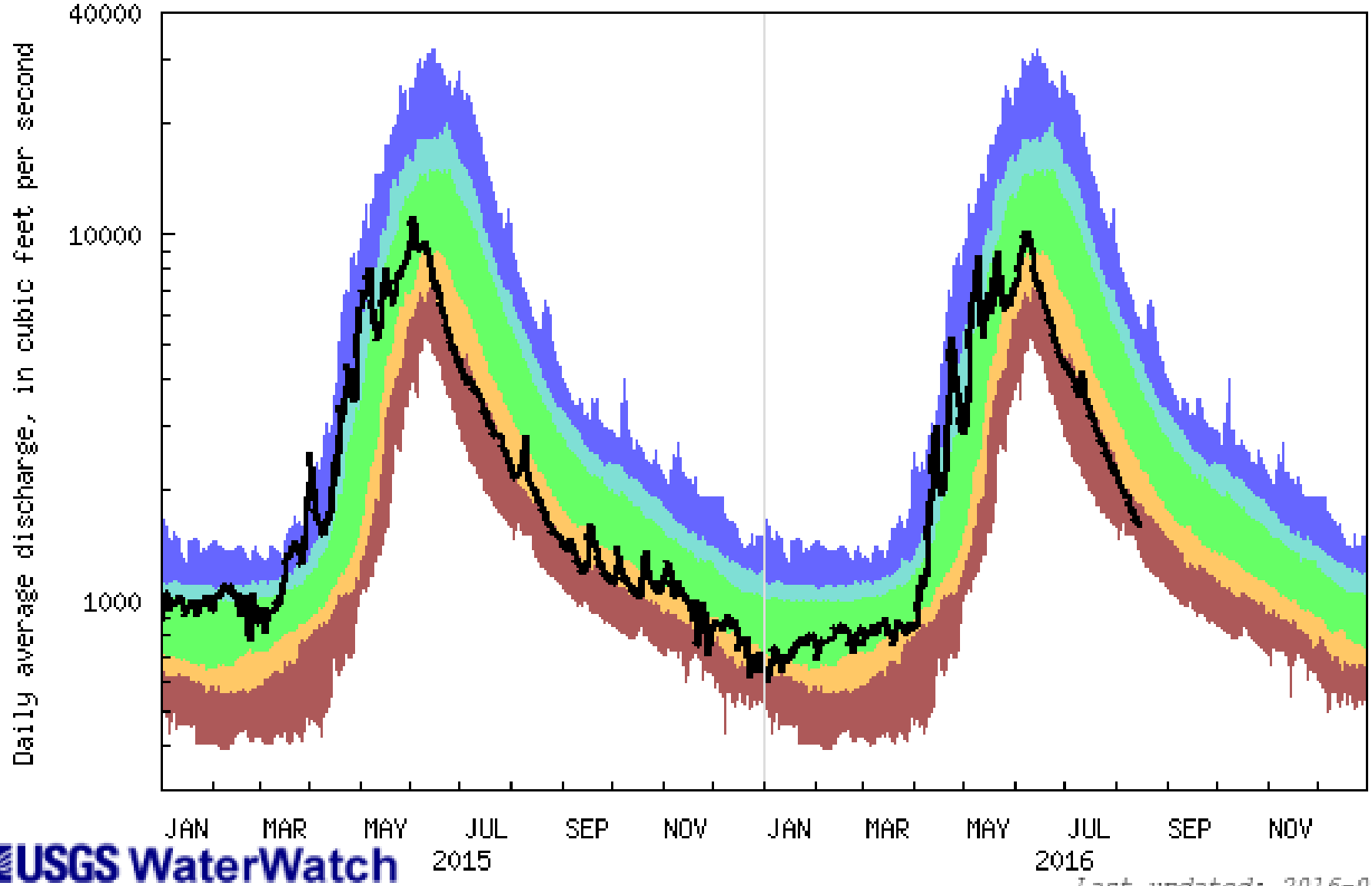
Last updated: 2016-08-16

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	

Yellowstone River Basin



USGS 06191500 Yellowstone River at Corwin Springs MT
(Drainage Area: 2616 square miles, Length of Record: 126 years)

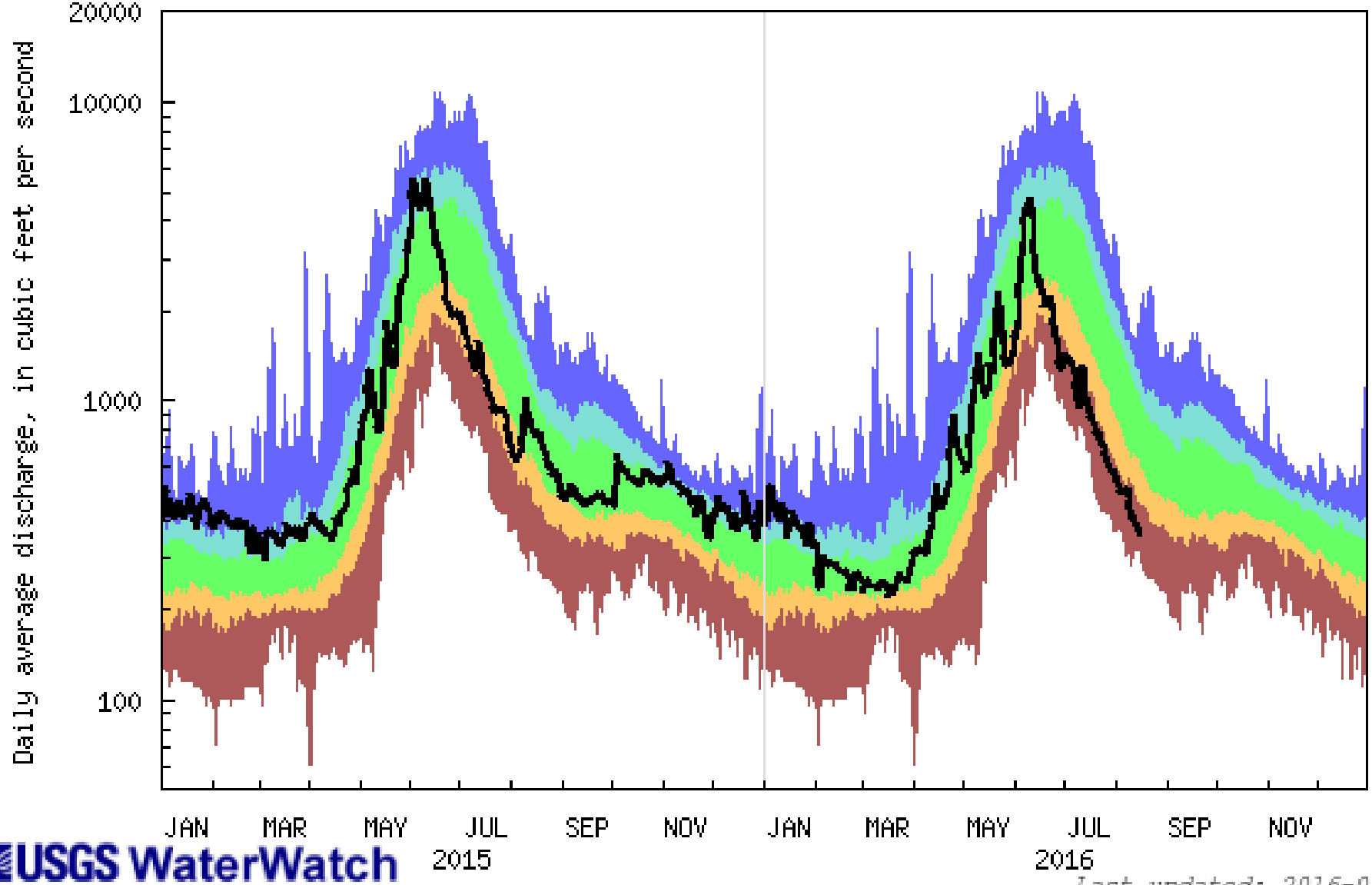


USGS WaterWatch

Last updated: 2016-08-16

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: 80 years)

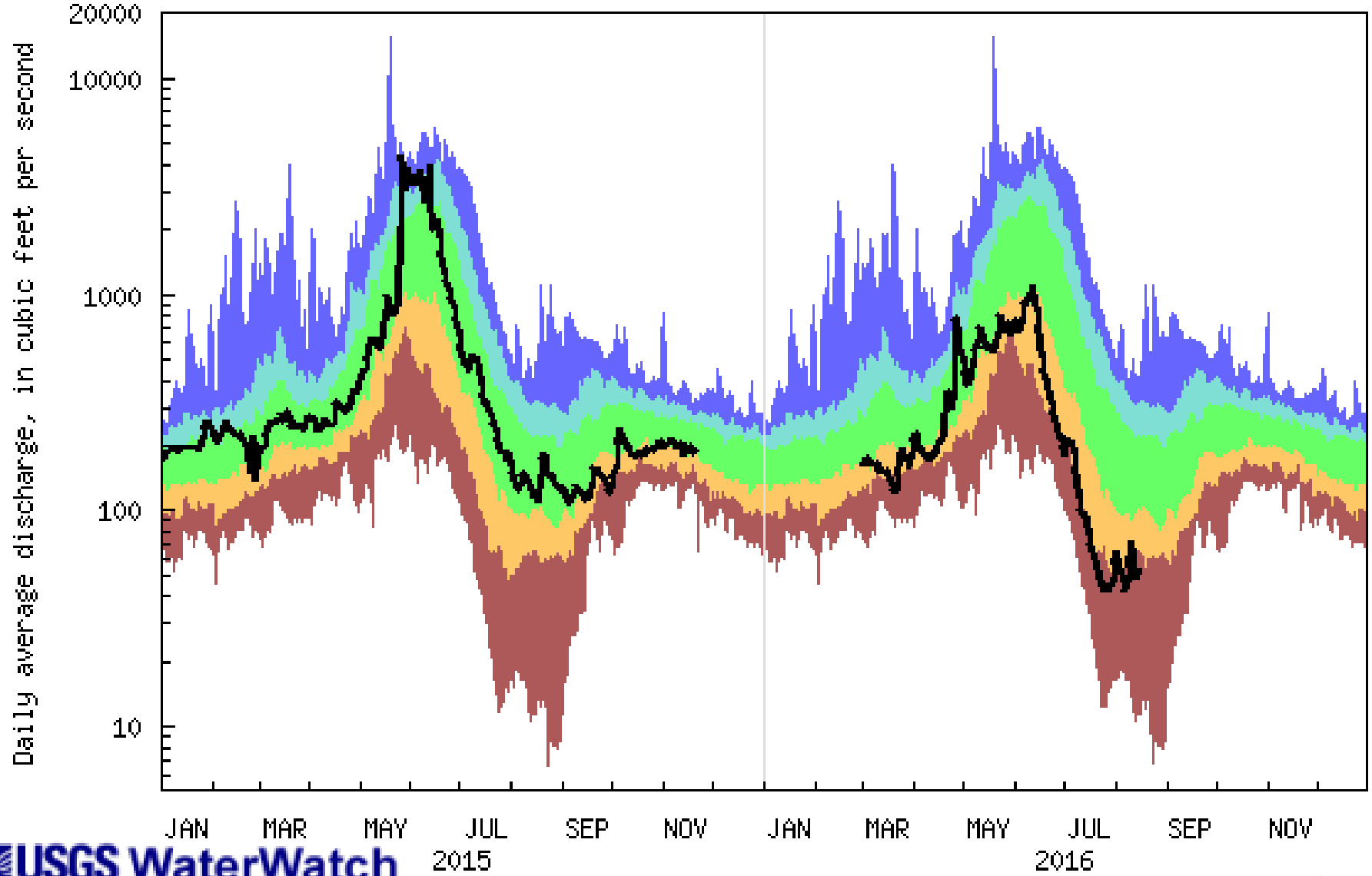


USGS WaterWatch

Last updated: 2016-08-16

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: 55 years)

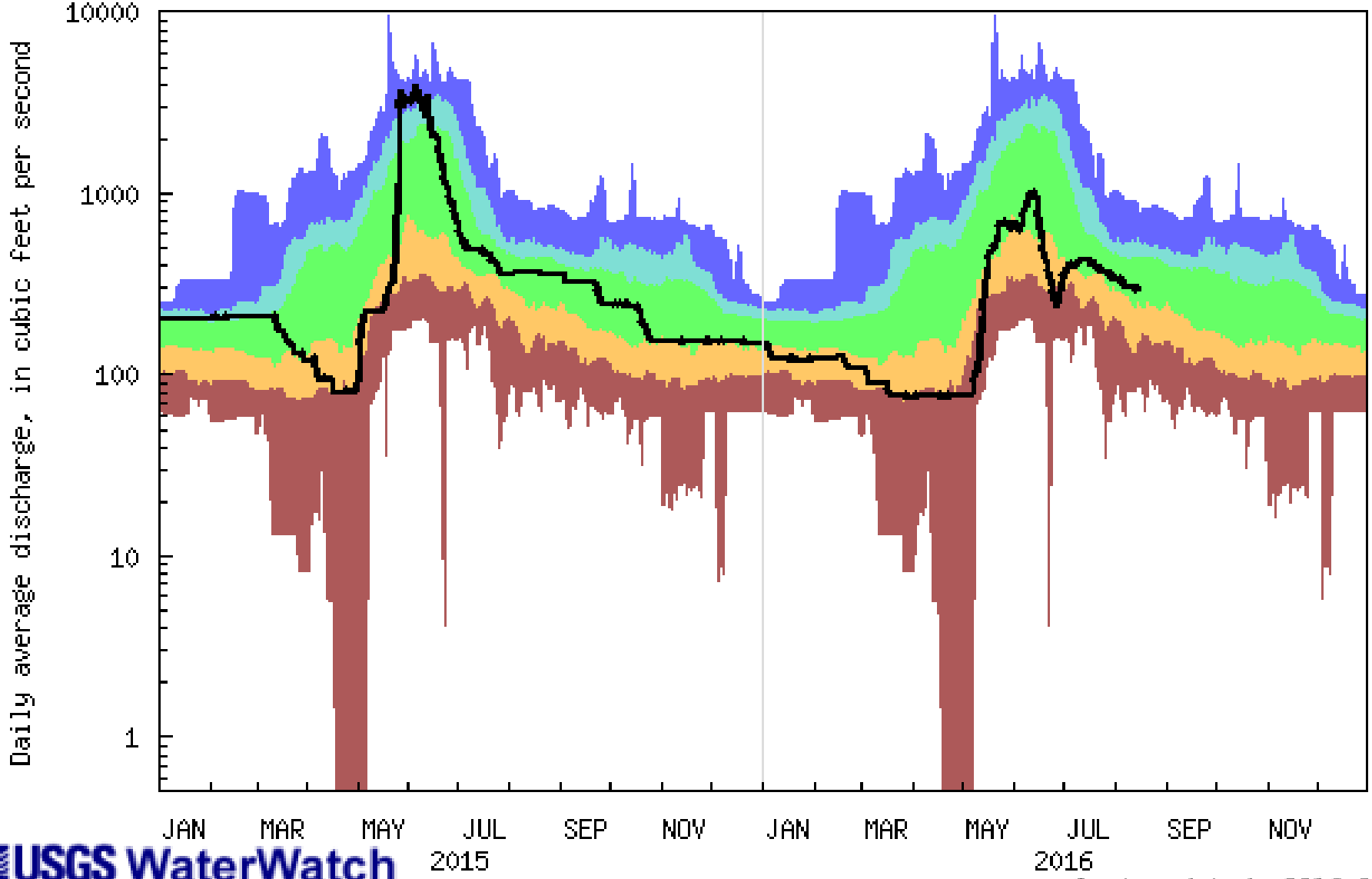


USGS WaterWatch

Last updated: 2016-08-16

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: 76 years)

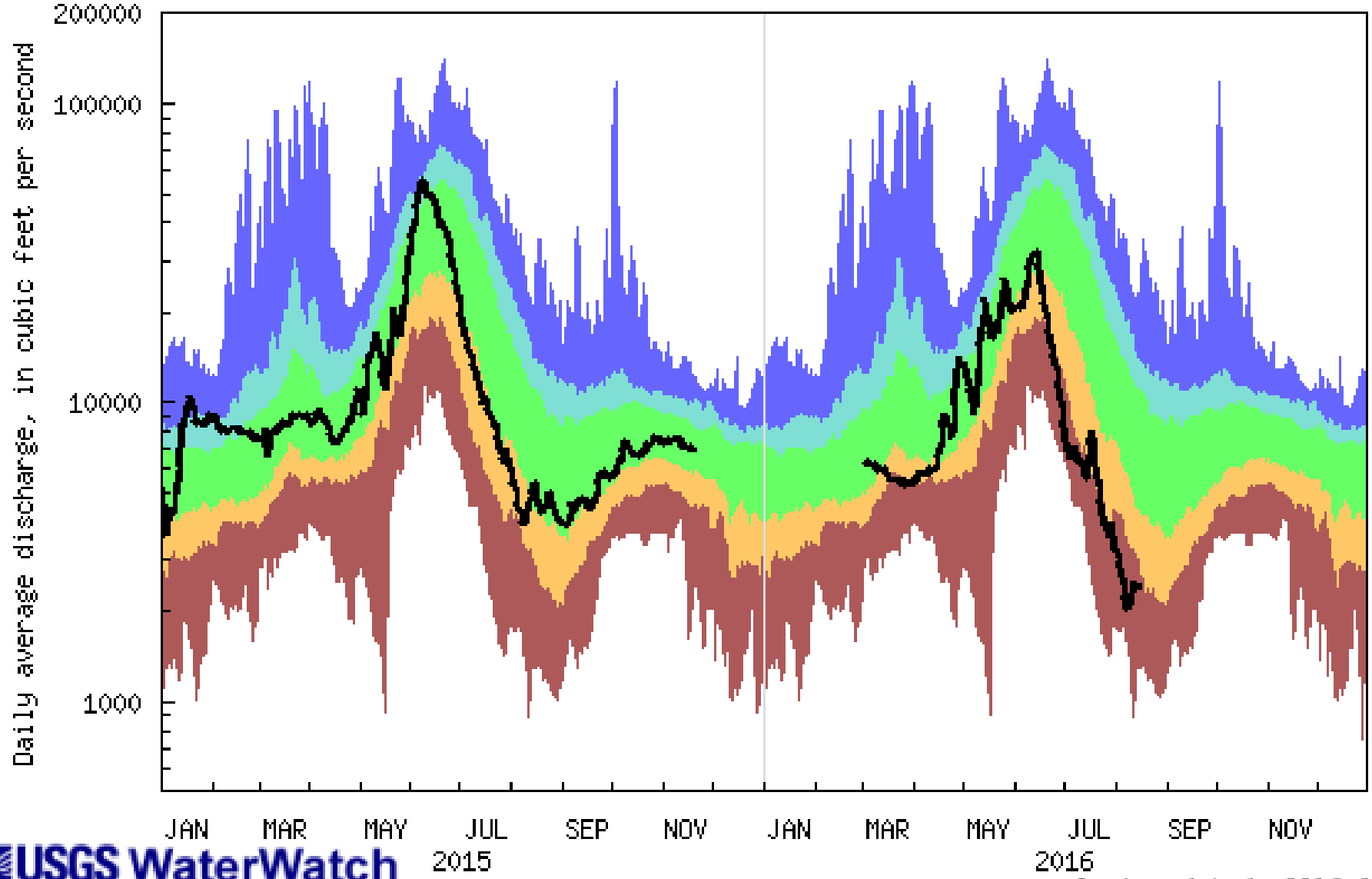


USGS WaterWatch

Last updated: 2016-08-16

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: 105 years)



USGS WaterWatch

Last updated: 2016-08-16

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/

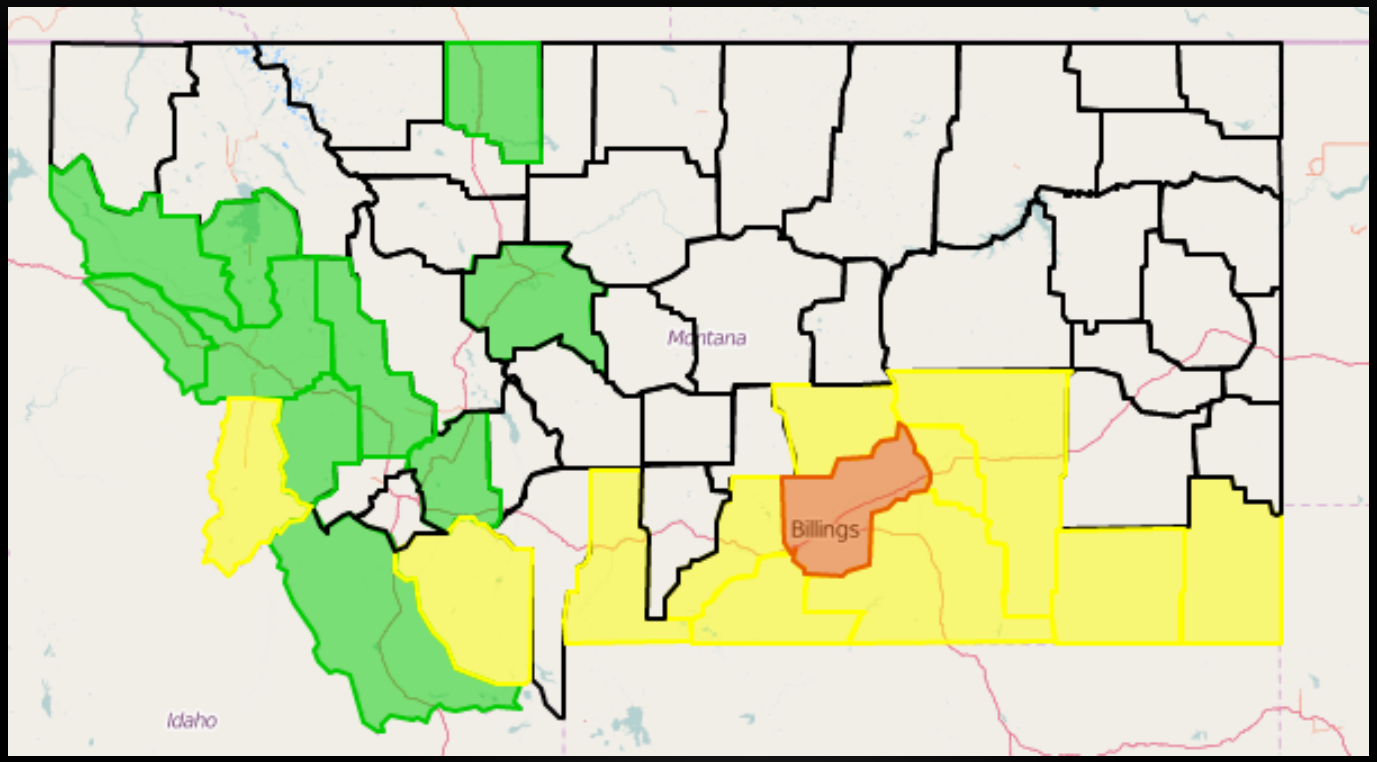
Montana Current Streamflow Conditions
http://waterdata.usgs.gov/mt/nwis/current/

WILDFIRE

CURRENT CONDITIONS

Restriction Stages

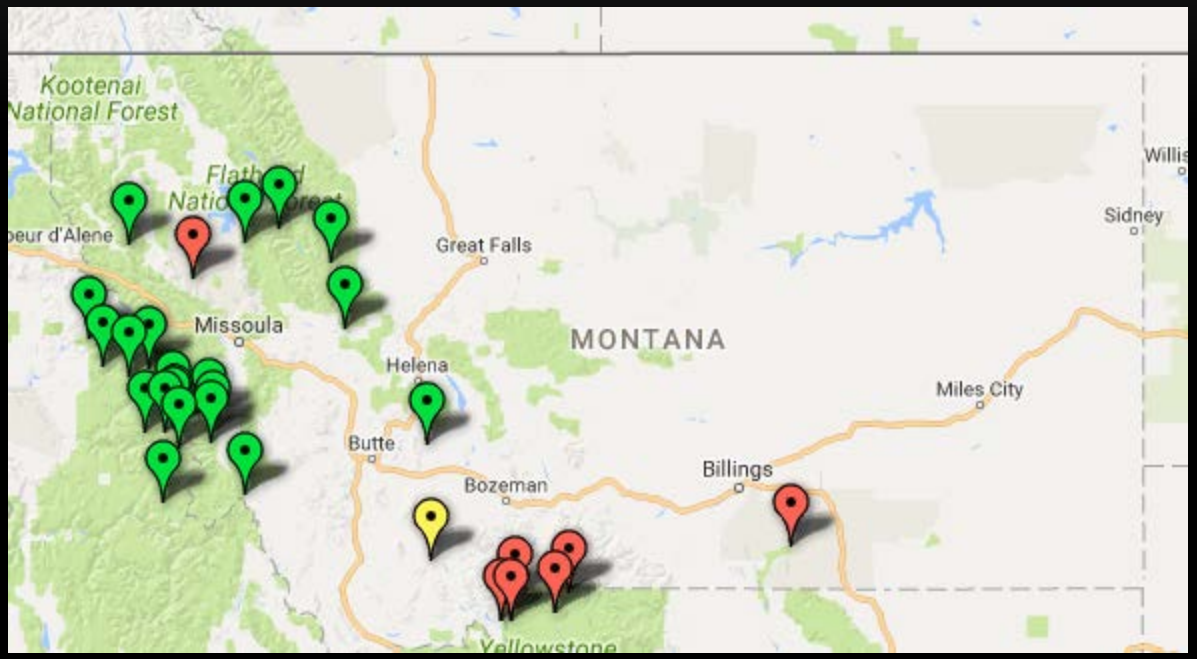
- Local Burn Ban
- Stage I
- Stage II
- Closures



INCIDENTS (INCIWEB)

Incident	Type	Unit	Status	Acres	Updated
Roaring Lion Fire	Wildfire	Bitterroot National Forest	Active	8,311	21 min. ago
Black Mountain Fire	Wildfire	Helena National Forest	Active	5	3 hrs. ago
Copper King Fire	Wildfire	Lolo National Forest	Active	2,278	6 hrs. ago
Blue Lake Fire	Wildfire	Dillon Field Office	Active	750	6 days ago
Observation Fire	Wildfire	Bitterroot National Forest	Active	1,422	8/2/2016
Pole and Fine Fires	Wildfire	Beaverhead - Deerlodge National Forest	Active	88	7/26/2016
Harris Fire	Wildfire	Miles City Field Office	Active	3,394	7/19/2016

CURRENT WILDFIRES OVER 100 ACRES



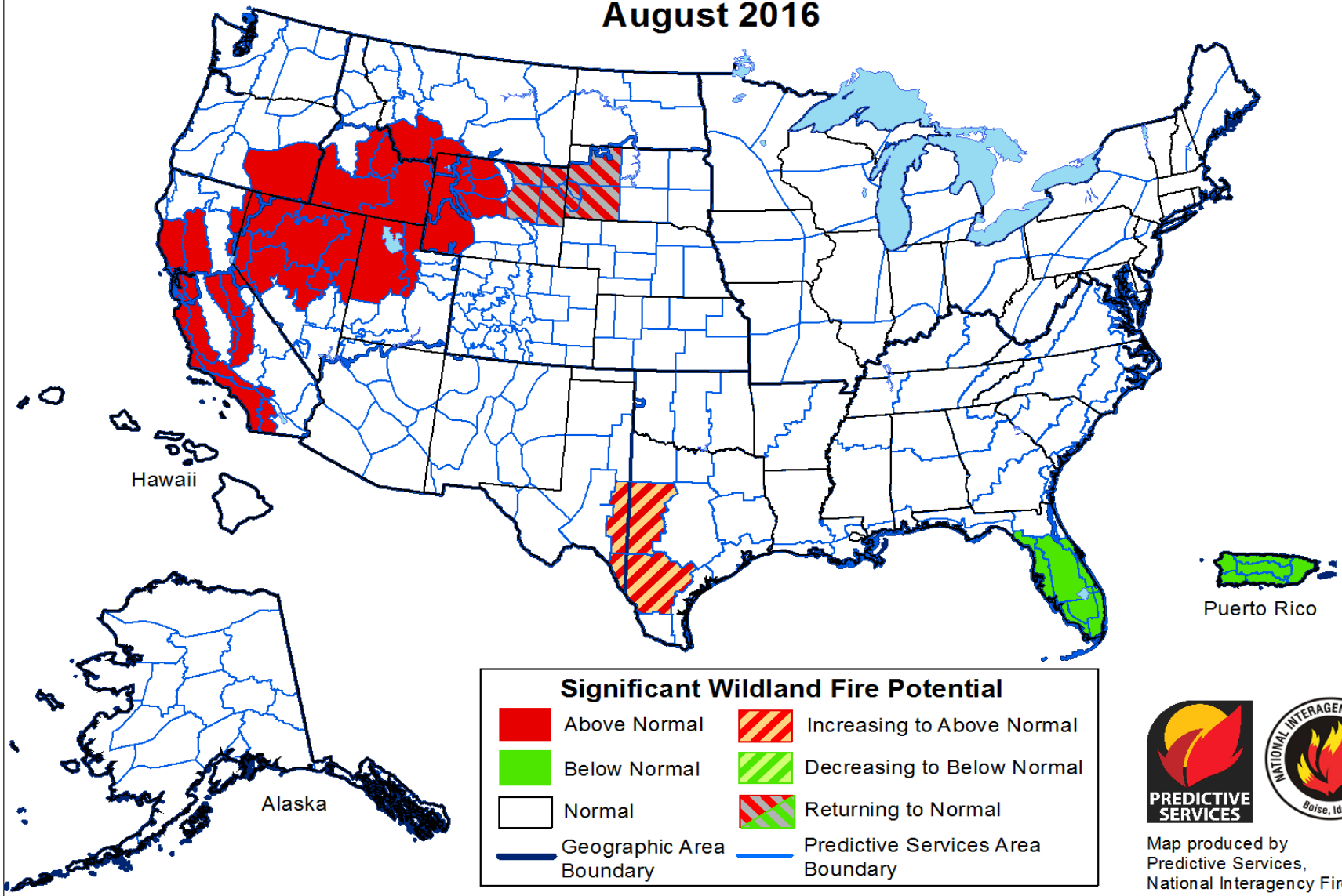
Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Mgmt
- U.S. Fish & Wildlife
- National Park Service

Department of Agriculture
- U.S. Forest Service

State Agencies
- Idaho Dept. of Lands
- Montana Dept. of Natural Resources & Conservation
- North Dakota Forest Service

Other Agencies
- Dept. of Defense
- Tribes

Significant Wildland Fire Potential Outlook
August 2016



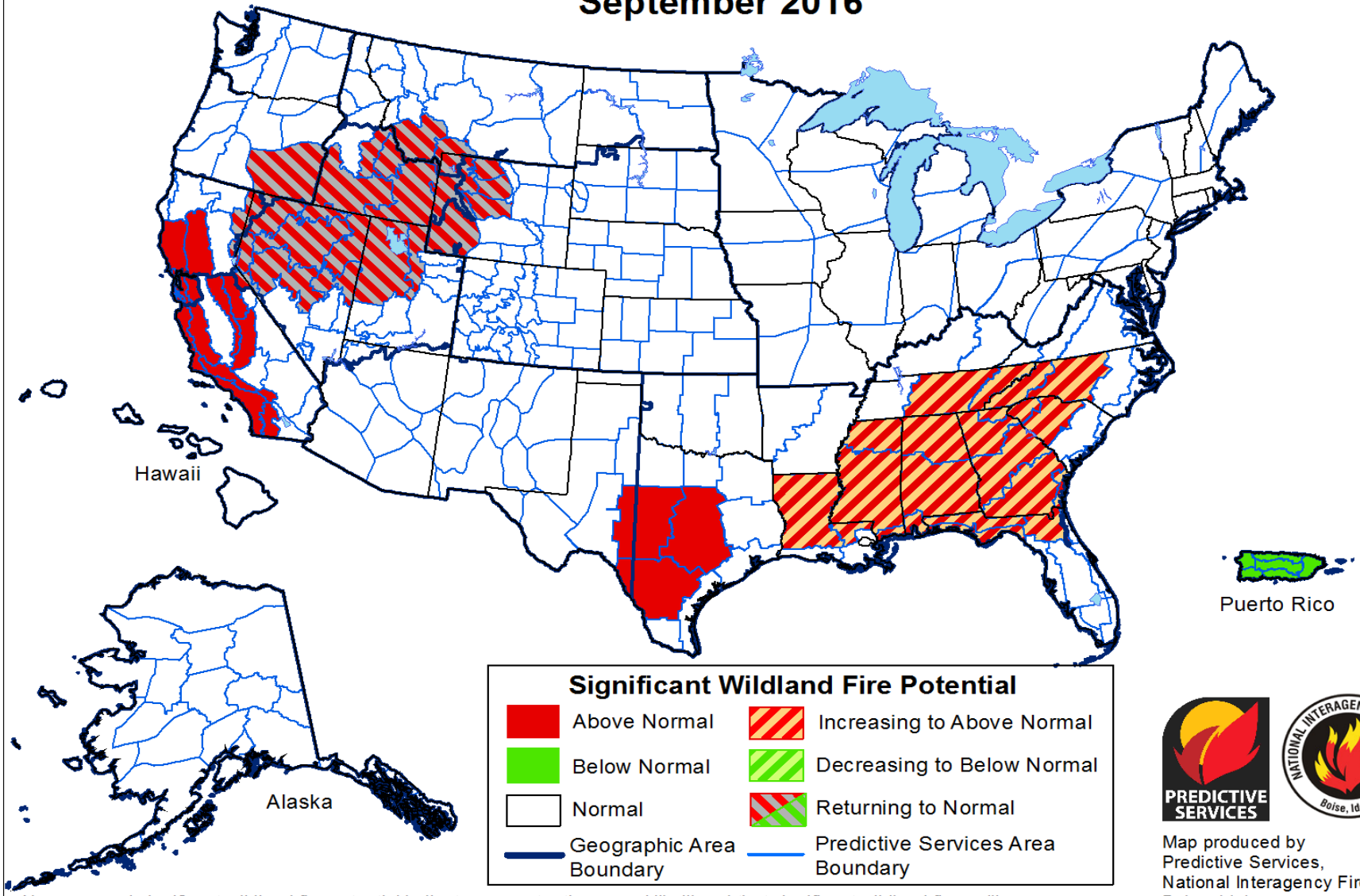
Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires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

PREDICTIVE SERVICES

NATIONAL INTERAGENCY FIRE CENTER Boise, Idaho

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

Significant Wildland Fire Potential Outlook
September 2016



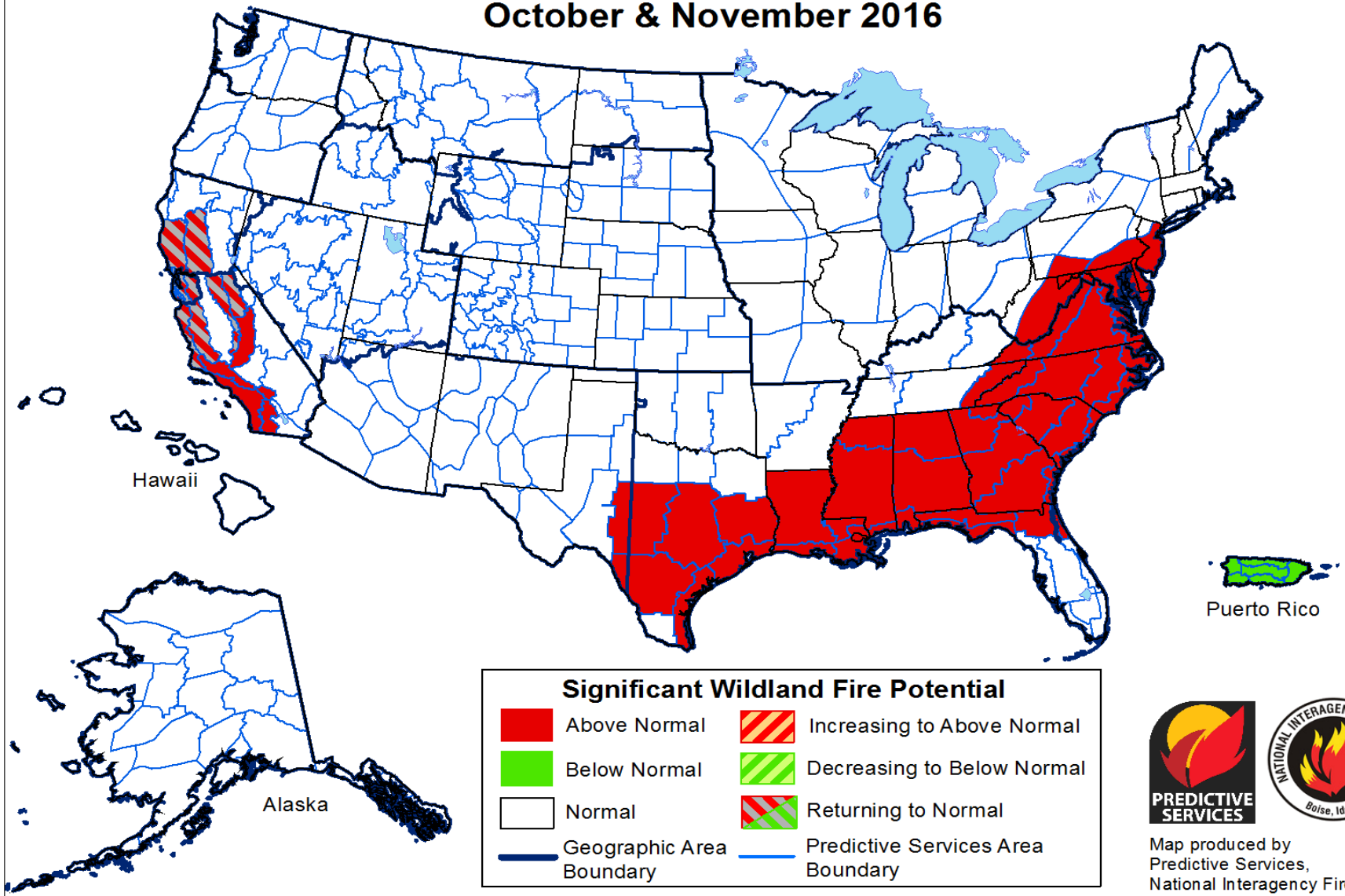
Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires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

PREDICTIVE SERVICES

NATIONAL INTERAGENCY FIRE CENTER Boise, Idaho

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

Significant Wildland Fire Potential Outlook
October & November 2016



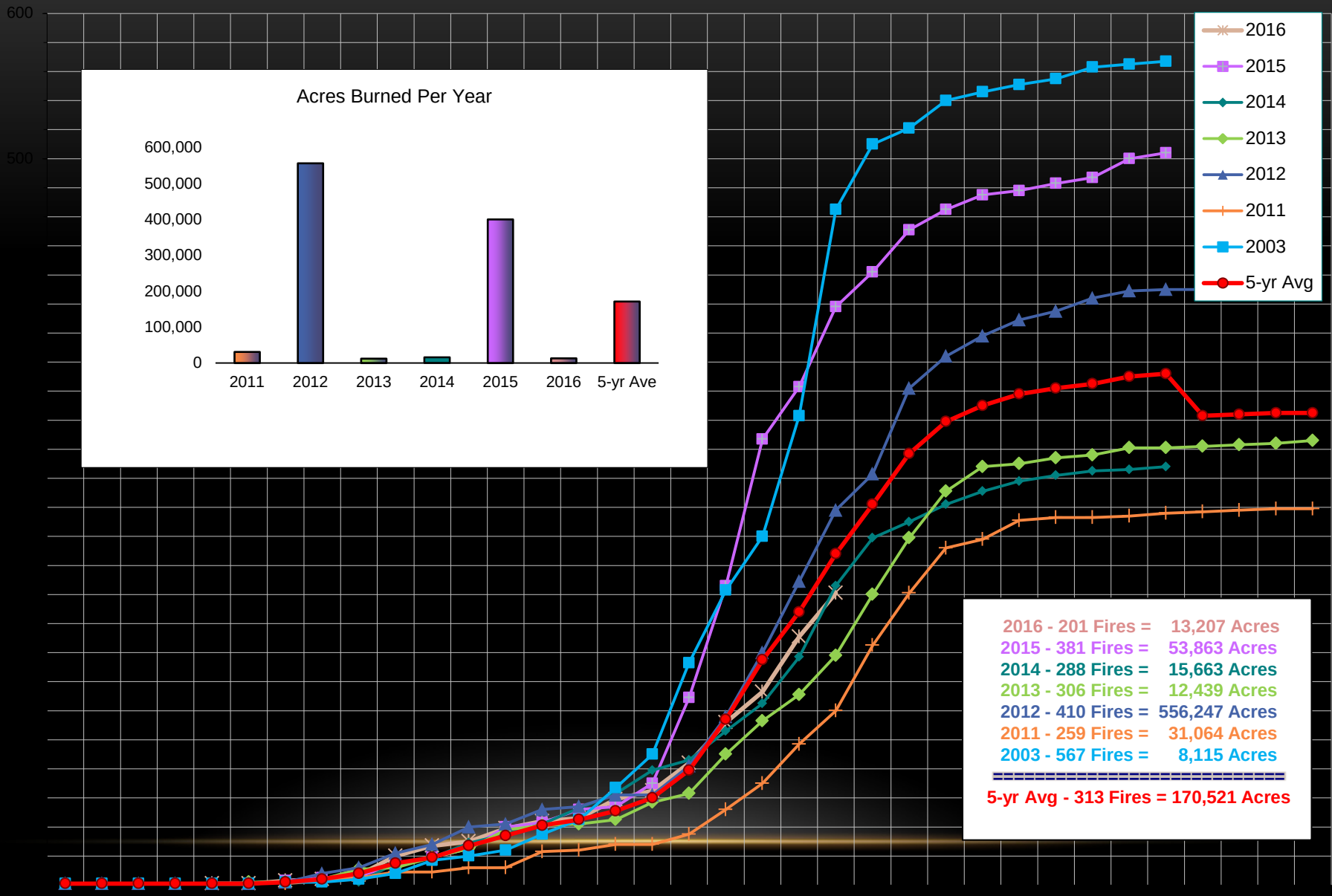
Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires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

PREDICTIVE SERVICES

NATIONAL INTERAGENCY FIRE CENTER Boise, Idaho

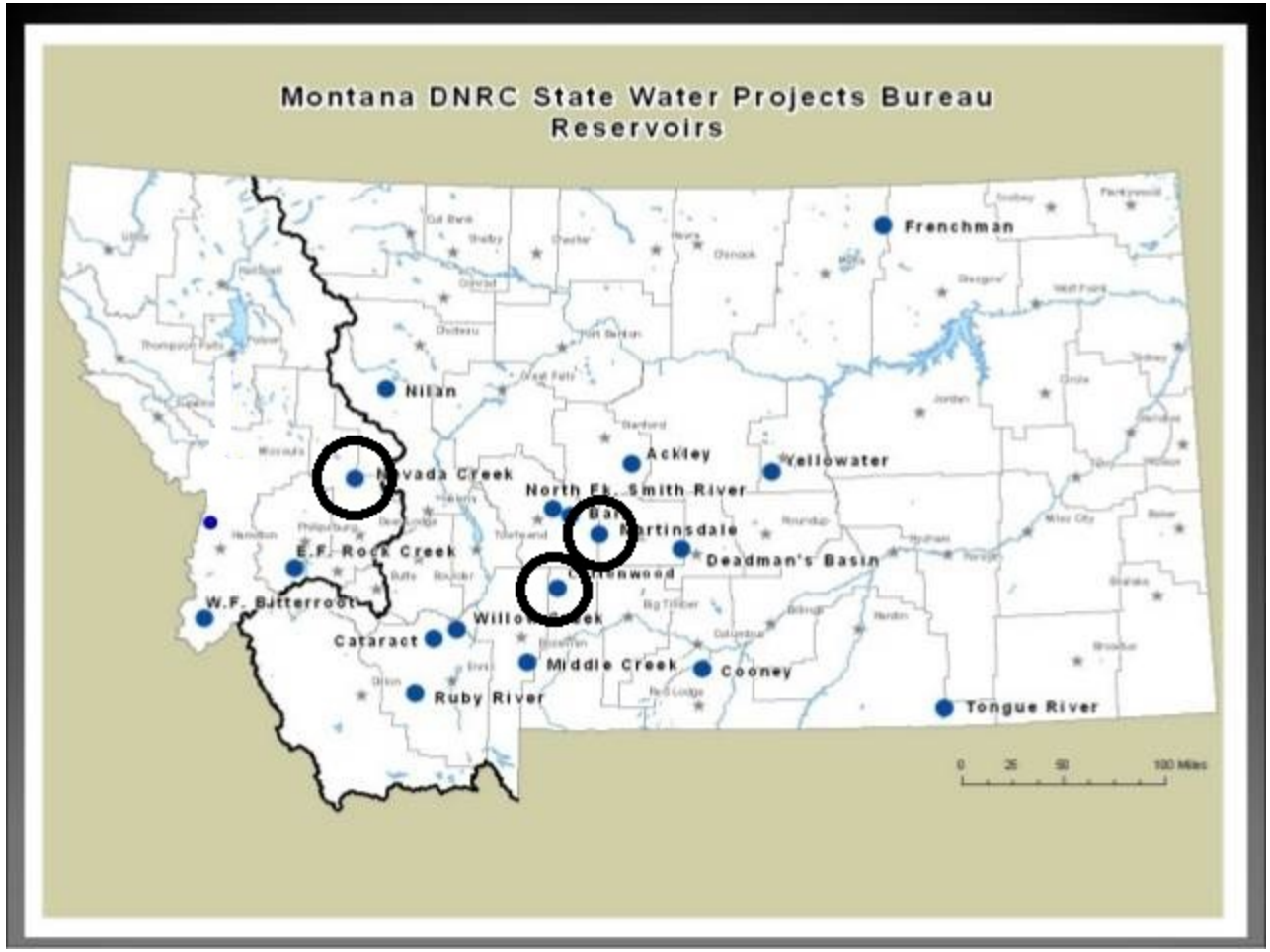
Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued August 1, 2016
Next issuance September 1, 2016

Fire Burned Summary - 2016

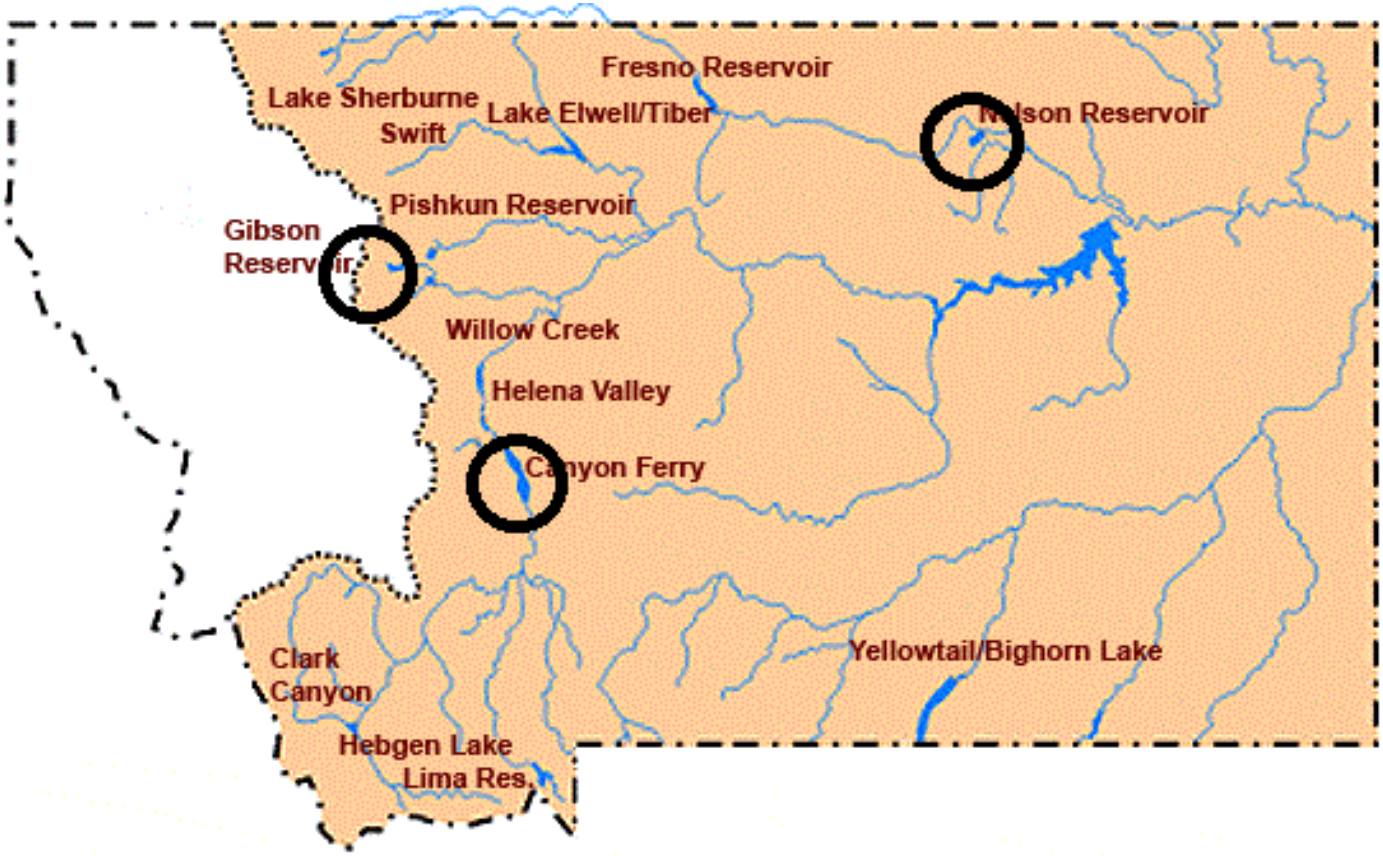


Reservoirs

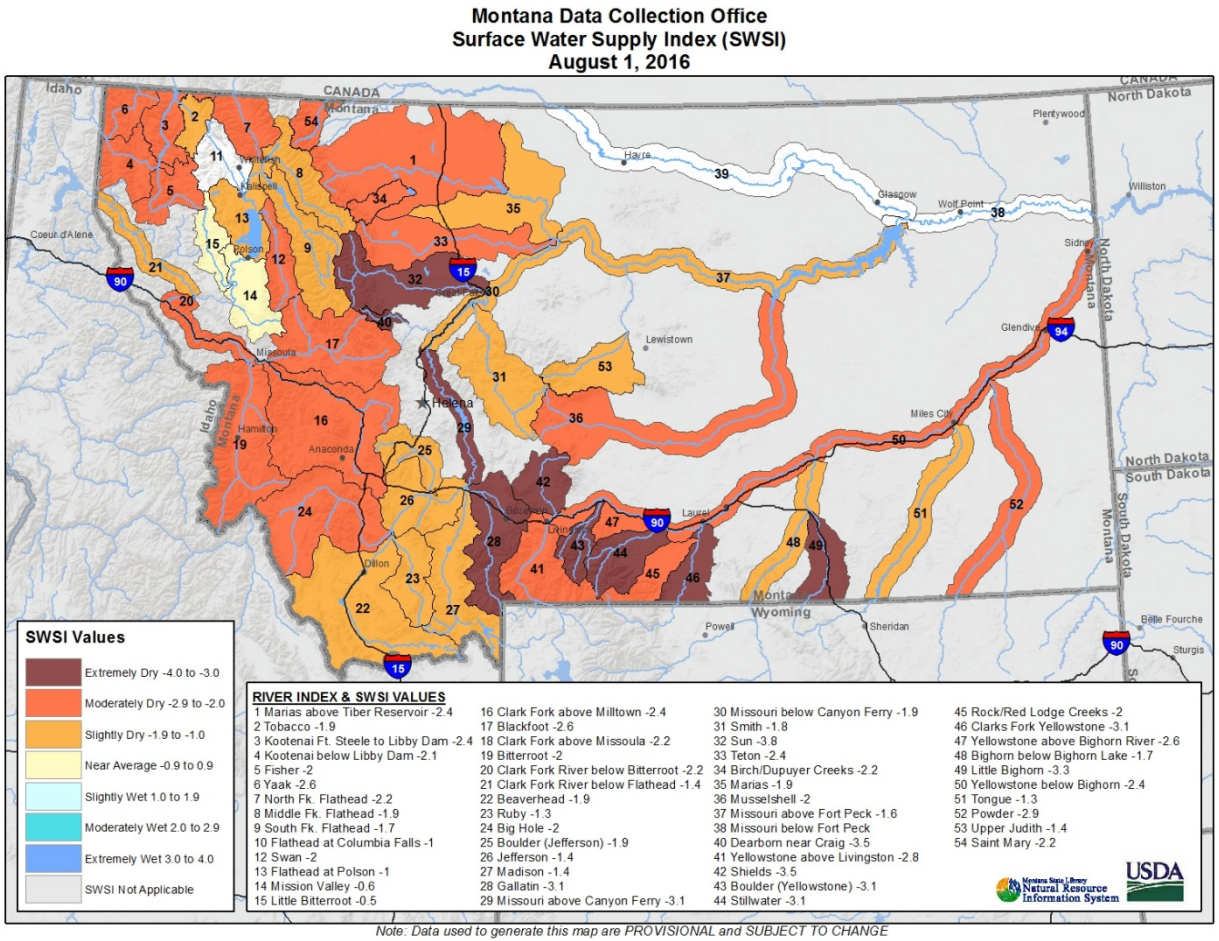
DNRC


Montana DNRC State Water Projects Bureau
Reservoirs
Frenchman
Nilan
Ackley
Yellowater
Nevada Creek
North Ft. Smith River
Martinsdale
Deadman's Basin
E.F. Rock Creek
W.F. Butterroot
Cataract
Middle Creek
Cooney
Ruby River
Tongue River
0 25 50 100 Miles

Bureau of Reclamation

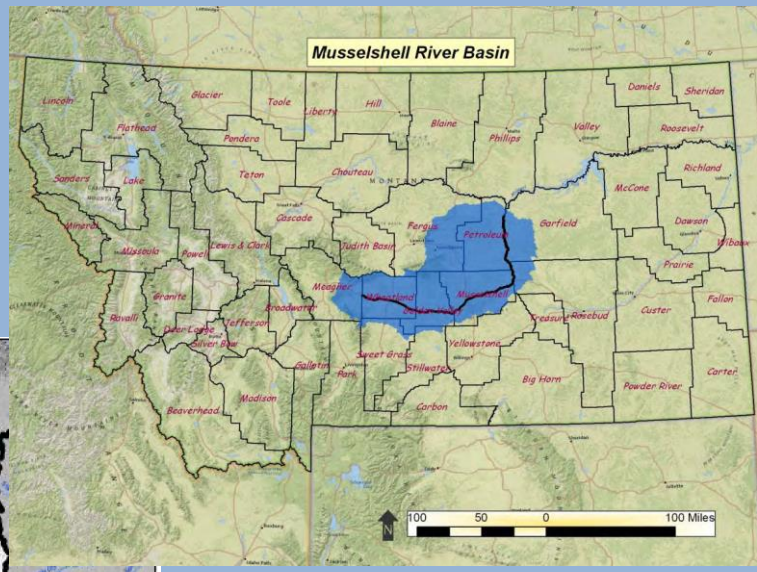


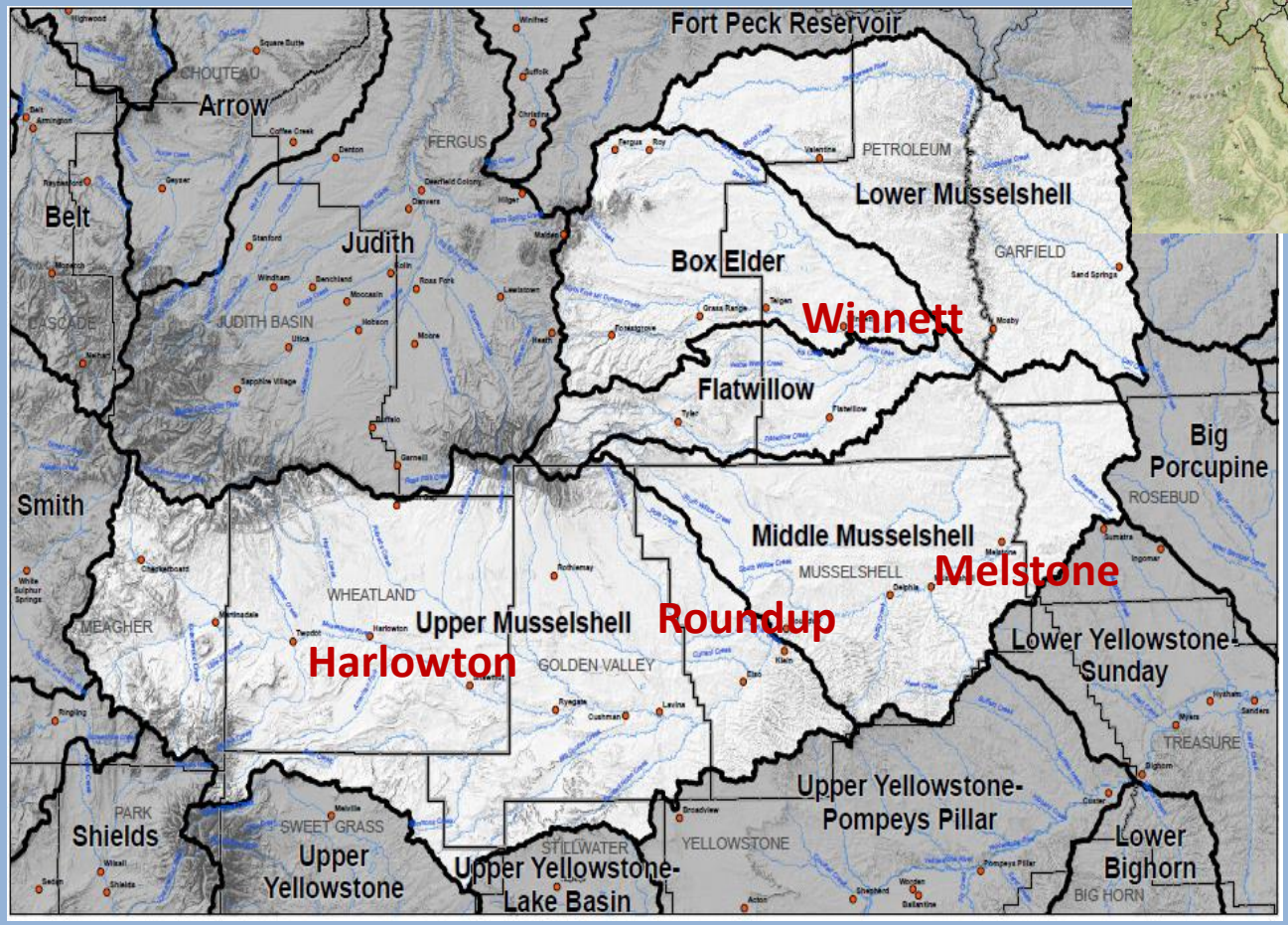
Surface Water Supply Index



Note: Data used to generate this map are PROVISIONAL and SUBJECT TO CHANGE

Musselshell River Watershed



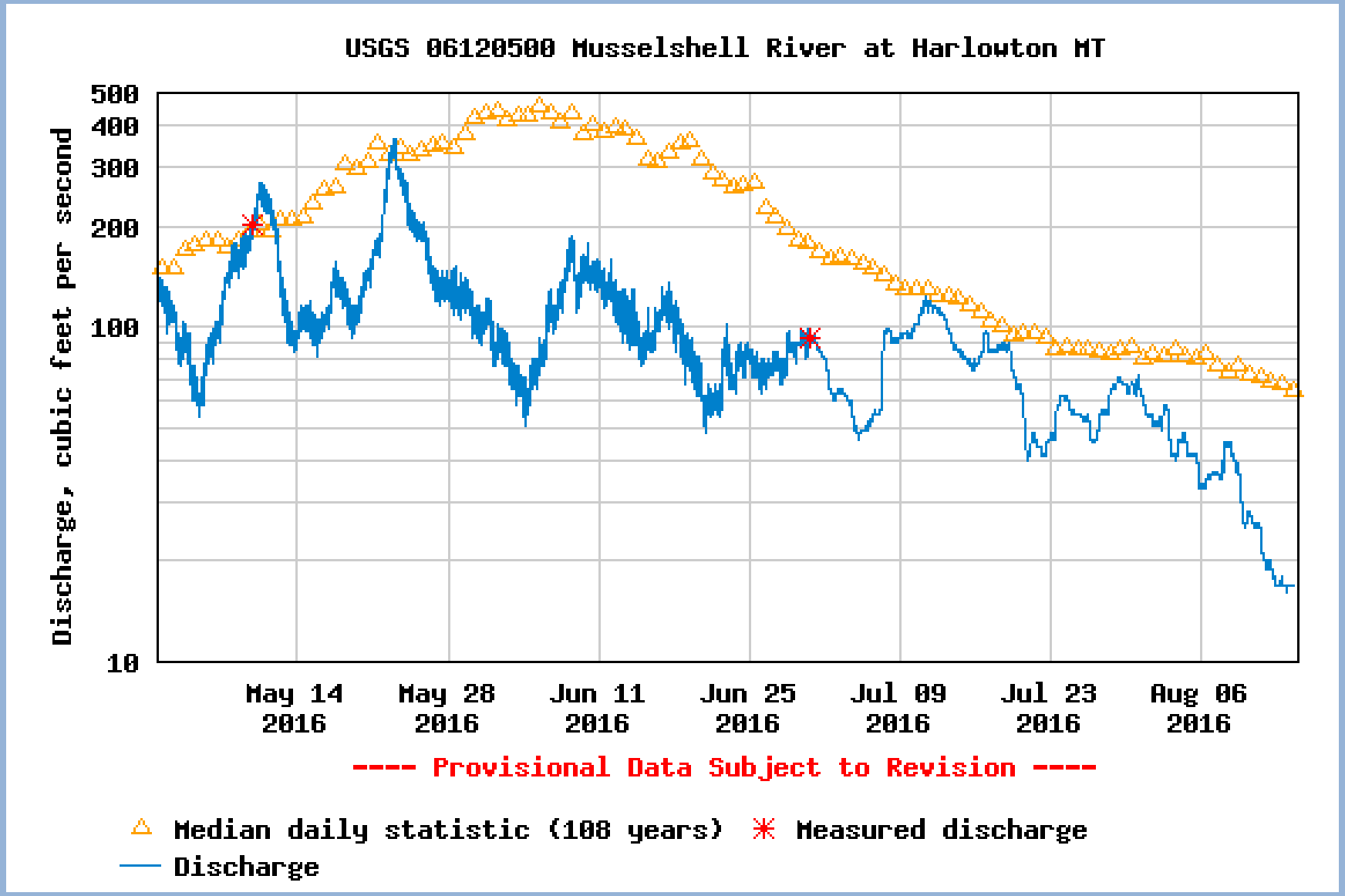


- 9,500 Square Miles
- 9,500 People
- 340 River Miles
- 250+ Water Users
  - Irrigators
  - Municipalities

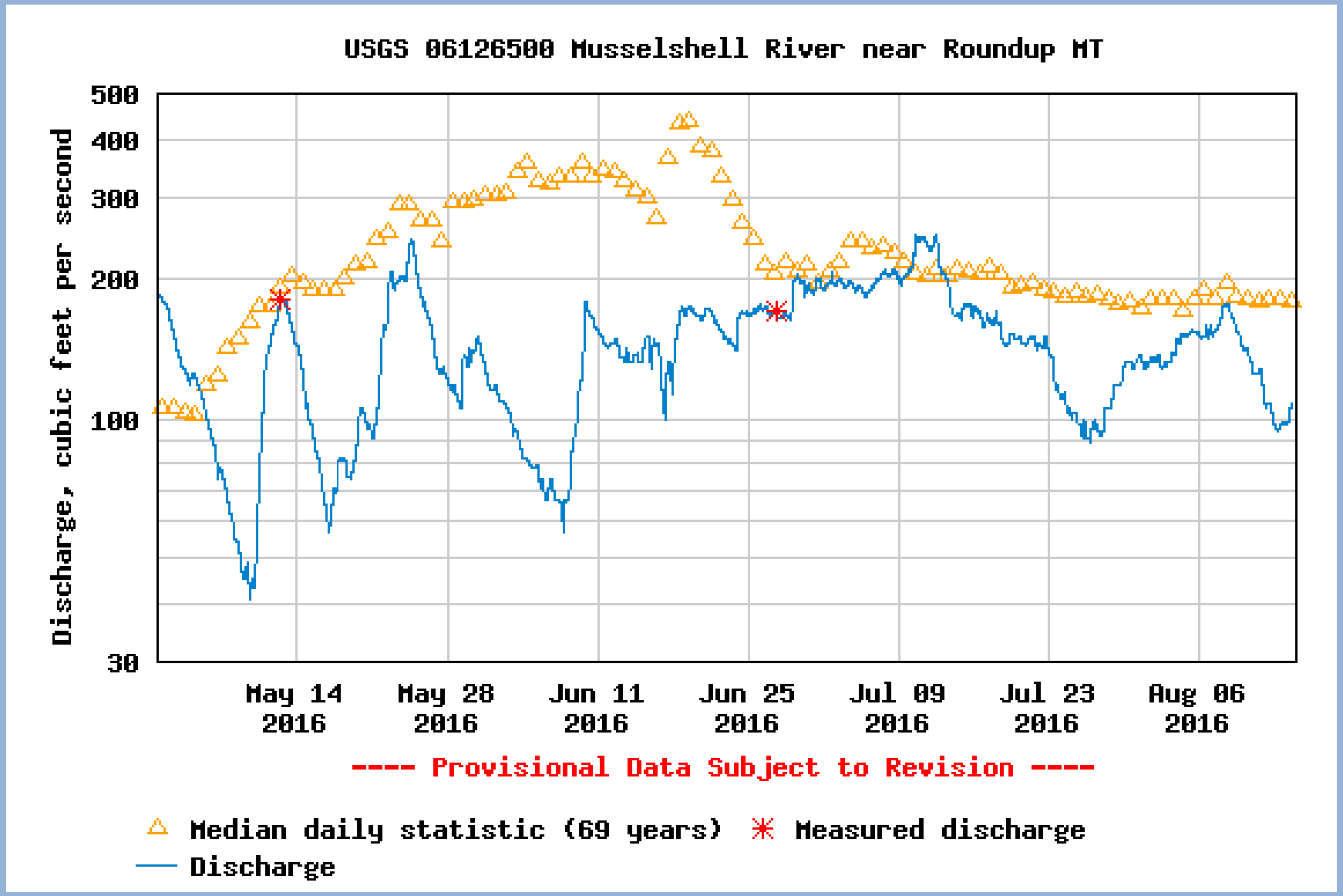
Musselshell River Watershed 2016

- Normal snowpack melted early
- Early use of decreed water
- High use of stored water
- Drought conditions in western part of watershed
- Normal to high levels of precipitation in eastern part of watershed – crop/grazing losses to hail

View from outlet at Martinsdale Reservoir

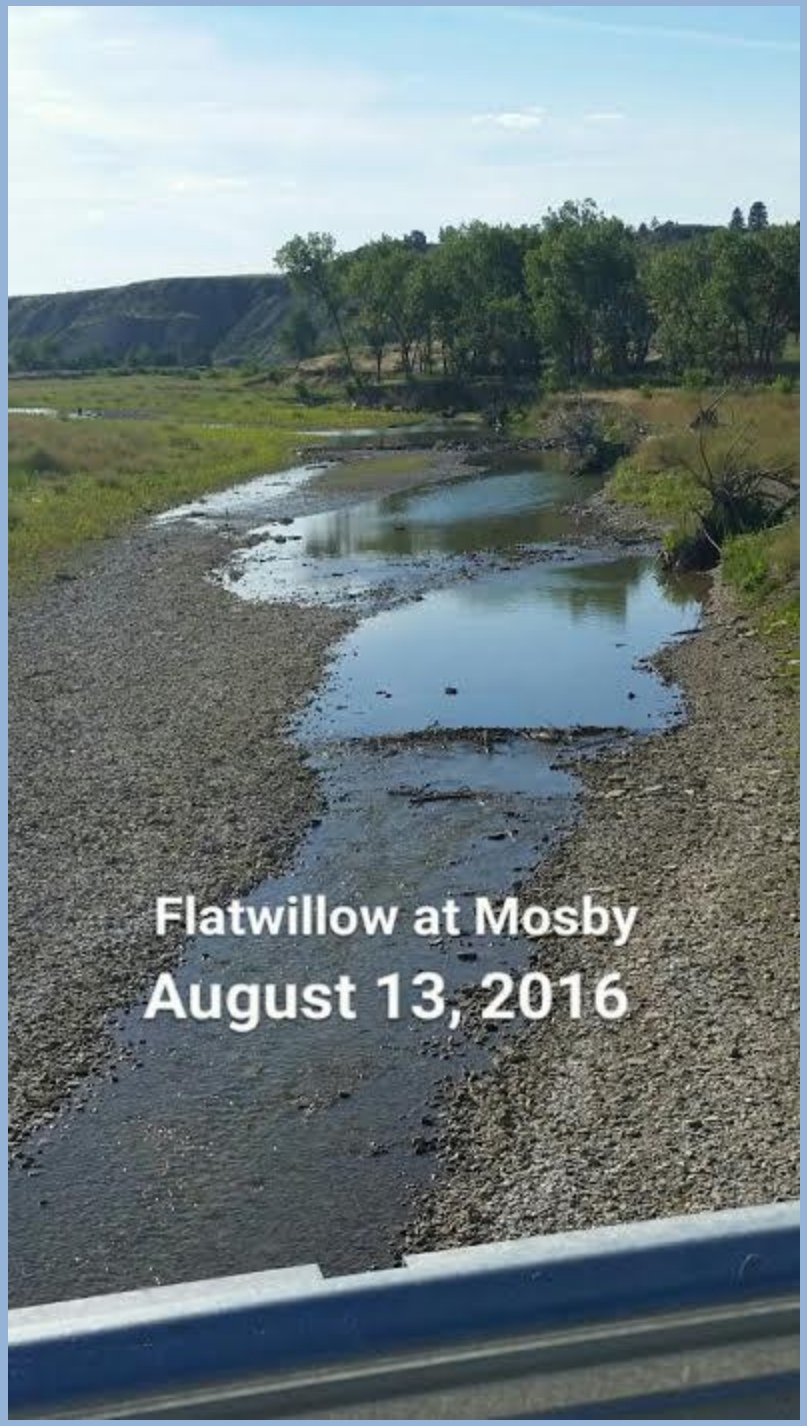

USGS 06120500 Musselshell River at Harlowton MT
Discharge, cubic feet per second
500
400
300
200
100
10
May 14 2016
May 28 2016
Jun 11 2016
Jun 25 2016
Jul 09 2016
Jul 23 2016
Aug 06 2016
---- Provisional Data Subject to Revision ----
Median daily statistic (108 years)
Measured discharge
Discharge

Musselshell River at Deadman's Basin Diversion, July 27

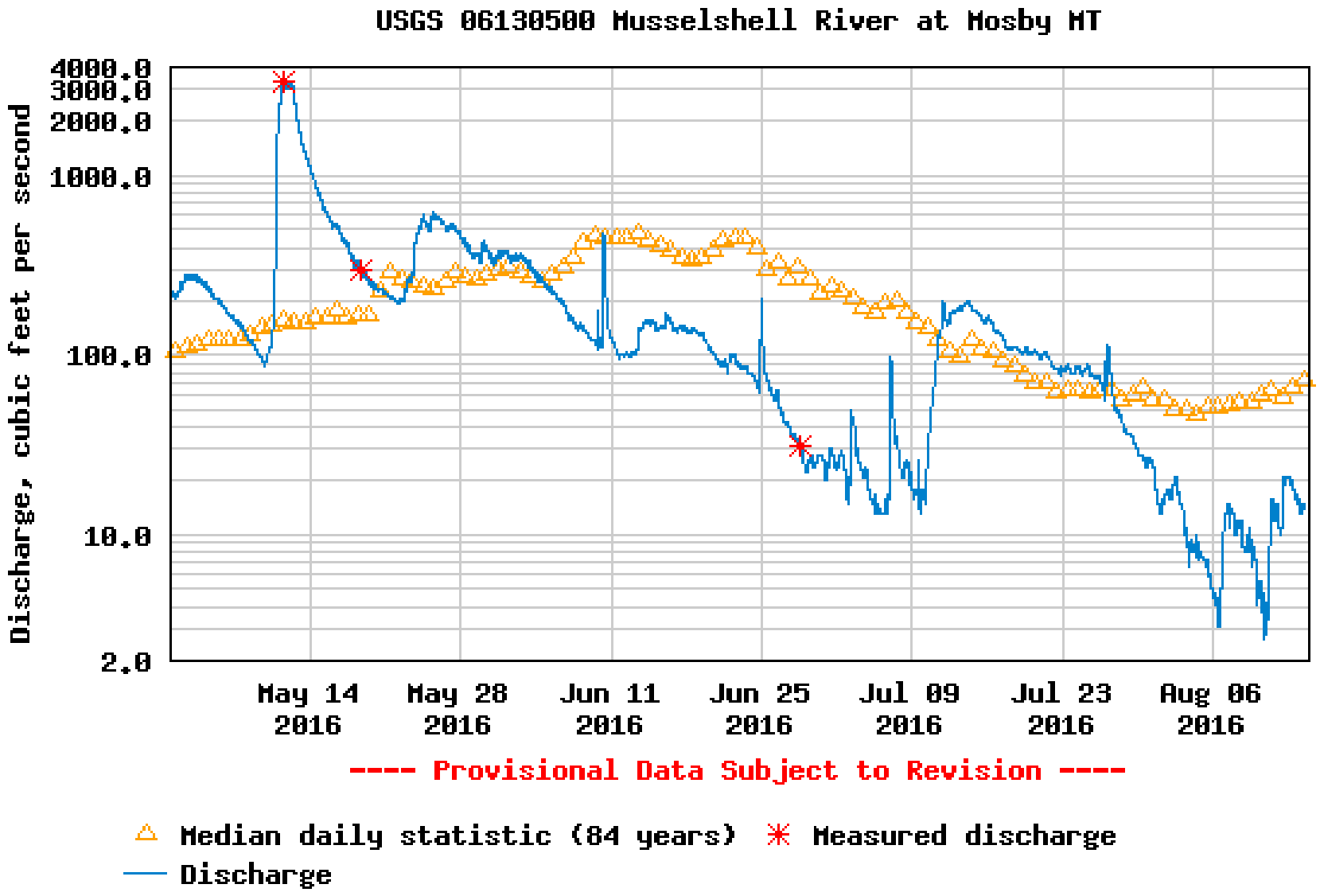

USGS 06126500 Musselshell River near Roundup MT
Discharge, cubic feet per second
500
400
300
200
100
30
May 14 2016
May 28 2016
Jun 11 2016
Jun 25 2016
Jul 09 2016
Jul 23 2016
Aug 06 2016
---- Provisional Data Subject to Revision ----
Median daily statistic (69 years)
Measured discharge
Discharge

At Roundup, August 12

Delphia-Melstone Canal System


Flatwillow at Mosby
August 13, 2016

Hail damage in Winnett and near Mosby, June 2016


USGS 06130500 Musselshell River at Mosby MT
Discharge, cubic feet per second
4000.0
3000.0
2000.0
1000.0
100.0
10.0
2.0
May 14 2016
May 28 2016
Jun 11 2016
Jun 25 2016
Jul 09 2016
Jul 23 2016
Aug 06 2016
---- Provisional Data Subject to Revision ----
Median daily statistic (84 years)
Measured discharge
Discharge