BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday August 16, 2019

A couple storms this week left ½ inch of rain across much of the drainage with some getting more and some less. This caused brief increases in streamflows followed by further drops. Most of next week should be sunny and warm. Crop water use declined this week but remained above average at about 1 inch for most crops. This should increase to about 1 ½ inches next week.

Blackfoot River flows at Bonner are below the 700 CFS trigger level and drought plans are being implemented throughout the drainage (see page 3). For drought options – see page 4. Lots of sprinklers came back on last week when it rained but it will take a monsoon to overcome dropping river levels so please turn off unless you really need water for new plantings.

These reports, provide weekly summaries of weather, crop water use and soil moisture conditions plus tips for irrigation, soil health and crops. Hints for the entire irrigation season are on the last page. For other irrigation information please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).

WEATHER – SUNNY & VERY WARM AGAIN

Most croplands in the drainage had about ½ inch of rain last week with some spots getting more and some less. Next week will turn into sunny skies and warm temperatures in the high 70s and low 80s. The 30-day and 90-day predictions still say above average temperatures and average rainfall.

CROP WATER USE – STILL ABOVE AVERAGE – CUT 2/3 BY HAYING

Crop water use dropped with cooler, wet weather this week but is still above average. Hay crops, spring grains and lawns used about 1 inch. Water use will increase slightly next week with slightly warmer temperatures to about 1 ½ inches. The table below provides a quick summary of crop water use last week and an estimate for next week. The table and chart on Page 2 summarize the entire irrigation season. Crop water use the week after cutting is only about 1/3 of the uncut crop potential. The second week it is about 2/3 of potential and back to normal by the third week.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**1.2**	**1.6** (1.0 - 1.4)	.17	20.4
PASTURE	**0.9**	**1.2** (0.7 - 1.2)	.13	17.3
SPRING GRAINS	**1.25**	**1.7** (0.8 - 1.4)	.18	16.4
WINTER WHEAT	**0.1**	**0.1** (0.1 - 0.1)	.01	16.6
LAWNS	**1.1**	**1.5** (0.8 - 1.2)	.16	19.5

[1]Expected water use over the next week (range if weather becomes cooler or hotter than expected)
[2]Expected average daily water use over the next week (compare this with your soil moisture content)
[3]Beginning April 1

BLACKFOOT 2019 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

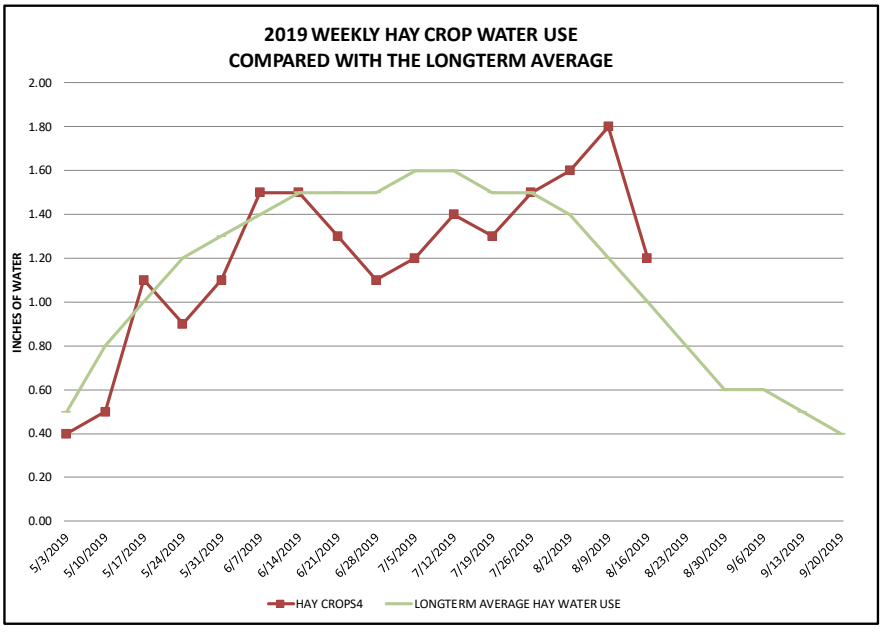
	RAIN[1]	2019 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE POTENTIAL CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/3/2019	0.30	0.40	0.50	0.10	0.10	0.40	0.50	0.50	0.80	0.30
5/10/2019	0.30	0.50	0.40	0.10	0.10	0.50	0.50	0.80	1.00	0.50
5/17/2019	0.40	1.10	0.90	0.10	0.10	1.10	1.00	1.00	1.10	0.60
5/24/2019	0.10	0.90	0.80	0.20	0.10	1.00	0.90	1.20	1.30	0.80
5/31/2019	0.75	1.10	0.90	0.50	0.20	1.20	1.00	1.30	1.40	0.90
6/7/2019	0.30	1.50	1.30	1.00	0.60	1.60	1.40	1.40	1.50	1.00
6/14/2019	0.50	1.50	1.40	1.50	1.10	1.70	1.50	1.50	1.70	1.00
6/21/2019	0.10	1.30	1.10	1.40	1.20	1.50	1.20	1.50	1.90	1.10
6/28/2019	0.10	1.10	0.90	1.20	1.10	1.20	1.00	1.50	2.00	1.10
7/5/2019	0.40	1.20	1.00	1.30	1.20	1.30	1.10	1.60	2.10	1.30
7/12/2019	0.25	1.40	1.10	1.50	1.50	1.50	1.30	1.60	2.00	1.20
7/19/2019	0.50	1.30	1.00	1.40	1.40	1.00	1.20	1.50	2.00	1.20
7/26/2019	0.01	1.50	1.20	1.70	1.70	0.75	1.40	1.50	2.20	1.10
8/2/2019	0.01	1.60	1.30	1.80	1.80	0.50	1.50	1.40	1.70	1.00
8/9/2019	0.10	1.80	1.40	1.50	2.00	0.10	1.70	1.20	1.50	0.90
8/16/2019	0.40	1.20	0.90	1.00	1.25	0.10	1.10	1.00	1.30	0.70
8/23/2019								0.80	1.00	0.50
8/30/2019								0.60	0.80	0.40
9/6/2019								0.60	0.70	0.30
9/13/2019								0.50	0.70	0.30
9/20/2019								0.40	0.60	0.20
9/30/2019								0.40	0.60	0.20
TOTAL	**6.02**	**20.40**	**17.30**	**16.40**	**15.55**	**16.55**	**19.50**	**24.80**	**31.40**	**17.10**

[1] Rainfall should be reduced to account for immediate evaporation from crop and soil surfaces (0.1-April,May and Sept, 0.15-June and August, 0.2-July)

[2] **This years** maximum water use by healthy crops that are well-fertilized and irrigated, disease and insect-free. Will vary slightly across the drainage.

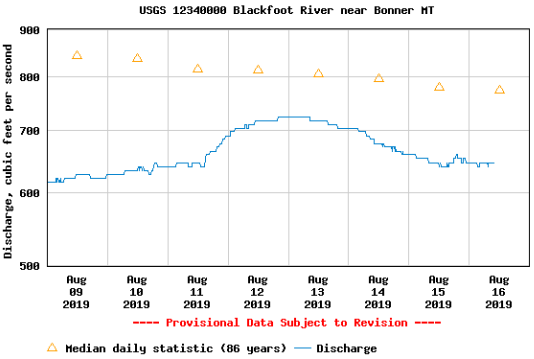
[3] **Longterm average** water use for each crop each week based on long-term historic data.

[4] Hay Crop water use drops approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.



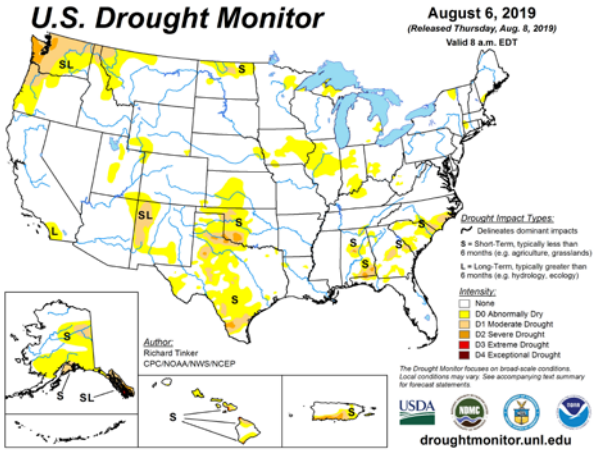
STREAMFLOWS - CRITICAL

The Blackfoot river flow rose with rainfall in the past week but dropped quickly below the critical 700 CFS level which triggers irrigation restrictions. Todays flow is at 646 CFS compared with an average for this date of 788 CFS. The Highest flow on this date was 1,720 (1899) and the lowest was 374 CFS (1988). Flows are expected to continue to drop and could reach the level where all irrigation is cut off.



DROUGHT 2019!!

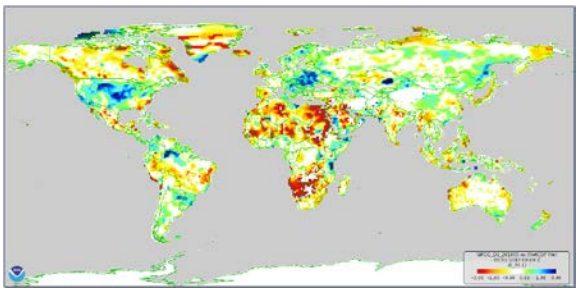
Drought Status Maps of the US and Montana continue to show dry conditions encroaching on our area. Missoula County continues in the "Slightly Dry" category while Powell County is "near average". The Montana website below shows a trend of increasing drought. Blackfoot River flows at Bonner have dropped below the 700 CFS trigger level for drought restrictions and may reach a level requiring all irrigation to cease. Blackfoot Challenge Water Steward Jennifer Schoonen is now working with irrigators to help implement drought plans. It would take a large storm every week to reverse this trend.



https://mslservices.mt.gov/Geographic_Information/Maps/drought/

Don't feel like we are the only ones with drought concerns. Drought is becoming widespread across the entire globe. Current estimates say 25% of the world's population now is suffering from extreme water stress. Recent reports predict that large parts of the US will experience similar water shortages within 50 years.

https://www.sciencealert.com/17-countries-are-facing-extreme-water-stress-and-they-hold-a-quarter-of-the-world-s-population



For further information contact Jennifer Schoonen, Blackfoot Challenge Water Steward, 406-360-6445 or Barry Dutton, Professional Soil Scientist, 406-240-7798 barry@landandwaterconsulting.net

OPTIONS FOR DROUGHT – WHAT TO DO RIGHT NOW

- CEASE IRRIGATION OF ALFALFA AND GRASS HAY OR PASTURES, THESE CROPS ARE DROUGHT-TOLERANT AND WILL SURVIVE UNTIL FALL RAINS
- IF YOU HAVE MULTIPLE IRRIGATION SYSTEMS – RUN ONLY ONE AT A TIME TO MAINTAIN STREAM FLOWS
- IRRIGATE AT NIGHT SO MORE GOES INTO THE SOIL
- IRRIGATE ONCE AFTER CUTTING THEN WAIT FOR STREAMFLOWS TO RECOVER

MANAGING ALFALFA IN DROUGHT CONDITIONS

Modern Alfalfa varieties are very well-adapted to drought. It uses water very efficiently compared with other crops. Alfalfa can also survive being cut off suddenly from water and still produce just as well the following season.

Alfalfa extracts most of its water for growth from the first three feet of soil and this is the depth commonly managed for irrigation purposes. However, alfalfa can root to 20 feet when water is available. This deep rooting can keep it healthy and happy when shallow-rooted grass plants stress or die. Deep rooting can also produce spectacular yields when winter snowmelt and spring rains store deep soil moisture. In most years, snowmelt and rains only moisten the top few feet of local cropland soils. But in moist years, deeper soil layers may also store moisture that deep roots can use. In 2018, one local irrigator produced a 4 ton first cutting after applying only 1 inch of irrigation. Rainfall supplied a few inches, but much of it came from soil storage, especially from deep layers. His clay soil holds 2 inches of available water per foot so he had 10 inches stored just in the top 5 feet before irrigating at all.

Depth of Roots	**Percent of Total Water Extracted Coming From that Depth[1]**
0-1.5'	40%
1.5-3.0'	30%
3.0-4.5'	20%
4.5-6.0	10%

Prepare Your Alfalfa for Drought

If you are in a drought, your best option may be to just stop irrigating. However, you can prepare your alfalfa for future drought conditions. Irrigating alfalfa deeply during the early irrigation season will encourage deep root growth. Plants are not the Starship Enterprise and do not *"boldly go where no root has gone before."* Plant roots follow moist soil downward. They do not grow through dry soil hunting for moisture below. You need to lead them by irrigating deeper and creating a continuous zone of moist soil.

The articles below include more detailed information on alfalfa management during drought.
https://anrcatalog.ucanr.edu/pdf/8522.pdf
http://waterquality.montana.edu/farm-ranch/irrigation/alfalfa/guidelines.html [1]

THE BLACKFOOT DRAINAGE IRRIGATION SEASON IN BRIEF

This is a summary of general activities and recommendations for the whole season (more detail in the irrigation guide).

APRIL – GET READY AND PLAN YOUR IRRIGATION STRATEGY!

- Get your irrigation system ready – perform maintenance and test system.
- Evaluate soil moisture conditions and weather predictions then plan for irrigation and drought if needed. Some years you better start up now.

MAY – CHECK SOIL MOISTURE & BE READY FOR UNUSUAL HEAT OR COLD!

- Check the soil moisture content at the start of growing season and fill up the soil to its water holding capacity during early irrigations (2-4 inches).
- Watch for dry soil conditions, especially with new plantings and apply water to ensure good germination and emergence.
- Irrigate deeply at least once early in the season to promote deep root growth.
- Apply 2-5 inches of irrigation to hay and pasture crops in May depending on weather. Apply 0-2 inches to spring grains and new plantings as needed based on weather and growth. Apply extra water to fill up the soil (2-4 in).

JUNE – THIS IS THE TIME TO MAKE YOUR BIGGEST EFFORT SO POUR IT ON!

- Apply 6-8 inches of irrigation in June to hay and pasture crops and winter wheat depending on weather. Apply 5-8 inches to spring grains and new plantings as needed based on weather and growth.
- Consider irrigating deeply to fill up soil root zone and promote deep root growth.
- Be sure small grains are irrigated well during their critical periods of boot, bloom and early heading.

JULY – POUR IT ON UNTIL HARVEST AND RETURN QUICKLY

- Apply 1 - 2 ½ inches of irrigation per week in July to all crops - depending on weather.
- Cutting is a critical stress period for hay crops, especially alfalfa so irrigate deeply to fill up the root zone before cutting then get back across the field quickly after cutting. Crop water use declines when hay is cut so this is a good opportunity to fill up the soil again. Irrigate at least once after cutting. Small grains harvested for seed are usually irrigated up to the milk to soft dough stage but be sure soil moisture remains to prevent kernel shriveling. Small grains for forage are often harvested earlier when plants are less dry and seeds soft.

AUGUST- KEEP IRRIGATING SMALL GRAINS UNTIL KERNELS MATURE, BE DROUGHT AWARE!

- Apply 1 - 2 inches of irrigation per week in August to hay and pasture crops for full production depending on weather. Irrigate new plantings as needed.
- Many folks irrigate for pasture following their one hay cutting. Irrigate according to how much pasture you seek and with consideration for other water needs in the drainage, especially in drought years.
- Reduce river withdrawals by rotating systems and reducing the amount of irrigation at one time. Stop irrigating if you can.

SEPTEMBER – APPLY AS NEEDED/AVAILABLE & GET READY FOR SPRING!

- Apply ½ - 1 ½ inches of irrigation per week in September to hay and pasture crops for full production depending on weather. Irrigate new plantings as needed. Prepare the system for winter and an early start next spring.