

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday July 29, 2022



Blackfoot watershed croplands again had little or no rain this week and sunny skies. Next week will see the hottest temperatures of the year and no rain. The good news is record hay crops and great haying weather. Soil moisture fell about 2 inches this week unless irrigated. Crop water use was above average and will be again next week. Remember that water use drops for two weeks after harvesting hay. Blackfoot streamflows have dropped below average for the first time this year and we have continued to avoid drought designations or hoot owl restrictions.

HOTTEST WEATHER THIS YEAR

Rain was again scarce this week and very warm temperatures dried out cut hay crops quickly. Next week will start out with the hottest temperatures of the year then cool significantly by mid-week. High temperatures next week will be in the upper 90s to start with then drop to near 80F by weeks end. Lows will be in the 40s and 50s. The 30-day forecast says average rainfall and temperatures. The 90-day forecast says average rainfall and above average temperatures.

Your own rain gauge is your best source of rainfall information.

CROP WATER USE - ABOVE AVERAGE WITH HOT WEATHER

Crop water use was above average again this week and will remain above average next week due to hot dry weather. Most crops will use about 2 inches of soil moisture next week (see chart below). Reduce these figures by 2/3 the first week after cutting hay and by 1/3 the second week.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.9	1.8	.26	17.1
PASTURE	1.6	1.5	.21	14.5
SPRING GRAINS	2.1	2.0	.29	14.7
WINTER WHEAT	1.0	0.5	.07	15.3
LAWNS	1.8	1.7	.24	16.4

¹Expected water use over the next week (range if weather becomes cooler or hotter than expected)

²Expected average daily water use over the next week (compare this with your soil moisture content)

³Beginning April 1 – note in 2010-13 we started our seasonal total on May 1 but since include April

SOIL MOISTURE- DROPS 2 INCHES UNLESS IRRIGATED OR CUT

Soil moisture dropped by about 2 inches this week unless irrigated. Soil moisture will drop about the same next week without irrigation. Continue to check your soil moisture and refill with at least as much as the weekly crop water use. Remember that crop water use drops by 2/3 the first week after cutting and by 1/3 the second week after cutting. Haying is a good time to replenish soil moisture while crop water use is reduced and there is less foliage to catch and evaporate water.



The table on Page 1 provides a quick summary of crop water use this last week and an estimate for next week. The table and chart below summarize the entire irrigation season and compare it with average, hot and cool conditions so you can plan ahead. This table and chart will be updated weekly all season.

BLACKFOOT 2022 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)										
WEEK ENDING	RAIN ¹	2022 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	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
APRIL	1.25	1.00	1.00	0.00	0.00	1.00	1.00			
5/6/2022	0.25	0.70	0.60	0.10	0.00	0.80	0.80	0.70	1.00	0.40
5/13/2022	0.01	0.80	0.70	0.20	0.00	0.90	0.90	0.80	1.10	0.60
5/20/2022	0.10	0.90	0.80	0.40	0.20	1.00	0.90	0.90	1.20	0.70
5/27/2022	0.20	0.90	0.80	0.70	0.50	1.00	0.90	1.00	1.30	0.70
6/3/2022	0.10	1.00	0.80	0.80	0.60	1.10	0.90	1.10	1.50	0.80
6/10/2022	0.50	1.00	0.80	0.90	0.70	1.10	0.90	1.20	1.70	0.80
6/17/2022	0.75	1.00	0.80	1.10	0.90	1.10	0.90	1.25	1.90	0.90
6/24/2022	1.00	1.30	1.10	1.30	1.20	1.30	1.20	1.30	2.00	1.00
7/1/2022	0.01	1.70	1.40	1.60	1.70	1.70	1.60	1.40	2.00	1.00
7/8/2022	0.75	1.40	1.20	1.60	1.60	1.50	1.30	1.60	2.10	1.10
7/15/2022	0.01	1.60	1.30	1.70	1.70	1.30	1.50	1.65	2.20	1.10
7/22/2022	0.01	1.90	1.60	2.10	2.10	1.00	1.80	1.70	2.20	1.10
7/29/2022	0.01	1.90	1.60	2.20	2.20	0.50	1.80	1.70	2.00	1.10
8/5/2022								1.50	1.80	1.00
8/12/2022								1.40	1.70	1.00
8/19/2022								1.30	1.60	0.90
8/26/2022								1.20	1.40	0.90
9/2/2022								1.15	1.40	0.70
9/9/2022								1.00	1.30	0.60
9/16/2022								0.90	1.20	0.50
9/23/2022								0.80	1.10	0.50
9/30/2022								0.70	1.00	0.40
TOTAL	3.70	17.10	14.50	14.70	13.40	15.30	16.40	26.25	34.70	17.80

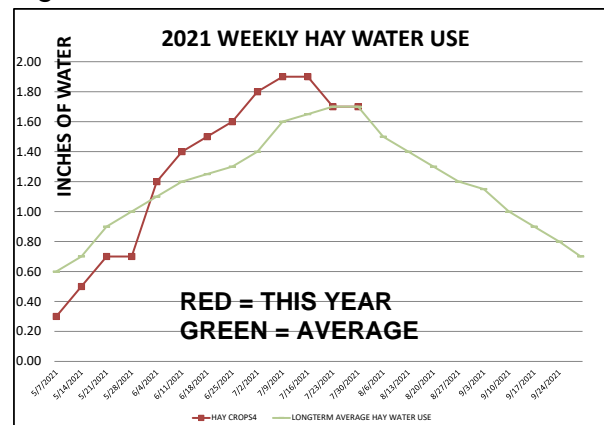
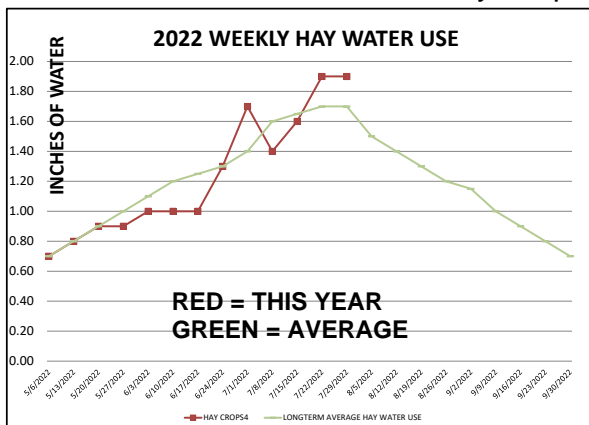
¹ Rainfall should be reduced to account for immediate evaporation from crop and soil surfaces (0.1-April, May and Sept, 0.15-June and August, 0.2-July) (This rainfall figure is an average across all Blackfoot croplands - use your own rain gauge for better accuracy)

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.

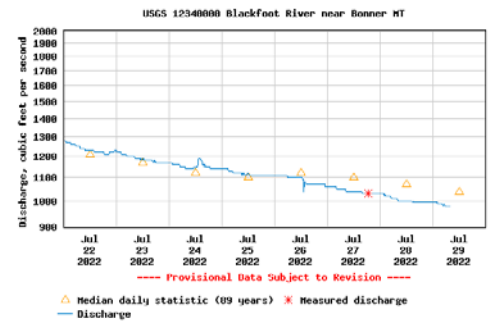
⁴ Hay Crop water use drops approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.

2022 Weekly Crop Water Use Again Exceeds Last Year



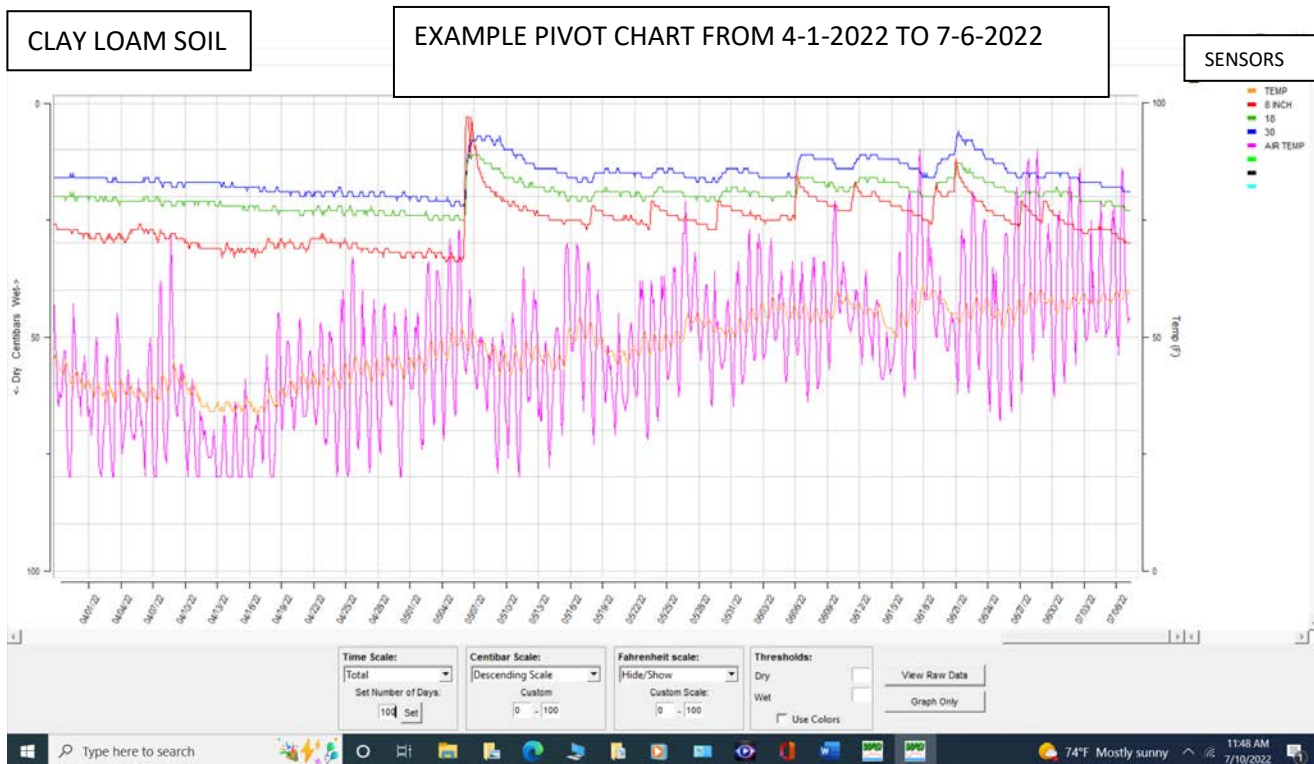
STREAMFLOW

The Blackfoot river flow at Bonner has dropped below average for the first time this year. Today flow is **980 CFS** (average for this date is 1,080 CFS). 1899 saw the highest flow at 2,890 CFS while the lowest flow was 409 CFS in 1988. Blackfoot river flows are still predicted to be about normal for the rest of this season. Hoot owl restrictions have been implemented elsewhere in Montana but not here yet.



SOIL MOISTURE SENSORS DOCUMENT A GREAT IRRIGATION SEASON

The chart below is typical for well-irrigated sites so far this season. It is a pivot on a clay loam soil growing alfalfa/grass hay. All soil layers start out with good moisture April 1. The surface soil dries slightly through April when there was little rain (red 8 inch sensor). The 18 inch (green) and 30 inch (blue) sensors show these depths dry more slowly. Soil moisture is boosted at all depths by a big irrigation in early May. Then there are a series of irrigation and rain events that boost soil moisture (peaks) followed by declines. The surface soil (red) dries first with the deeper depths following. Soil moisture is maintained above 30CB (centibars) throughout the period which is well above 50% of the Water Holding Capacity for this soil (130CB). It's important to note that the crop is using soil moisture from all depths and not just the surface soil. We want to encourage deep rooting and use as much soil as possible to grow crops. Soil temperature (orange) ranged from about 35F to 60F at 8 inches. Air temp (pink) is much more variable. For help installing soil moisture sensors contact Jennifer Schoonen or myself.



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

THE BLACKFOOT WATERSHED 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.



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 watershed, especially in drought years.
- Reduce river withdrawals by rotating systems and reducing the amount of irrigation at one time. Stop irrigating if you can to help streamflows.



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.