

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

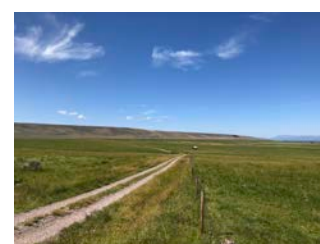
Friday July 1, 2022



Blackfoot watershed croplands had little or no rain this week and warm, sunny skies. Next week will again have little rain with highs in the 70s and 80s and lows in the 40s and 50s. Crops have grown like crazy this week after weeks of cool temperatures. Since growth has been slow, some folks will delay hay harvest to maximize yields on the first cutting. Soil moisture fell about 1½ inches this week unless irrigated. Crop water use will be high again next week drying soils in fields not irrigated. Streamflows are dropping fast. Have a safe and happy 4th of July weekend!

WEATHER - WARM SUNNY DAYS

Blackfoot croplands had little or no rain this last week with a few spots getting some from isolated thunderstorms. Little rain will fall next week except in rare and scattered thunderstorms. High temperatures will be in the 70s and 80s with lows in the 40s and 50s. The 30-day forecast says average rainfall and temperatures. The 90-day forecast says below average rainfall and above average temperatures.



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

CROP WATER USE - ABOVE AVERAGE FOR FIRST TIME THIS YEAR

This week crop water use was above average for this time this year and should remain high through next week as well. We finally have some warm, sunny weather and crops are responding by dramatically increasing growth after a cool spring. Crops will use 1½ inches to 2 inches of soil moisture next week (see chart below).

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.7	1.8	.26	10.3
PASTURE	1.4	1.5	.21	8.8
SPRING GRAINS	1.7	1.9	.27	7.1
WINTER WHEAT	1.7	1.9	.27	11.0
LAWNS	1.6	1.7	.24	10.0

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 - DROPPING 1½ TO 2 INCHES NEXT WEEK

Soil moisture dropped in fields not irrigated this week since crop water use was high and there was little or no rainfall. Soil moisture will drop 1½ to 2 inches next week without irrigation so continue to check your soil moisture and refill with at least as much as the weekly crop water use. The next few weeks are the best time to “**MAKE HAY**” so pour it on while water is available and crops are growing fast. Boost soil moisture before cutting and as soon as you can after.

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.

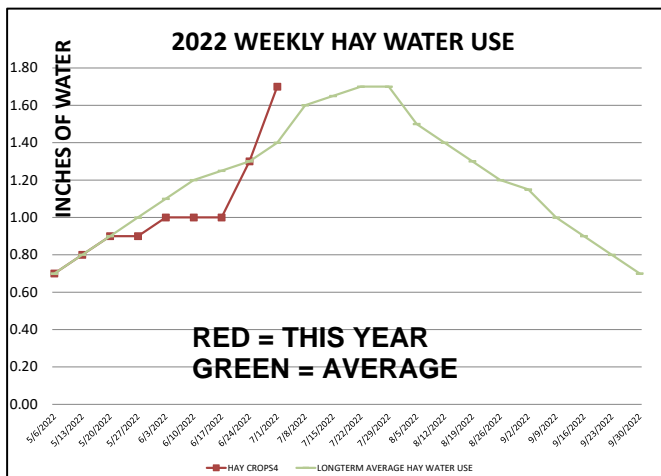
BLACKFOOT 2022 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)											
WEEK ENDING	RAIN ¹	2022 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³			
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE 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								1.60	2.10	1.10	
7/15/2022								1.65	2.20	1.10	
7/22/2022								1.70	2.20	1.10	
7/29/2022								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	2.92	10.30	8.80	7.10	5.80	11.00	10.00	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.

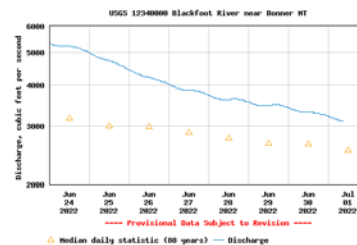
³ **Longterm average** water use for each crop each week based on long-term historic data.

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



STREAMFLOW

The Blackfoot river flow at Bonner dropped significantly this week to **3,120 CFS** today. This is about average for this date (3,030 CFS). 1899 saw the highest flow at 12,100 CFS while the lowest flow was 612 CFS in 1977. Blackfoot river flows are still predicted to be about normal for the rest of this season.



PUMP TESTS

are available this year in late June and early July while systems are still running. This can get your system operating at its peak while using the least power = **better crops and lower electric bills**. We are very lucky to have John Heffernan doing the testing with his decades of experience helping irrigators understand their systems and what options are for improvements. Contact Jennifer if you are interested.

WHEN WATER RIGHTS DON'T COVER GROUNDWATER



The land has dropped over 30 feet due to groundwater removal

This amazing photo shows how the land elevation has sunk dramatically due to groundwater pumping for irrigation in the central valley of California. As water is removed and not replaced by rain and snowmelt, the underground aquifer that was supported by water simply collapses. Pore spaces that used to contain water make up about 50% of the aquifer and when the water is removed the empty pore spaces are crushed. It's hard to believe that the land surface in 1925 was near the top of that power pole. This has had severe effects on roads, bridges, houses and other features across the landscape. The effect has continued since 1977 when this photo was taken and only recently have legislators begun to address the excessive pumping with new water laws.

This same problem in Arizona has resulted in similar subsidence across large valleys with cracks forming across the landscape for miles.

California and Arizona water law failed to regulate groundwater which resulted in *"The Law of the Biggest Pump."* Whoever could afford to drill the deepest wells and use the biggest pumps could extract all the water they wanted. Most of this water was left over from the last ice age and is not replenished in our current climate. We call this water mining. Small towns, historic irrigators and individuals with domestic wells have seen their wells go dry as rich new-commers drilled deeper than the original residents could afford. Although these states have changed their water laws somewhat, many of the worst impacts have been grandfathered in and many have been left without access to water.

Montana water law recognizes that surface water and groundwater is connected and protects both from over-use. We often complain about government regulations and the water right adjudication process we went through in recent decades. However, these *regulations* have proved to be the *protections* needed to ensure future Montanans will have water into the future.

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.



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.