

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday May 21, 2021



After a warm, sunny start, this week ended in rain and snow with more to come next week. Most Blackfoot croplands had about ½ inch of rain this week with some snowflakes. Surface soil moisture levels are still slightly depleted in most fields not yet irrigated. Most of the Blackfoot drainage is not listed as being in a drought condition at this time, unlike most of Montana. The NOAA US Drought Monitor Map shows only Potomac and Lincoln area irrigated croplands in the “Slightly Dry” category.

The snowpack continues to be good this week at 96% of average (similar to last year). Stream flow continues to hover around average, fluctuating with rain and temperatures. There appears to be plenty of water for early season irrigation but predicted hot, dry weather could change that later on.

WEATHER - WINTER RETURNS



Last week had a mix of weather again but this coming week looks just cold and moist. It will start out snowy with highs in the 50s then switch to rain with highs in the 60s later in the week. Lows will be in the 20s then rise to the 30s. The 30-day forecast says above average rainfall and average temperatures. The 90-day forecast says below average rainfall and above average temperatures.



CROP WATER USE - CONTINUES LOW WITH COLD WEATHER

Crop water use remains below average due to cool weather. Note that in these early season reports, we list a range of crop water use to account for elevation and soil differences. Crop water use will even out across the drainage when crops start actively growing everywhere. Right now, lower elevations and coarser soils are using more water. Blackfoot irrigated croplands range from 3500 feet in the Potomac area to 5000 feet in the higher valleys. The table below provides a quick summary of crop water use this last week and an estimate for next week.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	0.5-0.8	0.4-0.7	.06-.10	1.5
PASTURE	0.5-0.7	0.4-0.6	.06-.09	1.5
SPRING GRAINS	0.0-0.3	0.2-0.4	.03-.06	0.4
WINTER WHEAT	0.6-0.9	0.5-0.8	.07-.11	2.0
LAWNS	0.6-0.9	0.5-0.8	.07-.11	2.0



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

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.

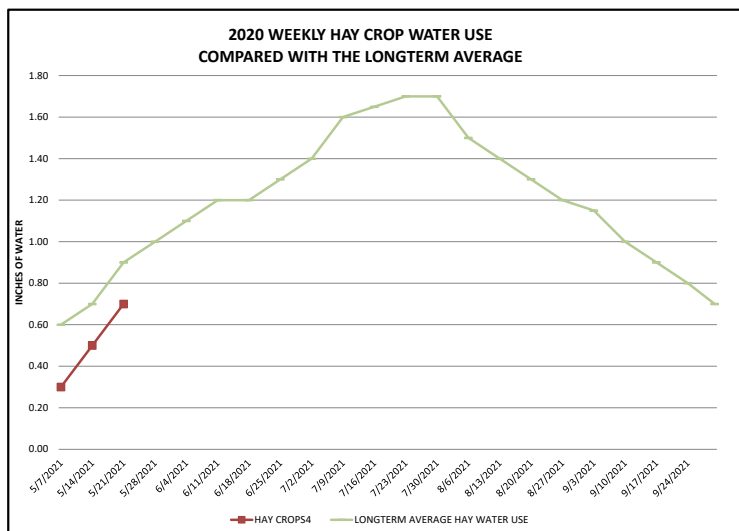
BLACKFOOT 2021 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)										
WEEK ENDING	RAIN ¹	2021 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/7/2021	0.40	0.30	0.40	0.00	0.00	0.50	0.50	0.60	1.00	0.30
5/14/2021	0.20	0.50	0.50	0.10	0.00	0.70	0.70	0.70	1.10	0.40
5/21/2021	0.50	0.70	0.60	0.30	0.10	0.80	0.80	0.90	1.20	0.50
5/28/2021								1.00	1.30	0.50
6/4/2021								1.10	1.50	0.60
6/11/2021								1.20	1.70	0.70
6/18/2021								1.20	1.90	0.70
6/25/2021								1.30	2.00	0.80
7/2/2021								1.40	2.00	0.90
7/9/2021								1.60	2.10	1.00
7/16/2021								1.65	2.20	1.00
7/23/2021								1.70	2.20	1.00
7/30/2021								1.70	2.00	1.00
8/6/2021								1.50	1.80	0.90
8/13/2021								1.40	1.70	0.80
8/20/2021								1.30	1.60	0.80
8/27/2021								1.20	1.40	0.70
9/3/2021								1.15	1.40	0.70
9/10/2021								1.00	1.30	0.60
9/17/2021								0.90	1.20	0.50
9/24/2021								0.80	1.10	0.50
9/30/2021								0.70	1.00	0.40
TOTAL	1.10	1.50	1.50	0.40	0.10	2.00	2.00	26.00	34.70	15.30

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.

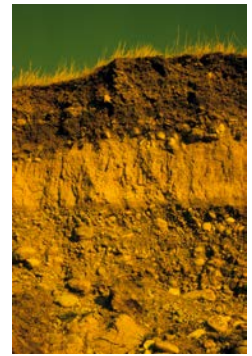
³ **Longterm average** water use for each crop each week based on long-term historic data.

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



SOIL MOISTURE - A BIT LOWER THAN AVERAGE!

Soil moisture levels throughout the drainage this week continue to be slightly lower than last year. Most surface soils are filled up to about 50 percent of their water holding capacity. Surface soils begin to slowly lose moisture after snowmelt by evaporation alone and then by transpiration from crop plants even when they are young or remnants of cutting. The time between snowmelt and vigorous crop growth in May has been getting longer. Irrigators should plan to fill up their soils and concentrate on early season irrigation (May-mid July) when it's most effective (less immediate evaporation).



WEEKLY TIPS

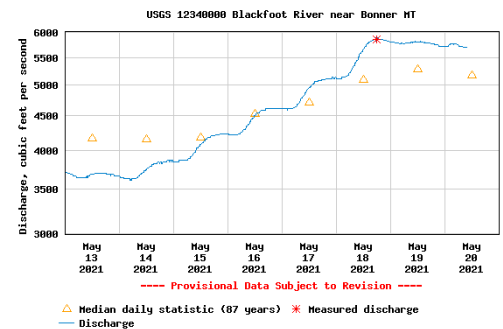
Water Supply



Blackfoot drainage snowpack is holding up well at 94% of average down from 102% on May 1. Alternating warm and cool weather has caused snowmelt and streamflow to fluctuate in recent days. Blackfoot precipitation was down to 75% of normal in the last 30 days. Reservoir storage remains good. Blackfoot river flows are predicted to be slightly above normal this season but watch for a change if the weather should turn hot and dry.

Streamflows

The Blackfoot river flow at Bonner is about 5,700 CFS today which is about average for this date (5,720 CFS) and about the same as last year. 2018 set the highest flow record at 12,700 CFS while the lowest flow on this date was 1180 CFS in 1941.



When Do Blackfoot Cropland Soils Freeze and Thaw?

The soil moisture sensors we are using stop working when they freeze. This tells us the approximate freeze dates from sensors installed at different depths. In the winter of 2020-2021 our **sensors at 8 inches froze about December 1 and thawed between March 20 and April 3.** The 18-inch sensors froze from December 1 to January 1 and thawed from April 1 to 20. The 30-inch sensors that did freeze, froze about February 1 and thawed from mid to late April. Not all of the 30-inch and 55-inch sensors froze. We don't have enough data to say more at this time but will present more when available.



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 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.



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.