

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday May 5, 2023



Welcome to the 2023 irrigation season! This winter was more reminiscent of “the old days” where snowfall accumulated on croplands throughout the winter and persisted until April. Most recent snowmelt on croplands was effective at increasing soil moisture leaving it at a high level to start the season. Without a snowless period between snowmelt and rapid early growth in May, soil moisture remains high. You should still check recent plantings to ensure good surface soil moisture since it has dried rapidly in the past week due to high temperatures and rapid growth. Some irrigators have begun applying water, but many have waited due to good soil moisture levels. The snowpack was looking good but has melted quickly in recent days due to warm temperatures with most streams running bank-full. Once again, we will provide weekly summaries of weather and crop water use along with predictions for the upcoming week. Other topics will include streamflow, drought conditions, soil health and anything else you want to talk about. Please send us any ideas or questions on these or other subjects. We will respond and share them with everyone.

WEATHER - COOLER NEXT WEEK, A LITTLE RAIN

Most cropland in the watershed had little or no rain this week with a little falling in the last 24 hours. Next week will see cooler temperatures with highs in the 60s and lows in the 30s and 40s. There is a chance of rain but no major storms are predicted. The 30-day forecast says **average rainfall and above average temperatures**. The 90-day forecast says the below average rainfall and average to above average temperatures.



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

CROP WATER USE - LOW NEXT WEEK WITH COOL WEATHER

Crop water use was very low throughout April but increased quickly with warm weather this last week. It will be low next week due to cool temperatures and some rain. Note that in the early season things are more variable across Blackfoot croplands since low elevations and coarser soils warm up quicker. In these early reports, we list a range of crop water use to account for this variation. Crop water use will even out when crops start actively growing across the entire drainage.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	0.3-0.5	0.3-0.5	.04-.07	0.7
PASTURE	0.3-0.5	0.3-0.5	.04-.07	0.7
SPRING GRAINS	0.0	0.0	.00-.00	0.0
WINTER WHEAT	0.3-0.6	0.3-0.6	.04-.09	0.8
LAWNS	0.3-0.5	0.3-0.5	.04-.07	0.7

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 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 2023 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

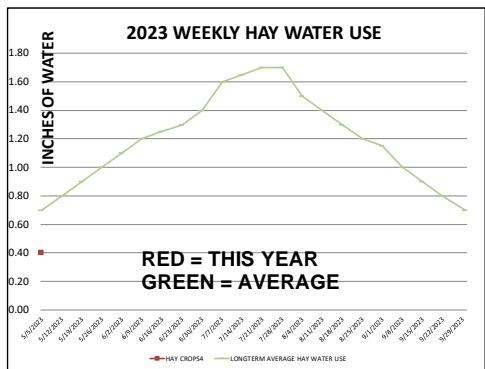
WEEK ENDING	RAIN ¹	2023 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	0.25	0.25	0.25	0.00	0.00	0.25	0.25			
5/5/2023	0.10	0.40	0.40	0.00	0.00	0.50	0.40	0.70	1.00	0.40
5/12/2023								0.80	1.10	0.60
5/19/2023								0.90	1.20	0.70
5/26/2023								1.00	1.30	0.70
6/2/2023								1.10	1.50	0.80
6/9/2023								1.20	1.70	0.80
6/16/2023								1.25	1.90	0.90
6/23/2023								1.30	2.00	1.00
6/30/2023								1.40	2.00	1.00
7/7/2023								1.60	2.10	1.10
7/14/2023								1.65	2.20	1.10
7/21/2023								1.70	2.20	1.10
7/28/2023								1.70	2.20	1.10
8/4/2023								1.50	2.20	1.00
8/11/2023								1.40	2.20	1.00
8/18/2023								1.30	2.00	0.90
8/25/2023								1.20	1.80	0.90
9/1/2023								1.15	1.60	0.70
9/8/2023								1.00	1.40	0.60
9/15/2023								0.90	1.40	0.50
9/22/2023								0.80	1.20	0.50
9/30/2023								0.70	1.00	0.40
TOTAL	0.10	0.65	0.65	0.00	0.00	0.75	0.65	26.25	37.20	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 d

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.

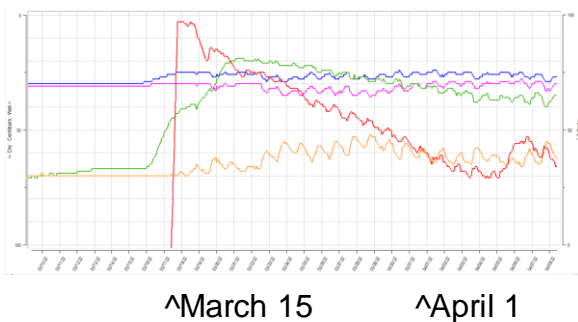


SOIL MOISTURE – ABOVE AVERAGE FOR A CHANGE!

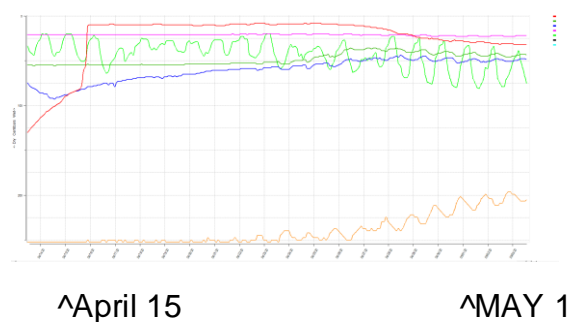
Soil moisture levels throughout the drainage this week were high and much higher than this time last year. Most soils are filled to 75 - 90% of their water holding capacity throughout the 3-foot root zone. In most fields, a late snowmelt filled soils to their water holding capacities and only the past week or so has had warm temperatures which stimulated growth and dried the surface soil. This is more reminiscent of the “good old days” when the time between snowmelt and the start of active growth was short. Soils therefore did not have time to dry out as they have in most recent years. New seedlings and shallow-rooted crops may need irrigating if the surface soil they are rooted in has dried so check to ensure good growth.

The charts below are examples from our soil moisture sensor program. The chart on the left shows a sharp decrease in soil moisture in the surface foot (red line) starting when snow melted in early March of 2022. The chart on the right shows that this year snow didn’t melt until late April and soil moisture in the surface foot didn’t begin to decrease until the end of the month – almost 6 weeks later than in 2022.

2022



2023



Soil near 100% of its water holding forms a ball when squeezed and leaves the hand moist. Water is visible on the surface of the soil and the hand as a dark stain or shiny surface.



Soil near 50% of its water holding capacity may form a weak ball but leaves little moisture on the hand. Soil at 25% or less of its water holding capacity does not form a ball when squeezed. It feels and looks dry. If sandy or loamy, it crumbles easily, if high in clay it forms a hard lump. Call, text or email anytime if you have questions about evaluating your soil moisture content and irrigation options.

WEEKLY TIPS

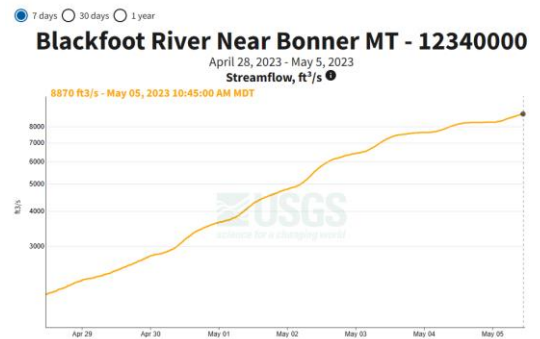
SNOWPACK AND WATER SUPPLY

Our Blackfoot watershed snowpack is at 81% of average today which is slightly lower than the past few years. The snowpack on May 1 was 88% of average and dropped to 81% with warm weather over the past 5 days creating bank-full stream flows. Precipitation in the Blackfoot was 88% of normal in April which combined with melting snow on croplands left soils more moist than average this week. Reservoir storage is good at 97% of normal compared with 82% last year. Blackfoot river flows are predicted to be slightly above average this season but much of it seems to be coming right now due to warm weather.



STREAMFLOW

The Blackfoot river flow at Bonner is 8,870 CFS today which is above average for this date (3,780 CFS) and above last year. 2018 set the highest flow record at 13,100 CFS while the lowest flow on this date was 700 CFS in 1905. Weather predictions for the next 30 days are for above average temperatures and average rainfall which should keep stream flows high. Predictions for the next 90 days are for average to above average temperatures and below average rainfall.



CHECK SOIL MOISTURE IN NEW SEEDINGS

Soil moisture looks good this year but recent hot weather dried out the surface soil so check soil moisture in the root zone of new plantings and shallow-rooted crops. Possible rain this week could provide all the moisture you need but a light irrigation may be needed in some fields.



BIOCHAR PROJECT UPDATE

Late snowmelt has delayed access to the biochar produced last fall from Gold Creek slash piles. Current plans are to deliver biochar to the participating ranches later in May. The Missoula compost facility has generously offered to donate compost to the project and it will be delivered at the same time as biochar. Participants will mix the biochar and compost then let it sit before spreading on fields. This is a preferred method since microbes in the compost will inoculate the biochar which is excellent microbe habitat. The increased water holding capacity and increased microbial activity should benefit soil health and productivity.

For further information contact [Jennifer Schoonen](mailto:Jennifer.Schoonen@blackfootchallenge.com), Blackfoot Challenge Water Steward, 406-360-6445 or [Barry Dutton](mailto:Barry.Dutton@landandwaterconsulting.net), 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.