

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday May 13, 2022



It was another week with cool temperatures and a bit of snow up high but little precipitation for local croplands. Soil moisture levels remain low in fields not yet irrigated, especially in the surface 2 feet. Now is the best time to boost moisture levels while temps are cool, crop water use is low and water is abundant. Most irrigators will need to apply an extra 2-3 inches of water to fill up soils during early irrigations. Check how deep you are irrigating with a probe, shovel or moisture sensors to ensure you fully moisten the crop root zone. Lead your roots to deeper depths by irrigating deeply. Let us know your ideas for other information you would like in these reports.

WEATHER - COOL AGAIN NEXT WEEK

Most of the Blackfoot drainage had only a trace of rain this week and cool temperatures. There could be a few snowflakes this weekend but then become mostly sunny with little rain. Highs will be in the 50s and 60s with lows in the 30s and 40s. The 30-day forecast says above average rainfall and below average temperatures. The 90-day forecast says the opposite - below average rainfall and above average temperatures.



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

CROP WATER USE - ABOUT AVERAGE WITH COOL WEATHER

May has begun with little moisture and cool conditions on local croplands. Crop water use was low this week and looks to continue that way until warmer temperatures return. 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 | 0.5-0.8 | 0.7-0.9 | .10-.13 | 2.5 |
| PASTURE | 0.5-0.7 | 0.6-0.8 | .09-.11 | 2.3 |
| SPRING GRAINS | 0.0-0.2 | 0.0-0.4 | .00-.06 | 0.3 |
| WINTER WHEAT | 0.7-0.9 | 0.8-1.0 | .10-.14 | 2.7 |
| LAWNS | 0.7-0.9 | 0.8-1.0 | .10-.14 | 2.7 |

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.

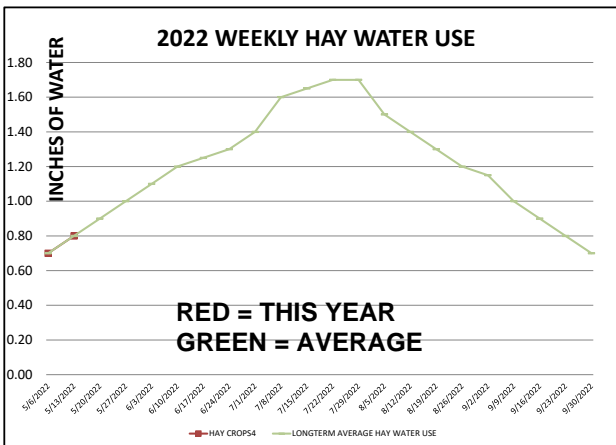
| BLACKFOOT 2022 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER) | | | | | | | | | | |
|---|-------------------|---|-------------|-------------------------|--------------------------|--------------|-------------|--|------------------------|-------------------------|
| WEEK ENDING | 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 | | | | | | | | 0.90 | 1.20 | 0.70 |
| 5/27/2022 | | | | | | | | 1.00 | 1.30 | 0.70 |
| 6/3/2022 | | | | | | | | 1.10 | 1.50 | 0.80 |
| 6/10/2022 | | | | | | | | 1.20 | 1.70 | 0.80 |
| 6/17/2022 | | | | | | | | 1.25 | 1.90 | 0.90 |
| 6/24/2022 | | | | | | | | 1.30 | 2.00 | 1.00 |
| 7/1/2022 | | | | | | | | 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 | 0.26 | 2.50 | 2.30 | 0.30 | 0.00 | 2.70 | 2.70 | 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.



SOIL MOISTURE - STILL BELOW AVERAGE UNLESS IRRIGATED!

Soil moisture levels throughout the drainage this week continue to be average or slightly below unless irrigated. Most soils are filled to about 50% of their water holding capacity throughout the 3-foot root zone. Irrigators should check soil moisture levels and fill up soils during early irrigations. This is the easiest time to fill up soils to their full water holding capacities while crop water use is low, crops are short and weather is cool. Most soils could use an extra 2-3 inches to fill them up.



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 (photo at left).



Soil near 50% of its water holding capacity may form a weak ball but leaves little moisture on the hand (photo at left).

Soil at 25% or less of its water holding capacity does not form a sturdy ball when squeezed. It feels and looks dry. If sandy or loamy, it crumbles easily, if high in clay it forms a hard lump (no photo). Call, text or email anytime if you have questions about evaluating your soil moisture content and irrigation options.

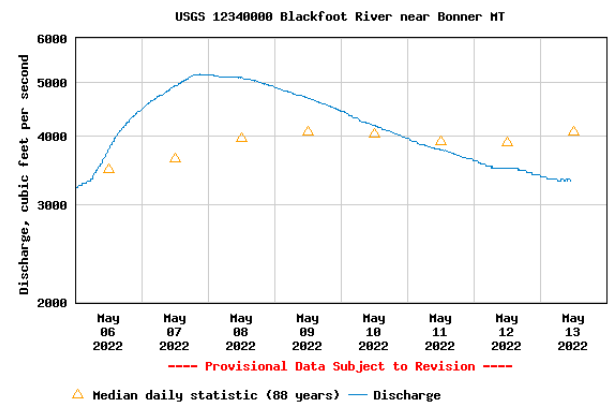
SNOWPACK AND WATER SUPPLY

Blackfoot drainage snowpack rose from 96% of average last week to **107%** due to cool weather and a little snow up high. Precipitation in the last 30 days is about average. Reservoir storage is good but slightly below last year. Blackfoot river flows are predicted to be about normal this season. Last year the prediction at this time was for above-normal flows but drought conditions dropped late season flows below normal. You may notice that these figures are not exactly the same as those in the NRCS Monthly Water Supply Reports. We use figures which are updated daily and not those reported at the start of each month in those reports.



STREAMFLOW

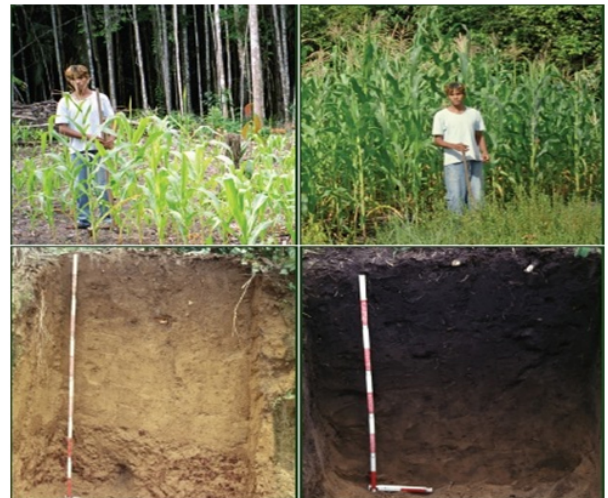
The Blackfoot river flow at Bonner is **3,320 CFS** today which is below average for this date (4,820 CFS). 2018 set the highest flow record at 15,800 CFS while the lowest flow on this date was 1180 CFS in 1941. Weather predictions for the next 30 days are for below average temperatures and above average rainfall which should help maintain streamflows. Predictions for the next 90 days say above average temperatures and below average and rainfall.



SOIL HEALTH - LESSONS FROM THE PAST - TERRA PRETA SOILS

The Amazon basin has lots of sandy soils from which most of the nutrients have been leached away by abundant rainfall over thousands of years. Ancient farmers would clear forest lands and grow crops but soil fertility and crop production would only last a few years before they had to move on to a new site.

Anthropologists discovered areas with very dark and fertile soils which they called **Terra preta** (black soil) or **Terra preta de índio** (black soil of the Indians). Early Indian farmers added charcoal, bones, pottery, compost and manure to these soils over decades or centuries. The charcoal and its biochar components last for long periods staining these soils black. They have dramatically more microbial activity plus much better water and nutrient holding capacity. These soils grow much better crops that adjacent untreated soils. This allowed these ancient farmers to remain in one place instead of constantly moving to new sites which had to be cleared of forest and prepared for crops. More stable societies could then develop and lifestyles became less nomadic.



Terra preta soils where early peoples added biochar-like materials to sandy Amazon soils for decades or more to increase yields

These soils are an inspiration for soil health and biochar advocates supporting the value of biochar and its ability to improve soils and sequester carbon for long periods. The carbon these early farmers added to their soils is still present hundreds of years later. The increased biological activity, water and nutrient holding capacity and crop production is still evident on these soils. The young man in the photo and his soil have become one of the most famous biochar symbols today.

The Blackfoot Challenge is participating in a pilot project that will produce biochar from local forest wood wastes. It will be applied to local croplands and other lands in the drainage. More information about this effort will be included in future reports.

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.