

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday September 11, 2020



Yes, it did rain and snow on Labor Day with most Blackfoot croplands receiving about ¼ inch. Next week will likely have temperatures in the 70s and 80s with scattered showers later in the week. Crop water use continues at about 1¼ inches for most crops and should decrease next week. Blackfoot River flows are about 650 CFS today which is average for this time of year.

We provide weekly summaries of weather, crop water use and soil moisture conditions as well as tips for irrigation, soil health and crop production. A condensed overview of suggestions for the entire irrigation season is presented on the last page of this report. Use it to look ahead and plan or to compare what you're doing now. If you would like other information please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).



WEATHER - HAZE AND SCATTERED SHOWERS

Most croplands had ¼ inch of rain or this week and clear skies. The highest elevations had snow. Fire haze has returned and will persist unless scattered showers later next week blow it out from the right direction. The coming week will have **highs in the 70s & 80s** and **lows in the 30s & 40s**. The 30-day forecast says above average temperatures and below average rainfall. The 90-day forecast predicts above average temperatures and rainfall.

CROP WATER USE - DROPPING WITH COOLER WEATHER

Crop water use continues higher than average for this time of year but is decreasing steadily with temperatures. The table below provides a quick summary of crop water use this last week and an estimate for next week. The table and chart on Page 2 summarize the entire irrigation season and compare it with average, hot and cool conditions so you can plan ahead.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.3	1.0 (0.9 - 1.2)	.14	24.9
PASTURE	1.0	0.8 (0.7 - 1.0)	.11	20.6
SPRING GRAINS	0.0	0.0 (0.0 - 0.0)	.00	16.7
WINTER WHEAT	0.0	0.0 (0.0 - 0.0)	.00	15.9
LAWNS	1.2	1.0 (0.9 - 1.1)	.14	23.3

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

BLACKFOOT 2020 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

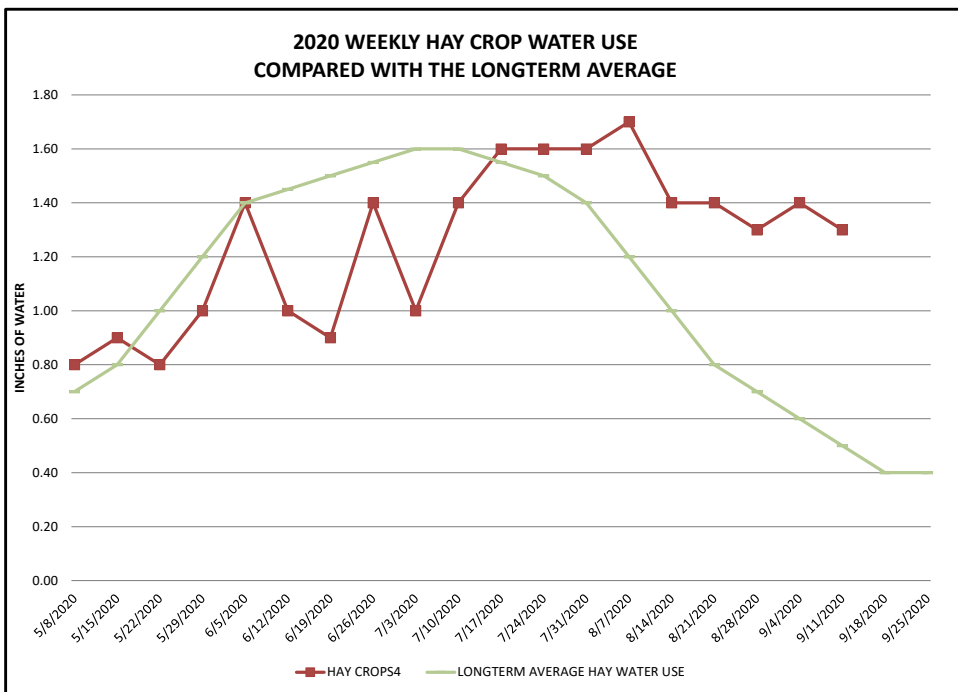
WEEK ENDING	RAIN ¹	2020 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/8/2020	0.01	0.80	0.70	0.10	0.10	0.90	0.90	0.70	1.00	0.30
5/15/2020	0.30	0.90	0.80	0.10	0.10	0.90	0.90	0.80	1.10	0.50
5/22/2020	1.25	0.80	0.70	0.30	0.20	0.80	0.80	1.00	1.20	0.60
5/29/2020	0.10	1.00	0.80	0.70	0.40	1.20	0.90	1.20	1.30	0.80
6/5/2020	1.00	1.40	1.20	1.00	0.70	1.50	1.30	1.40	1.50	1.00
6/12/2020	1.00	1.00	0.90	1.00	0.90	1.10	1.00	1.45	1.70	1.00
6/19/2020	0.25	0.90	0.70	0.90	0.90	1.00	0.80	1.50	1.90	1.10
6/26/2020	0.25	1.40	1.20	1.70	1.70	1.70	1.30	1.55	2.00	1.10
7/3/2020	1.00	1.00	0.80	1.20	1.20	1.20	0.90	1.60	2.10	1.30
7/10/2020	0.01	1.40	1.10	1.50	1.50	1.40	1.20	1.60	2.00	1.20
7/17/2020	0.01	1.60	1.30	1.80	1.80	1.20	1.50	1.55	2.00	1.20
7/24/2020	0.01	1.60	1.30	1.80	1.80	0.80	1.50	1.50	2.20	1.10
7/31/2020	0.01	1.60	1.30	1.80	1.80	0.80	1.50	1.40	2.20	1.10
8/7/2020	0.01	1.70	1.40	1.20	2.00	0.25	1.60	1.20	1.50	0.90
8/14/2020	0.01	1.40	1.20	0.50	1.00	0.00	1.30	1.00	1.30	0.70
8/21/2020	0.01	1.40	1.10	0.00	0.50	0.00	1.20	0.80	1.20	0.60
8/28/2020	0.01	1.30	1.00	0.00	0.00	0.00	1.20	0.70	1.10	0.50
9/4/2020	0.01	1.40	1.10	0.00	0.00	0.00	1.30	0.60	1.00	0.40
9/11/2020	0.25	1.30	1.00	0.00	0.00	0.00	1.20	0.50	0.90	0.40
9/18/2020								0.40	0.70	0.30
9/25/2020								0.40	0.70	0.30
TOTAL	6.75	24.90	20.60	15.70	16.70	15.85	23.30	22.85	30.60	16.40

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 - DROPS ABOUT 1 INCH IF IRRIGATED

Where there was soil moisture it dropped by about 1 inch this week depending on crop type. Most local soils are relatively dry and await fall rains for recharge.



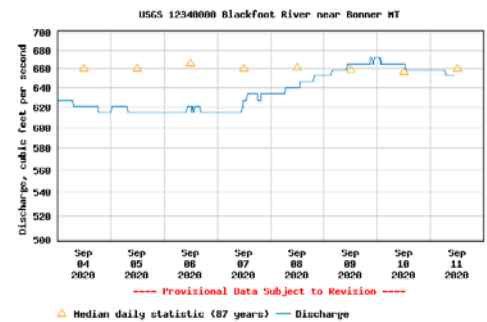
WEEKLY TIPS



Blackfoot River Flow is Slightly Below Average

TODAY:	653 CFS
AVERAGE:	661
HIGHEST:	1,280 (1899)
LOWEST:	357 (1988)

After ¼ inch of rain this week, the Blackfoot River flow is average for this time of year. It has been nice to have a season without river flow concerns for a change.



Blackfoot Irrigator Installs Sensors, Saves Water and Improves Irrigation

Local rancher Kyle Graveley installed soil moisture sensors at 5 pivots and 1 wheel-line in 2019. For the first time he had a continuous look at his soil moisture and a permanent record to contemplate and compare with future years. Already he altered his irrigation to both save water and improve conditions for crops. The wheel line sensors confirmed what Kyle already knew - he was putting more water on than needed. He ran his wheel-line on 24-hour sets for convenience but the sandy/gravelly soil would not hold this much water in the root zone. His choices were to 1) go to 12-hour sets which means more labor, 2) use a timer to shut off for part of each 24-hour set or 3) change nozzles to apply less water. He chose the smaller nozzle route which is probably best for the crop.

Kyle estimates he is **saving about 30,000 gallons per irrigation** on a field that gets about 10 irrigations each year. As well as saving water he is improving soil aeration by not saturating pores with water as much of the time. The soil microbes that make nutrients available to crops need oxygen to thrive. Less water also reduces the risk of washing nutrients below the root zone. In a future of less water, every savings will become increasingly important. Go Kyle!!



Thank to Kyle Graveley for sharing his experience and data!

Examples of Information from Soil Sensors

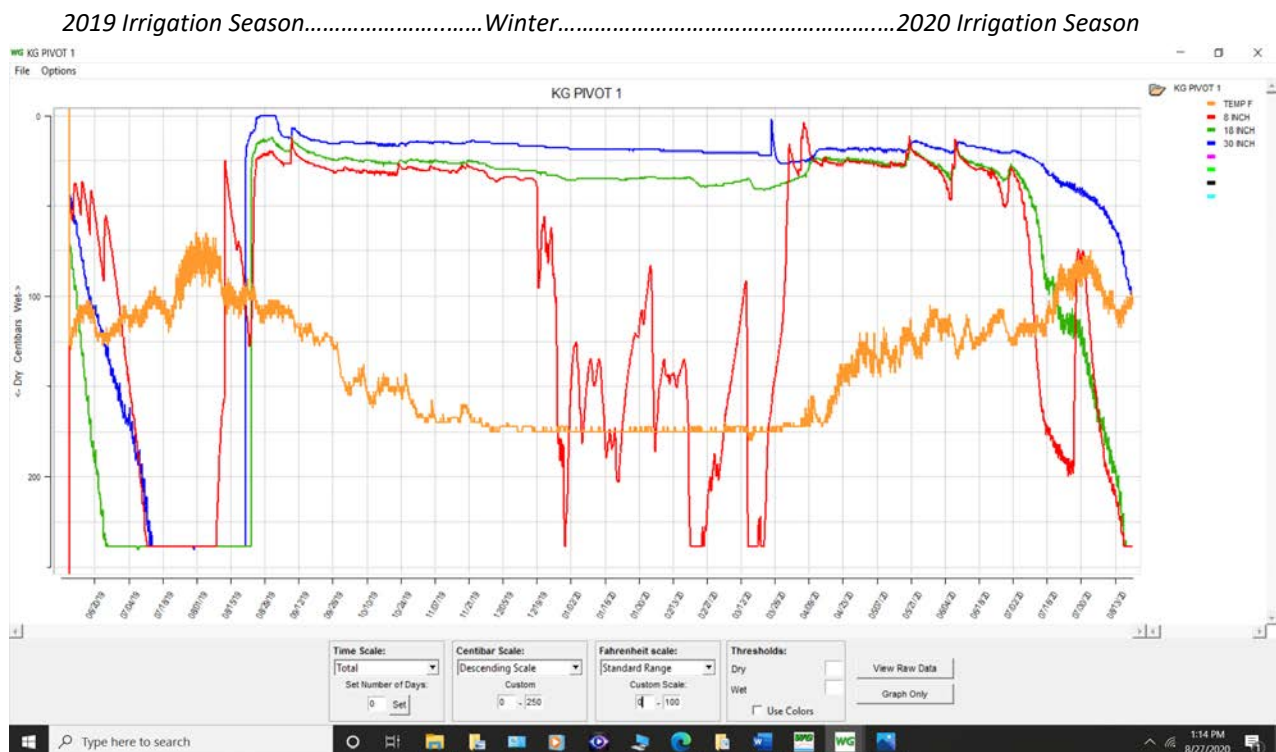
The graph below shows soil moisture at three depths (red=8inch, green=18inch, blue=30inch) and soil temperature (orange=8inch). These depths are about the middle of the first, second and third foot of soil. The graph starts in June of 2019 and ends in August of 2020 so you can see most of two irrigation seasons with the winter between.

In the first season you can see that irrigations in June are only affecting the surface foot of soil where the 8inch sensor is (red line). Each irrigation shows an increase (spike) in moisture at 8 inches. However, the 18 and 30 inch sensors show a steady decline. Soil moisture drops during haying and then irrigation resumes in early August. At this time, enough water is applied to increase moisture at all levels including the 30 inch zone. Wetting a larger root zone stores more moisture and expands the amount of soil crops draw both water and nutrients from.

Soil moisture levels are maintained at a high level throughout the winter and spike during snowmelt/spring rains in March and April. The wild fluctuations throughout the winter are likely caused by temperature affecting the sensor or data recorder battery.

2020 irrigation begins in late May and enough water is applied to affect soil moisture at all three sensors levels and not just the first foot of soil. This stores more soil moisture and allows more time between irrigations. Irrigation stops for haying in early June and soil moisture falls – first in the surface layer (red), then the second layer more slowly (green) and finally in the third foot of soil (blue).

The soil temperature data (orange) shows that 2019 was warmer in general than 2020. The highest soil temperature in 2019 was 74F while in 2020 it was 70F. The soil also took much longer to warm up in 2020. Unfortunately, the sensors don't work below 30F.



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- REDUCE OR CEASE IRRIGATING IF POSSIBLE DURING DROUGHTS!

- Apply 1 - 2 ½ 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.