

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday July 9, 2021



It was hot and dry again this week on Blackfoot croplands with temperatures in the 90s most days. Next week looks hot and sunny again with smoke. Crop water use this week reduced soil moisture levels by about 2 inches unless irrigated. Next week potential crop water use will again approach 2 inches but actual use will drop in many fields due to low soil moisture and harvest. Blackfoot River streamflows continue far below average. The Blackfoot Drainage has made it onto the drought map for the first time this year and the Challenge drought committee will meet on Monday to discuss options.



WEATHER - HOT AND DRY AGAIN NEXT WEEK

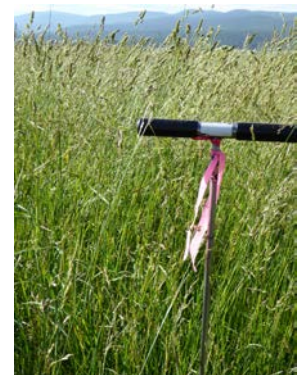
Hot, sunny weather last week with little or no rain will repeat again next week. Highs will mostly be in the 90s and lows in the 50s. Both the 30-day and 90-day forecasts continue to say **below average rainfall and above average temperatures**. The highest temp ever in Montana was 117F at Medicine Lake (1937) and Glendive (1893).

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

CROP WATER USE - ABOVE AVERAGE - Over $\frac{1}{4}$ INCH PER DAY

Hot temperatures and sunny skies kept crop water use above average again this last week. **Most crops used almost 2 inches of water and will use about the same next week unless harvested.** Hay cutting reduces water use by about 2/3 the first week and 1/3 the second week. The table below provides a quick summary of crop water use this last week and an estimate for next week. We also list season totals and compare them with past years in our annual reports available on the Challenge website.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL ¹	NEXT 7 DAYS DAILY AVE ²	SEASON TOTAL ³
HAY CROPS	1.9	1.9	.27	11.6
PASTURE	1.6	1.6	.23	10.1
SPRING GRAINS	2.0	2.0	.29	9.9
WINTER WHEAT	2.0	2.0	.29	12.8
LAWNS	1.9	1.9	.27	11.7



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 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)

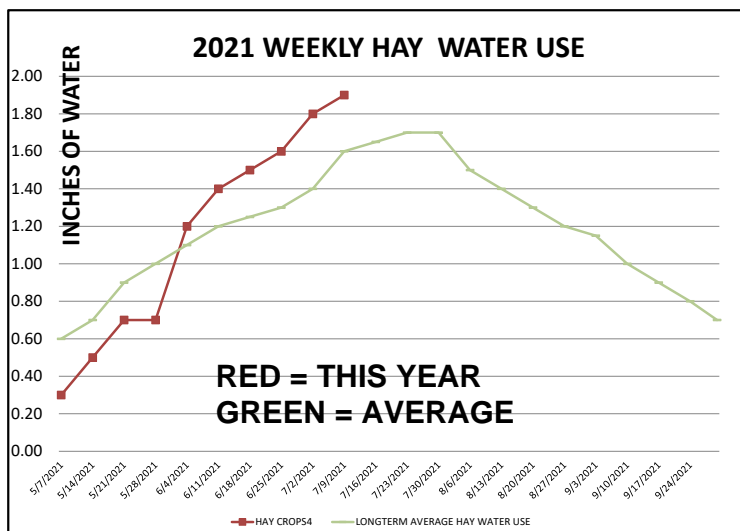
WEEK ENDING	RAIN ¹	2021 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	5-1 START	5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/7/2021	0.40	0.30	0.40	0.00	0.00	0.50	0.50	0.60	1.00	0.30
5/14/2021	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	2.00	0.70	0.60	0.60	0.20	0.80	0.70	1.00	1.30	0.50
6/4/2021	0.10	1.20	1.00	0.90	0.60	1.30	1.20	1.10	1.50	0.60
6/11/2021	0.10	1.40	1.20	1.10	0.80	1.50	1.30	1.20	1.70	0.70
6/18/2021	0.20	1.50	1.30	1.40	1.10	1.60	1.40	1.25	1.90	0.70
6/25/2021	0.20	1.60	1.40	1.60	1.40	1.70	1.50	1.30	2.00	0.80
7/2/2021	0.10	1.80	1.50	1.90	1.70	1.90	1.70	1.40	2.00	0.90
7/9/2021	0.01	1.90	1.60	2.00	2.00	2.00	1.90	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	3.81	11.60	10.10	9.90	7.90	12.80	11.70	26.05	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 - DROPPED ABOUT 2 INCHES IF NOT IRRIGATED

Soil moisture dropped about 2 inches this week in fields not irrigated due to higher crop water use and almost no rain. This dried out surface soils and reduced subsoil moisture too - especially in sandier soils with low water holding capacities. Remember that Silty, Clayey and Loamy soils with good organic matter content can hold 2 inches of water per foot of soil. Sandy and rocky soils can hold up to 1.5 inches of water per foot but the rockiest only hold $\frac{3}{4}$ to 1 inch per foot.



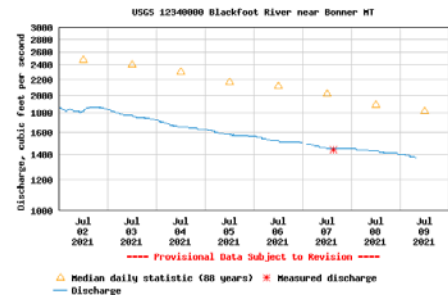
Soil near 100% of its water holding forms a ball when squeezed and leaves the hand visibly moist. Water is visible on the surface of the soil and the hand is moistened. Soil near 50% of its water holding capacity also forms a ball but leaves little moisture on the hand.



WEEKLY TIPS

Streamflows - Below Average and Still Falling Fast

Blackfoot river flows continue to fall with more hot, dry weather. Today flow at Bonner is **1,370 CFS** compared with an average of 2,200 CFS. The highest flow recorded on this date was 8,790 CFS in 1899 while the lowest flow was 555 CFS in 1977. Streamflows will continue to drop this week with no predicted rain.



Irrigation Strategies in Drought

The drought committee meets Monday and next week we will have a complete discussion of options to reduce water use for the rest of the irrigation season. Until then, here are a few ideas for you can implement now. Most irrigators no longer have enough water to meet the potential crop water use and must now switch strategies. One good thing about grass hay and pasture crops is they will simply go into dormancy if you stop irrigating.

- Those without more water may decide to harvest hay crops soon to reduce crop water use and keep some soil moisture to help plants recover from cutting.
- Those with a little water left should irrigate one last time before cutting.
- If your water will last through cutting you should irrigate as close to cutting as possible and as quickly afterwards as you can. This is the best way to preserve plant health and longevity.
- Shut off during peak afternoon heat when water just evaporates from crop leaves
- Irrigate at night and early morning if possible
- Stagger start times to alternate the area irrigated during peak afternoon heat
- Irrigate a smaller area well instead of a large area poorly for best yield
- Switch to pasture fields which uses less water compared with hayfields since animals constantly remove part of the crop (less crop leaves = less water use)

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.