

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday August 6, 2021



Hot, dry, smoky weather continued this week on Blackfoot croplands. Next week will start with a mix of sun and thunderstorms then get sunny with cooler temperatures than recent weeks. Crop water use this week and next is at about 1 ½ inches. Folks are having a hard time increasing soil moisture due to the hot weather and break for cutting so check your soil after irrigating. Blackfoot River flows dropped to 780 CFS today and the 700 CFS drought response trigger may be reached this week. Rain gave flows and water temperatures a brief reprieve last week. The Blackfoot Challenge Drought Committee is now meeting weekly and working with irrigators to help manage diversions, stream flows and water temperatures.



WEATHER - COOLER TEMPERATURES, RAIN?

It was warm this last week with the smoke cooling things slightly. Thunderstorms Monday and Tuesday dropped almost an inch of rain on parts of the upper drainage. Most folks had little or no rain. The weekend will have a mix of sun and thunderstorms then sunny skies starting Tuesday. Sunday and Monday highs will be in the 70s with highs in the 80s the other days. Both the 30-day and 90-day forecasts continue to say **below average rainfall and above average temperatures**. I would like to point out that the National

Weather Service often chooses to change their forecast just after I send out these reports so if you really want to know the weather, look out the window and check your own rain gauge.

CROP WATER USE - HAY CROPS WILL USE ABOUT 1 ½ INCHES

This week crop water use was slightly above average with temperatures reduced by smoke. **Most crops used about 1 ½ inches of water and will use slightly less next 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 TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.6	1.5	.21	18.5
PASTURE	1.3	1.2	.17	15.8
SPRING GRAINS	1.8	1.8	.26	17.4
WINTER WHEAT	0.2	0.0	.00	16.0
LAWNS	1.5	1.4	.20	18.3



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

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.

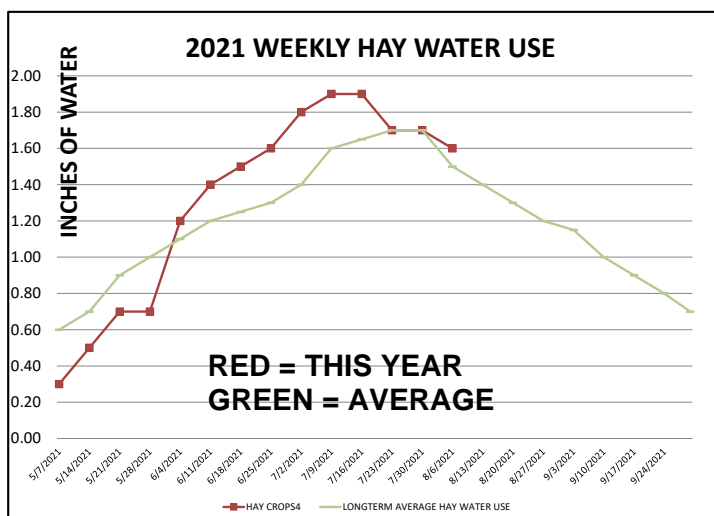
BLACKFOOT 2021 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)										
WEEK ENDING	RAIN ¹	2021 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY 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	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	0.01	1.90	1.60	2.00	2.00	1.50	1.90	1.65	2.20	1.00
7/23/2021	0.25	1.70	1.40	1.80	1.80	1.00	1.60	1.70	2.20	1.00
7/30/2021	0.01	1.70	1.40	1.90	1.90	0.50	1.60	1.70	2.00	1.00
8/6/2021	0.25	1.60	1.30	1.80	1.80	0.20	1.50	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	4.33	18.50	15.80	17.40	15.40	16.00	18.30	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 - WHY IS IT SO HARD TO INCREASE IT NOW?

If you check your surface soil moisture after haying, you don't need to be a soil scientist to know it's dry. Even though you chopped off all those plants heads, the remaining stems and leaves still dry the soil out.



So now it's your job to boost soil moisture and it just seems a lot harder and takes a lot more water than it did back at the start of the season. And you are right! This is why we encourage aggressive irrigation during the cooler season and reduced irrigation in July and August. When its hot irrigators must fight an uphill battle to overcome higher crop water use and evaporation loss.

Irrigation during hot weather is much less efficient (more is lost to evaporation and seepage before it reaches the plant). In the extreme, it can be 0% Efficient when hot winds evaporate all the applied water from sprinklers or the ditch soaks up all the water that was supposed to make it to the field. You get much less bang for your buck irrigating hot August weather as cooler June weather.



The only way to be sure you are actually getting water into the soil is to check your soil moisture with a soil probe, shovel or soil moisture sensor after irrigating. Look in the soil for the answer.

FLOOD IRRIGATORS:

More Water Evaporates From Hot Fields

Its obvious that more water evaporates when you put it across hot fields.

More Water Evaporates From Pastures When Slowed By Mature (taller) Plants

Surface irrigation water flows pretty well across croplands in the early season when plants are smaller and there is less to push through. Later in the season (hot period), especially in pastures, there is just a lot more vegetation and surface debris to slow down water and make it more susceptible to evaporation.



Tailwater May Raise Stream Temps

Flood irrigation systems that have tailwater which returns to a stream may raise water temperatures and harm fish. Some options are to: 1-adjust irrigation timing for cooler periods, 2-divert tailwater to wetlands or other off-stream areas or 3-manage irrigation to eliminate tailwater.

SPRINKLER IRRIGATORS:

More Water Evaporates In Hot Weather and When The Crop Is Tall

Early in the season when temperatures are cool and crops low, most irrigation water enters the soil and is effective at growing the crop. In hot, windy weather, over ½ inch of each application may evaporate from crop and soil surfaces. This may cool plants but doesn't create yield.

It Takes A Lot Of Water To Catch Up After Haying

After haying or other mid-season interruption it can take 3-5 inches of water applied in one week to recharge the surface 1 foot of soil. You have to apply enough to account for evaporation (.5 inches), weekly crop water use (1-1.5 inches) and the moisture holding capacity of the surface foot (1.5-2.5 inches). Many sprinkler irrigation systems simply can't put on this much water to catch up so plants are continually stressed after cutting.

DITCH USERS:

Hot Dry Ditches With Mature Vegetation Soak Up More Water

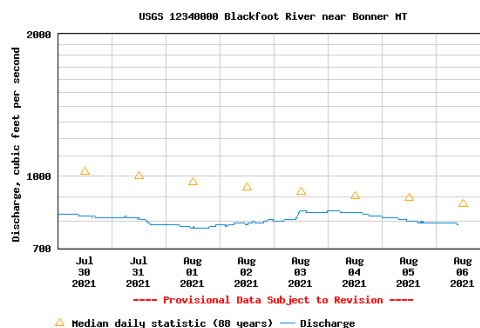
Most have ditches that are used intermittently soak up a lot more water in the hot season. In the spring ditches are moist from spring rains and snowmelt and don't soak up as much. Also, in spring the ditch-side plants are not as mature and don't dry out the ditch much. But when it's hot, and there's a break for harvest, that ditch can soak up a lot of water.



WEEKLY TIPS

Blackfoot Stream Downward Trend Continues

Blackfoot river flows had a slight uptick this last week due to rain in the upper drainage. Flow at Bonner today is **786 CFS** and will likely fall lower this week unless thunderstorms drop more rain than predicted. Today's flow compares with an average of 919 CFS for this date. The highest flow recorded on this date was 2,290 CFS in 1899 while the lowest flow was 380 CFS in 1988. The river turned brown below Monture Creek this week due to a mass of sediment entering Monture Creek from the rains. Water temperatures dropped significantly this week at Bonner. The high water temperature Thursday dropped to about 66F giving fish a break from the past weeks.



Blackfoot Drought Response

The US Drought Monitor Map now shows the entire Blackfoot Drainage in Severe Drought. The Drought Committee is meeting weekly due to rapidly changing conditions. Thunderstorms in the upper drainage last week produced enough rain to keep stream flows from falling to the 700CFS trigger level at Bonner and cooled water temps.

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 - IN DROUGHT CONSIDER REDUCING OR ENDING IRRIGATION

- Apply 1 - 2 inches of irrigation per week in August to hay and pasture crops for full production depending on weather and water availability.
- 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.