

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday July 23, 2021



Hot, dry, smoky weather continued most of this week on Blackfoot croplands with a little rain in the upper drainage. Next week looks sunny, smoky and only slightly cooler. Crop water use this week fell to average levels and reduced soil moisture by about 1 ½ inches unless irrigated. Irrigators are pondering how to reduce water use as drought conditions persist. The Blackfoot River dropped to 1000 CFS today triggering drought response throughout the drainage. Water temperature is also rising near its critical level for fish. The Blackfoot Challenge Drought Committee meets Wednesday and will be working with irrigators to manage diversions, streamflows and water temperatures.



WEATHER - HOT, DRY AND SMOKY NEXT WEEK

It was hot again this week but some lucky folks in the upper drainage had ¼ to ½ inch of rain while the rest had none. Hot, sunny, smoky weather continues with little or no rain predicted next week. Highs will be in the upper 80s and low 90s. Both the 30-day and 90-day forecasts continue to say **below average rainfall and above average temperatures**. Ovando is the green dot on this weeks smoke photo at left.

CROP WATER USE - AVERAGE AT ¼ INCH PER DAY

This week crop water use fell to average levels for the first time since May. **Most crops used about 1 ½ inches of water and will use about the same next week unless harvested.** Remember that cutting reduces water use by 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 TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.7	1.7	.24	15.2
PASTURE	1.4	1.4	.20	13.1
SPRING GRAINS	1.8	1.8	.26	13.7
WINTER WHEAT	1.0	0.5	.07	15.3
LAWNS	1.6	1.6	.23	15.2



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.

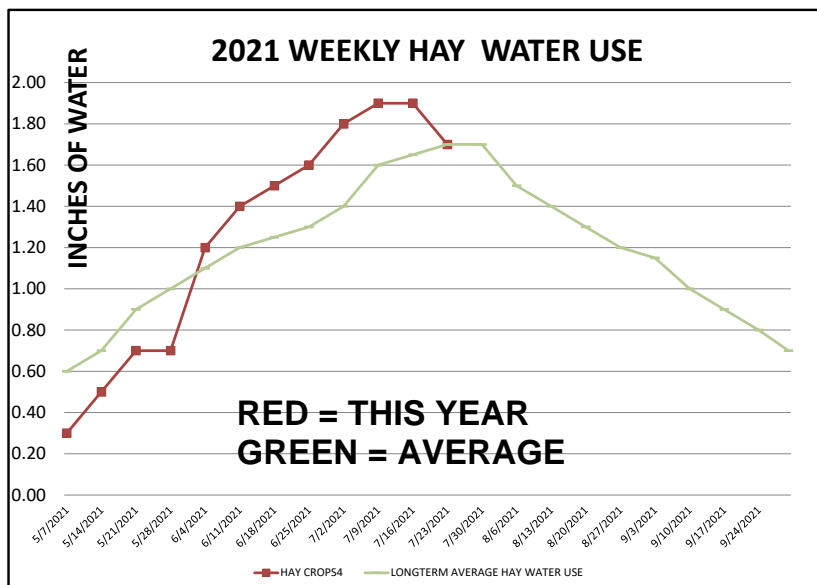
BLACKFOOT 2021 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)										
WEEK ENDING	RAIN ¹	2021 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY 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								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	4.07	15.20	13.10	13.70	11.70	15.30	15.20	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 - CHECK CAREFULLY AFTER IRRIGATING

Soil moisture dropped 1-1½ inches this week in fields not irrigated (less if you just cut hay). **It's now important to actually check your soil moisture after you irrigate** to make sure of how much water gets into the soil. If your crop is tall, it may intercept ¼ to ½ inch of irrigation before you start to see any in the soil. Water on the crop cools it but doesn't contribute to yield.



This is the time of year when irrigation is least efficient (more of the applied water evaporates and doesn't reach the soil and crop). It therefore takes a lot more water to produce the same amount of crop. If your surface soil is dry after cutting, it may take 2-3 inches of irrigation in a week before your 8 inch soil moisture sensor detects any increase. This makes it harder to catch up again after harvest.



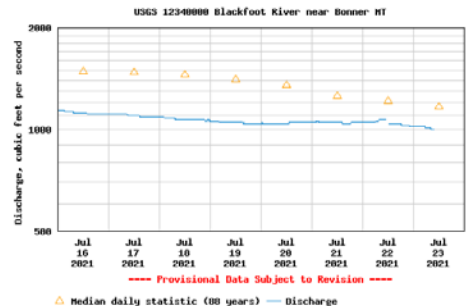
Soil near 100% of its water holding forms a ball when squeezed and leaves the hand visibly moist. Water is visible on the surface of the soil and the hand is moistened. Soil near 50% of its water holding capacity also forms a ball but leaves little moisture on the hand.



WEEKLY TIPS

Streamflows - Blackfoot hits 1000 CFS at Bonner

The Blackfoot river flow at Bonner fell to 1000 CFS this morning and will continue to fall with more hot, dry weather predicted. Today's flow at Bonner of **1,000 CFS** compares with an average of 1,290 CFS for this date. The highest flow recorded on this date was 4,340 CFS in 1899 while the lowest flow was 482 CFS in 1988. Streamflows will continue to drop this week with no predicted rain. Water temperatures have mostly been below 68F at Bonner.



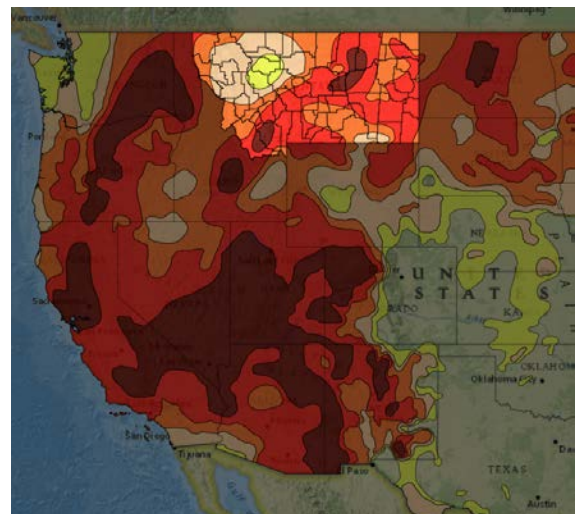
Blackfoot Drought Response Plan

The purpose of the Blackfoot Drought Response Plan is to minimize the adverse impacts of drought on fisheries and to aid in the equitable distribution of water resources during low flow summers. Some highlights of the plan are presented below. The complete Drought Response Plan can be found at:

[Blackfoot-Drought-Response-Plan_April2016Final.pdf \(blackfootchallenge.org\)](#)

In 2000, the Blackfoot Drought Committee was formalized to coordinate the development and implementation of a voluntary drought response effort in the Blackfoot watershed. The Blackfoot Drought Response Plan is

Current Drought Map of Western US



based on the premise of “**shared sacrifice**” with the goal that all Blackfoot water users (agricultural, irrigators, outfitters, anglers, recreational users, government agencies, homeowners associations, businesses, conservation groups, and others) voluntarily agree to take actions that will result in water savings and/or the reduction of stress to fisheries resources during critical low flow periods.

Flow & Temperature Triggers

As flows near the 1,000 cubic feet per second (cfs) trigger, the Committee will:

- Contact the roster of consumptive water users. Participants are asked to confirm their participation or non-participation in the Blackfoot Drought Response via response cards.
- Contact the roster of anglers and angling businesses and alert them to the potential need for angling restrictions.
- Implement outreach activities necessary to inform water users and the general public of drought conditions and the need for participation in the Drought Response.

When flows in the Blackfoot River fall to/or below 700 cfs, the Committee will:

- Upon having requested consumptive water users to implement their individual drought response plans, request Montana FWP to issue a “call for water” on non-participating junior water users under the Murphy Right. MT FWP, in consultation with the rest of the committee and in absence of extenuating circumstances, will issue a “call for water” on non-participating junior water right holders whose continued water use, in the judgment of FWP, warrants a call. If FWP declines to issue a call for water on any water users at all under its Murphy Right, it will provide the committee with a written explanation of its decision not to issue a call.
- Notify consumptive water users (primarily irrigators) that the Blackfoot Drought Response is active and request implementation of their individual drought response plans.
- Confirm that junior water users with approved drought response plans are participating through response cards, personal communication, and field checks.
- Assess effectiveness of the Drought Response. If needed, the Committee may solicit additional voluntary reductions in water use from existing drought plan participants or from senior water users not already participating in the Drought Response.
- Contact the roster of anglers and angling businesses to alert them of the potential need for angling time and location restrictions if not already in place.
- Contact anglers and angling businesses should the Drought Committee recommend that voluntary fishing technique restrictions go into place. These may be recommended for the entire Blackfoot and all tributaries or just for specific sections of the river and streams, based on flow and temperature conditions. Particularly later in the summer, anglers are advised to make an effort to know current river flows and water temperatures so that they are prepared to observe voluntary technique restrictions. Suggested technique restrictions can be found on the Blackfoot Challenge web site or by contacting the Challenge staff.
- Implement outreach activities to inform water users and the general public of drought conditions and the need for participation in the Drought Response.

If flows in the Blackfoot River are below 700 cfs and maximum daily water temperatures reach or exceed 71° F for three consecutive days at Bonner:

- MT FWP will issue partial (2:00 pm – midnight) or all-day fishing restrictions on the mainstem of the Blackfoot River, depending on when high water temperatures are being reached during the day. (For example, if temperatures are exceeding 71° in the Blackfoot Drought Response Plan Revised April 2016 Page 8 of 10 morning, then angling restrictions will be all day.) As flows at Bonner approach 600 cfs, the Committee will:

- Contact the roster of anglers and angling businesses to alert them of the potential need for angling restrictions if not already in place or of the need for additional angling restrictions.
- Implement outreach activities necessary to inform water users and the general public of drought conditions and the need for participation in the Drought Response.
- Re-confirm that junior water users are participating through response cards, email, personal communication and/or field checks, including notice to ALL juniors with an accepted drought plan that FWP is likely to make call if river conditions reach 500 cfs. If flows in the Blackfoot River at Bonner fall below 600 cfs and/or maximum daily water temperatures in the North Fork Blackfoot River below the falls and Monture Creek reach or exceed 65° F for three consecutive days:
 - MT FWP will issue partial (2:00 pm – midnight) or all day fishing restrictions on all critical bull trout streams. These may include Gold Creek, Belmont Creek, Cottonwood Creek, Monture Creek, North Fork Blackfoot River below the falls, Copper Creek, Landers Fork, and Morrell Creek.

If flows in the Blackfoot River at Bonner fall below 500 cfs, the Committee and FWP will:

- Implement outreach activities necessary to inform water users and the general public of ongoing drought conditions and re-confirm that junior water users are participating through response cards, email, personal communication and/or field checks.
- Notify all water users whose individual drought response involves a water trade in which there is less than a 1-to-1 exchange of senior water rights for junior water rights, that FWP is making call on their junior rights.
- Consider, along with MT FWP, if fishing restrictions in addition to those already in place are necessary to protect fisheries, or are needed to be consistent with the Drought Response Plan's shared sacrifice approach to water conservation. Areas considered for angling restrictions should include those where angling in combination with low water could affect fish survival. Agreements Outside of the Blackfoot Drought Response Plan In the Blackfoot, there are several cases where individual landowners have entered into agreements with an organization or agency in which management of water is described. These agreements may contain flow triggers that are similar to or the same as flow triggers described in this plan. While increasing in-stream flows is a common goal of the Blackfoot Drought Response and these agreements, they are managed separately. Enforcement of individual agreements is not dependent on implementation or non-implementation of the Blackfoot Drought Response.

Drought Options – Things You Can Do Now

- Rotate Irrigation Systems During Low River Flows
- Reduce Irrigated Acreage
- Concentrate Your Efforts on the First Cutting and Then Rest
- Apply More Water During Each Application
- 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 which uses less water compared with hayfields since animals constantly remove part of the crop (less crop leaves = less interception = 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 \[barry@landandwaterconsulting.net\]\(mailto:barry@landandwaterconsulting.net\)](#)

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.