

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

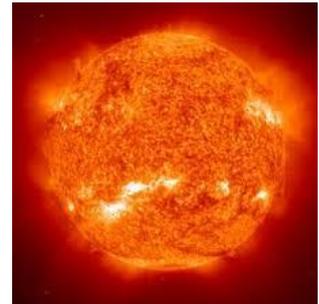
Friday July 21, 2023



The good news is that *haying weather continues for next week*. Blackfoot watershed croplands had no rain and warm temperatures last week while next will be sunny and even hotter. **Crop water use was about 2 inches last week for most crops and will increase next week unless you cut your hay.** Blackfoot river flows continue to be near half of average and are predicted to continue below average all season. Blackfoot Water Steward Clancy Jandreau says the drought committee is alerting irrigators about the impending water scarcity as stream flows fall quickly. Trigger levels will likely be hit this week. Please send us your ideas or questions about these reports and anything you would like to hear about related to irrigation, soil health, water quality, or other subjects. We will respond and share them with everyone.

WEATHER - SUNNY AND HOT NEXT WEEK

Blackfoot croplands were warmer this week with highs in the 70s and 80s. Only a trace of rain fell at scattered locations! The forecast for next week says sunny skies and little or no rain. Temperatures will be **hotter with highs in the 80s and 90s, lows in the 40s and 50s**. The 30-day day forecast predicts average rainfall and temperatures. The 90-day forecast predicts average rainfall and above average temperatures.



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

CROP WATER USE - 1/3 INCH PER DAY NEXT WEEK FOR SOME CROPS

Crop water use was above average this last week for the first time this season. It was almost 2 inches for most crops and will be even higher next week due to hotter weather. **For some crops it will be 1/3 inch per day!** However, many folks are cutting hay and crop water use decreases by 2/3 the week after cutting and by 1/3 the second week.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL¹	NEXT 7 DAYS DAILY AVE²	SEASON TOTAL³
HAY CROPS	1.8	2.0	.29	12.7
PASTURE	1.5	1.7	.24	11.0
SPRING GRAINS	2.0	2.2	.31	11.0
WINTER WHEAT	1.8	1.8	.26	14.0
LAWNS	1.7	1.9	.27	12.4

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 2023 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

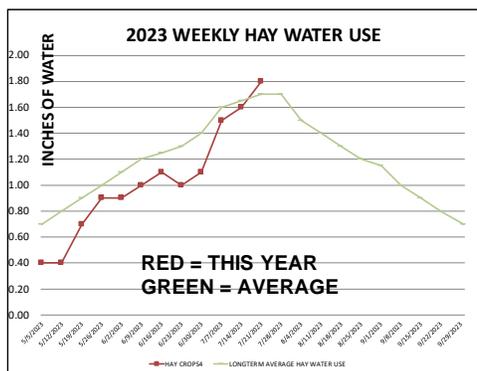
WEEK ENDING	RAIN ¹	2023 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE WEEKLY CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	0.25	0.25	0.25	0.00	0.00	0.25	0.25			
5/5/2023	0.10	0.40	0.40	0.00	0.00	0.50	0.40	0.70	1.00	0.40
5/12/2023	1.50	0.40	0.50	0.20	0.00	0.60	0.50	0.80	1.10	0.60
5/19/2023	0.25	0.70	0.70	0.30	0.00	0.80	0.80	0.90	1.20	0.70
5/26/2023	0.75	0.90	0.80	0.50	0.30	1.00	1.00	1.00	1.30	0.70
6/2/2023	0.25	0.90	0.80	0.60	0.40	1.00	0.90	1.10	1.50	0.80
6/9/2023	0.25	1.00	0.90	0.80	0.60	1.10	1.00	1.20	1.70	0.80
6/16/2023	0.40	1.10	0.90	1.00	0.80	1.20	1.00	1.25	1.90	0.90
6/23/2023	0.25	1.00	0.80	1.00	0.90	1.10	0.90	1.30	2.00	1.00
6/30/2023	0.40	1.10	0.90	1.20	1.10	1.20	1.00	1.40	2.00	1.00
7/7/2023	0.01	1.50	1.20	1.70	1.60	1.70	1.40	1.60	2.10	1.10
7/14/2023	0.01	1.60	1.30	1.70	1.60	1.70	1.50	1.65	2.20	1.10
7/21/2023	0.01	1.80	1.50	2.00	2.00	1.80	1.70	1.70	2.20	1.10
7/28/2023								1.70	2.20	1.10
8/4/2023								1.50	2.20	1.00
8/11/2023								1.40	2.20	1.00
8/18/2023								1.30	2.00	0.90
8/25/2023								1.20	1.80	0.90
9/1/2023								1.15	1.60	0.70
9/8/2023								1.00	1.40	0.60
9/15/2023								0.90	1.40	0.50
9/22/2023								0.80	1.20	0.50
9/30/2023								0.70	1.00	0.40
TOTAL	4.18	12.65	10.95	11.00	9.30	13.95	12.35	26.25	37.20	17.80

¹ Average across watershed (50-80% gets to the crop depending on irrigation method, weather, evaporation from crop and soil surfaces)

² This years potential water use by healthy crops that are well-fertilized and irrigated, disease and insect-free. Varies across watershed.

³ Longterm average water use for each crop each week based on long-term historic data.

⁴ Hay Crop water use drops from these figures approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.



SOIL MOISTURE FALLING ABOUT 2 INCHES A WEEK

With no rain and high crop water use, most soils lost about 2 inches of water this week and will lose even more next week due to higher crop water (except in cut hayfields). Remember to irrigate as close to haying as possible and try to irrigate at least once after cutting to help the crop recover (especially alfalfa). As temperatures rise, more of the applied water evaporates from crop and soil surfaces and less gets into the soil. Expect to apply an extra ¼ inch or so this week to make up for evaporation loss. As always, check your soil with sensors, probes or shovels to be sure you are adding enough water. You can reduce evaporation loss by increasing ground cover after haying so less of the soil surface is exposed to high temperatures. If you have a grain crop you can harvest the grain and cease irrigation until water is available again. If you have a grass hay crop you can cease irrigation after haying and it will go dormant.



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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.



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Soil near 50% of its water holding capacity may form a weak ball but leaves little moisture on the hand. Soil at 25% or less of its water holding capacity does not form a ball when squeezed. It feels and looks dry. If sandy or loamy, it crumbles easily, if high in clay it forms a hard lump. Call, text or email anytime if you have questions about evaluating your soil moisture content and irrigation options.

WEEKLY TIPS

THE ANSWER IS RIGHT IN FRONT OF YOU!

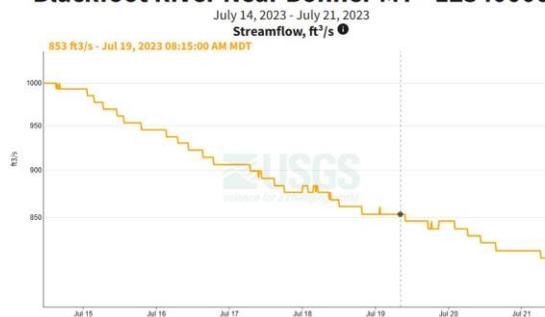
I didn't go to Harvard or Yale or even the *real ag school* in Bozeman. But one thing my favorite professors at UM taught me was to **observe**. "*Most of the answers to your questions are right there in front of you*" preached Dr. Tom Nimlos, revered soil scientist. This week I pulled up some radishes at the Rolling Stone Ranch. Those on the left came from the portion of the field where they have been bale-feeding. Those on the right are from the rest of the field. Unfortunately, I forgot my shovel or I could display their full subterranean differences as well which are equally impressive.



STREAMFLOWS

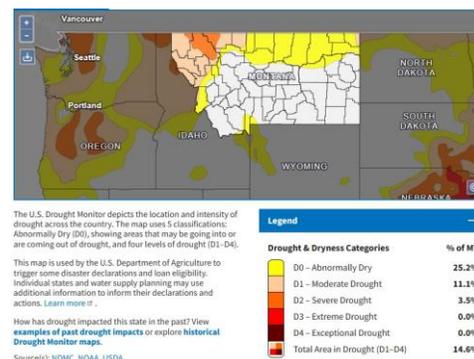
Blackfoot watershed stream flows continued their steep downward trend this week. Flow today at Bonner is again near half of average at **800 CFS**. The average for this date is 1,380 CFS. The highest flow on this date was 4,780 CFS in 1899. The lowest flow on this date was 512 CFS in 1988. Flow peaked this year on May 7 at 10,400 CFS. Stream flows for the rest of the season are predicted to be below average.

Blackfoot River Near Bonner MT - 12340000



DROUGHT

So far this season we had a good snowpack, a quick runoff, cool conditions and well-timed rain. This produced great crops and the switch to warm/dry conditions was also well-timed for haying. Now that you are in a warm and happy mood, the Drought Monitor just listed the Blackfoot watershed as *Abnormally Dry*. We could see it coming so now is the time to dust off **Drought Plans** and think about what you can do to balance crop and livestock needs with fish and boating concerns. The Bonner stream flow trigger level of 700 CFS will likely be reached this week.



Drought and Hoot Owl Restrictions

When I mentioned the word *drought* last week, I had a minor flood of emails from some of our most respected and esteemed neighbors. The concern was not over irrigation but Hoot Owl Restrictions. There seems to be a consensus of feeling that when surrounding streams have Hoot Owl restrictions but not the Blackfoot, it forces unfair pressure on Blackfoot fish. Folks up and down the river feel a uniform closure across the area would be more fair and less harmful. As an American in a free democracy, make up your own mind and contact FPW if you choose.

Drought Options - Things You Can Do Now

- Reduce Irrigated Acreage
- Rotate Irrigation Systems During Low River Flows
- 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)

When flows in the Blackfoot River fall to/or below 700 cfs, the Drought 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.

For further information contact [Clancy Jandreau, Blackfoot Challenge Water Steward, 406-304-5423](mailto:Clancy.Jandreau@mt.gov) or [Barry Dutton, Professional Soil Scientist, 406-240-7798 \[barry@landandwaterconsulting.net\]\(mailto:barry@landandwaterconsulting.net\)](mailto:Barry.Dutton@landandwaterconsulting.net)

THE BLACKFOOT WATERSHED 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 watershed, 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.