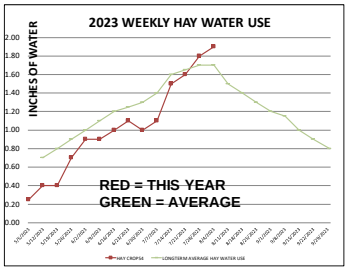
BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday July 28, 2023



Blackfoot watershed croplands had no rain and hot temperatures again last week. Next week will be sunny and hot again with thunderstorms possible. **Crop water use was about 2 inches last week for most crops and will be about the same next week unless you just cut your hay.** Blackfoot river flows continue to be almost half of average now and for the foreseeable future. The Blackfoot River flow trigger level of 700 CFS was reached this week and we also had 3 days of water temperatures reaching 70F. This drought plan has been implemented and current actions are listed on pages 4 and 5 of this report. ***Please think about what you can do to balance crop and livestock needs with fish and boating concerns.*** 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 80s and 90s. The lower watershed reached 100! There was no rain as far as I can tell. The forecast for next week says sunny skies with a slight potential for thunderstorms. So, unless you win the thunderstorm lottery, expect no rain. Temperatures will again be **hot with highs in the 80s and 90s, lows in the 40s and 50s**. The 30-day day forecast says average rainfall and temperatures. The 90-day forecast says average rainfall and above average temperatures.

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

CROP WATER USE – HIGHEST OF THE SEASON

Crop water use has likely peaked for the season and well above average. It was about 2 inches for most crops this week and will be similar next week due to hot, dry weather. **For spring grain crops it will be about 1/3 inch per day!** When cutting hay, 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 TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**1.9**	**1.9**	.27	14.6
PASTURE	**1.6**	**1.6**	.23	12.6
SPRING GRAINS	**2.2**	**2.2**	.31	13.2
WINTER WHEAT	**2.0**	**1.6**	.23	16.0
LAWNS	**1.8**	**1.8**	.26	14.2

[1]Expected water use over the next week (range if weather becomes cooler or hotter than expected)
[2]Expected average daily water use over the next week (compare this with your soil moisture content)
[3]Beginning 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)

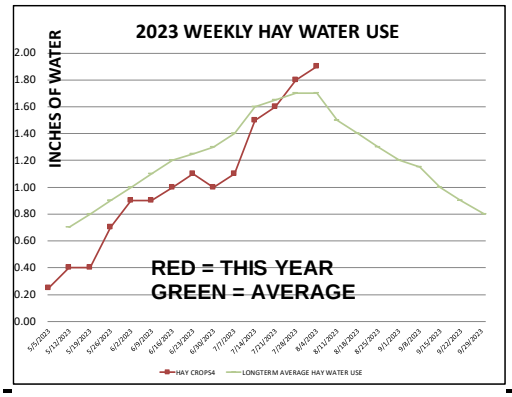
	RAIN[1]	2023 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	0.25	0.25	0.25	0.00	0.00	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	0.01	1.90	1.60	2.20	2.20	2.00	1.80	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	4.19	14.55	12.55	13.20	11.50	15.95	14.15	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 again this week and will lose about the same next week. Remember that 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 more this week to make up for evaporation loss (except for you few who irrigate at night). As always, check your soil with sensors, probes or shovels to be sure you add enough water. You can reduce evaporation loss by increasing ground cover after haying so less of the soil surface is exposed to high temperatures.

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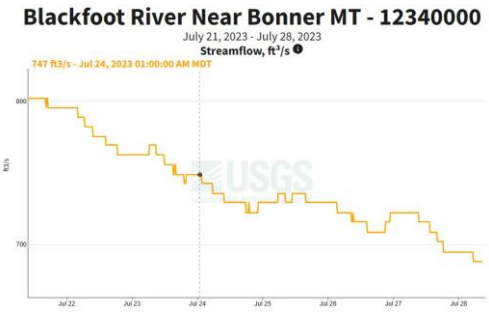
Soil near 50% of its water holding capacity may form a weak ball but leaves little moisture on the hand. Soil at 25% or less of its water holding capacity does not form a ball when squeezed. It feels and looks dry. If sandy or loamy, it crumbles easily, if high in clay it forms a hard lump. Call, text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

WEEKLY TIPS

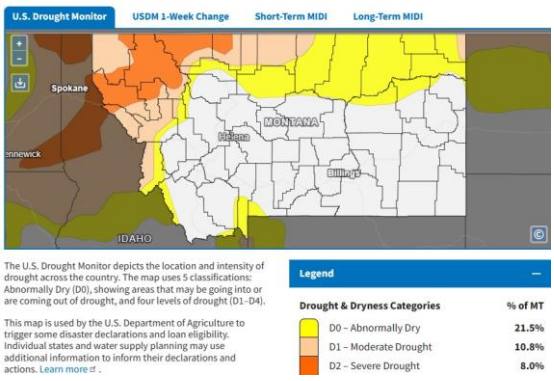
STREAMFLOWS

This week the magnificent Blackfoot River was looking more like what my New England relatives would call a *brook* and my Carolina relatives would call a *crick*. Stream flows throughout the watershed continue their steep downward trend. Flow today at Bonner is **689 CFS** while the average for this date is 1,000 CFS. The highest flow was 2,970 CFS in 1899 and the lowest flow was 419 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.



DROUGHT

This week the Drought Monitor lists the lower Blackfoot watershed as *Abnormally Dry*. The Bonner stream flow trigger level of 700 CFS was reached this week and the past three days have seen water temperatures reach 70F. That means all the drought plan components listed below are now being implemented. Please think about what you can do to balance crop and livestock needs with fish and boating concerns.



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)
- Harvest your grain crop and cease irrigation until water is available again.
- Harvest your hay crop and cease irrigation - it will go dormant until you irrigate again or until next season. Irrigate once after cutting if you can, especially if you have alfalfa

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 71º 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 71º 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 65º 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.

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.