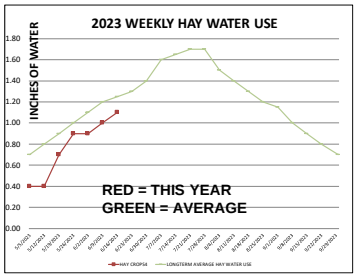
BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday June 16, 2023



Most Blackfoot watershed croplands again had ¼ to ½ inch of rain this week, but it was highly variable with some sites getting none. **Crop water use was again about 1 inch this week which continues to be below average.** It will remain below average with cool weather next week. Subsoil moisture is good in most fields due to low crop water use this season. Surface soils have dried out unless they've been irrigated or had extra rainfall. Crops are growing well but are still set back slightly by the late start of the growing season and cooler than normal weather. The snowpack is exhausted and stream flows are now predicted to be below average for the rest of the season. 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 – SHOWERS AND THUNDERSTORMS

Rainfall was variable again this week across Blackfoot croplands with many sites having ¼ to ½ in while others had very little. A few luck spots had ¾ inch or more, but this was rare. The forecast next week is for more showers and thunderstorms which means mostly small but variable rainfall amounts with more rain during thunderstorms. Temperatures will be cooler next week with **highs mostly in the 60s and lows mostly in the 30s to low 40s**. The 30-day day forecast predicts above average rainfall and temperatures. The 90-day forecast predicts above average temperatures and average rainfall.

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

CROP WATER USE – LOW NEXT WEEK WITH COOL WEATHER

Crop water use was again below average this last week due to somewhat cool, cloudy weather. **It was about 1 inch for most crops** and will be similar or increase only slightly next week due to cooler weather. Spring grains will have the largest increase since they are maturing rapidly.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**1.1**	**1.1**	.16	5.7
PASTURE	**0.9**	**1.0**	.14	5.3
SPRING GRAINS	**1.0**	**1.1**	.16	3.4
WINTER WHEAT	**1.2**	**1.3**	.19	6.5
LAWNS	**1.0**	**1.1**	.16	5.9

[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)

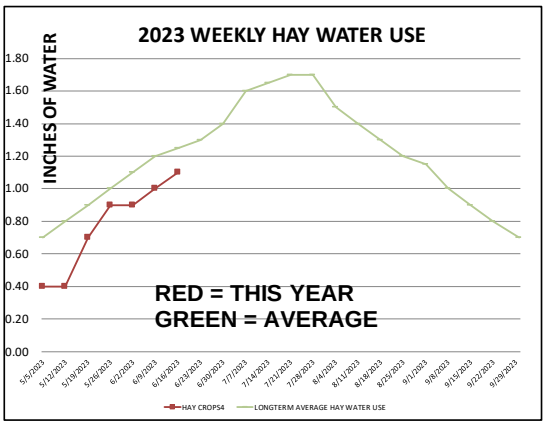
	RAIN[1]	2023 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	0.25	0.25	0.25	0.00	0.00	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								1.30	2.00	1.00
6/30/2023								1.40	2.00	1.00
7/7/2023								1.60	2.10	1.10
7/14/2023								1.65	2.20	1.10
7/21/2023								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	3.50	5.65	5.25	3.40	2.10	6.45	5.85	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 GOOD IN MANY FIELDS

It continues to be relatively easy to keep soil moisture levels high this season due to cool weather, rain and low crop water use. However, rainfall has been spotty with some areas getting 2-3 times as much as others nearby. Subsoil moisture has remained high in most fields since crops use moisture in the surface first. Surface soils have dried significantly on warmer days but have been replenished at many sites by rainfall and irrigation. Most sites did not have enough rain this week to completely replenish crop water use (unless they had more than 1 inch). Only 50-80% of rain actually gets into the soil and small rain amounts completely evaporate from soil and crop surfaces (about 2/10 inch evaporates under recent weather conditions during each irrigation).

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.

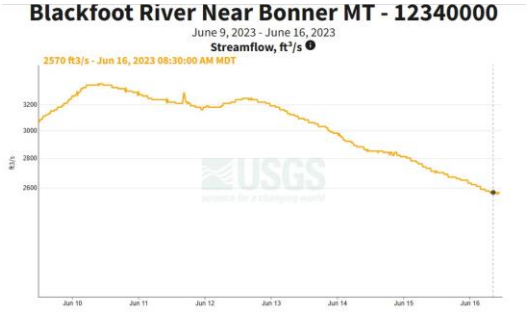
Soil near 50% of its water holding capacity may form a weak ball but leaves little moisture on the hand. Soil at 25% or less of its water holding capacity does not form a ball when squeezed. It feels and looks dry. If sandy or loamy, it crumbles easily, if high in clay it forms a hard lump. Call, text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

WEEKLY TIPS

SNOWPACK AND WATER SUPPLY

It's hard for a dog to find a patch of snow to cool off on these days. The NRCS indicates our Blackfoot watershed snowpack has melted out completely although I see a little left especially on north aspects. Rainfall and the slow release from wetlands and groundwater will now have to keep streams flowing. Reservoir storage is still good. Blackfoot river flows are now predicted to be below average for the rest of this season unless there is a whole lot of rain.

STREAMFLOWS



The Blackfoot river flow at Bonner continued to drop this week and is still below average at **2,650 CFS**. The average for this date is 4,820 CFS. The highest flow on this date was 12,500 CFS in 1899 (I think Land Lindberg measured that one). The lowest flow on this date was 995 CFS in 1987. Flow peaked this year on May 7 at 10,400 CFS. Weather predictions for the next 30 days are for above average temperatures and rainfall. The 90 day prediction is for above average temperatures and average rainfall it's hard to predict summer stream flows.

IRRIGATION SYSTEM DESIGNS INCORPORATE SOLAR & ELEVATION

A new 1.5 MW solar plant now powers an irrigation system covering 8,400 acres in northeastern Spain, serving 150 irrigators. The system uses no battery storage but instead uses elevation. A computerized energy management system combined with a properly sized reservoir meets irrigator needs without the significant financial and environmental cost of batteries. The solar power runs pumps that fill a reservoir at the upper elevation of the irrigated area. All irrigation is then gravity-fed. This concept may be applied to any area with elevation changes and sunshine (Montana?).

IRRIGATION WIRE THEFT

Here is one more way we are lucky in the Blackfoot Watershed. We have not been plagued by copper irrigation wire theft. This has become more common across the country and as close as Idaho. For anyone concerned, Valley Irrigation is offering a new anti-theft system for pivot wiring.

IRRIGATORS GET LESS WATER AFTER CRIMEA DAM BREACH

Ukraine and Russia have blamed each other for the recent dam breach in Crimea (the part of Ukraine Russia annexed in 2014). The recent dam breach has reduced flows into the Soviet-era North Crimean Canal - a channel which supplies 85% of Crimea's water. Most of that water is used for irrigation, some for industry, and around one fifth for drinking water and other public needs. Last year Crimea produced its largest wheat crop ever and has seen irrigated agriculture thrive. Reduced water for irrigation could be the end of this recent surge in production.

For further information contact Clancy Jandreau, Blackfoot Challenge Water Steward, 406-304-5423 or Barry Dutton, Professional Soil Scientist, 406-240-7798 barry@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.