BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday May 12, 2023

The deluge last Friday spread 1½ to over 2 inches of rain on Blackfoot Watershed croplands. Most cropland soils are not in need of immediate irrigation so go put out other fires. Of course, watch the predicted high temperatures next week since the new climate likes to provide rapid swings from flood to drought. Crops are growing like the sky is the limit and are starting to really use up that soil moisture. Streams have reached their peak unless we get a couple more deluges. Once again, we will provide weekly summaries of weather and crop water use along with predictions for the upcoming week. Other topics will include streamflow, drought conditions, soil health, random irrigation highlights and anything else you want to talk about. Please send us your ideas or questions about these or other subjects. We will respond and share them with everyone.

WEATHER–WARMER NEXT WEEK, SCATTERED RAIN

Most cropland in the watershed had 1 ½ - 2 inches of rain this week! Next week will see warmer temperatures with highs in the 70s and lows in the 40s and 50s. There is a chance of rain, but no major storms are predicted *(which is what I said last week just before the 1 ½ inch storm hit).* The 30-day forecast says **average rainfall and above average temperatures.** The 90-day forecast says the below average rainfall and average temperatures.

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

CROP WATER USE – HIGHER NEXT WEEK WITH WARMER WEATHER

Crop water use was low this last week due to cool temperatures and rain. It was almost ½ of the average weekly use. Note that in the early season things are more variable across Blackfoot croplands since low elevations and coarser soils warm up quicker. Therefore, in these early reports, we list a range of crop water use. Crop water use will even out when crops start actively growing across the entire watershed.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**0.3-0.5**	**0.5-0.7**	.07-.10	1.1
PASTURE	**0.3-0.5**	**0.5-0.8**	.07-.11	1.2
SPRING GRAINS	**0.0**	**0.0-.04**	.00-.02	0.2
WINTER WHEAT	**0.3-0.6**	**0.5-0.8**	.07-.11	1.4
LAWNS	**0.3-0.5**	**0.5-0.8**	.07-.11	1.2

[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)

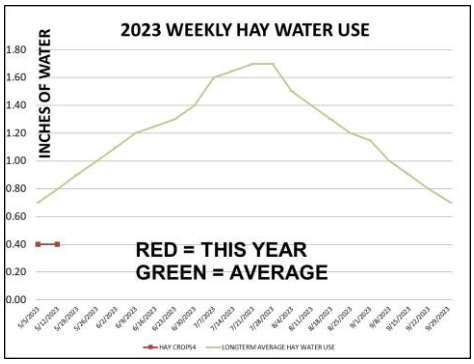
	RAIN[1]	2023 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/5/2023	0.10	0.40	0.40	0.00	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								0.90	1.20	0.70
5/26/2023								1.00	1.30	0.70
6/2/2023								1.10	1.50	0.80
6/9/2023								1.20	1.70	0.80
6/16/2023								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	1.60	1.05	1.15	0.20	0.00	1.35	1.15	26.25	37.20	17.80

[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-Ju
(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 d

[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.

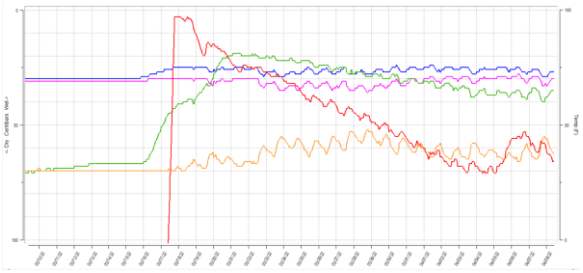


SOIL MOISTURE – ABOUT AS GOOD AS IT GETS!

Soil moisture levels throughout the watershed this week are excellent with many cropland soils at or near their water holding capacities throughout the root zone. You can attend to other emergencies or hobbies instead of irrigation but watch for rapid drying with warmer weather and eager crops using more water next week.

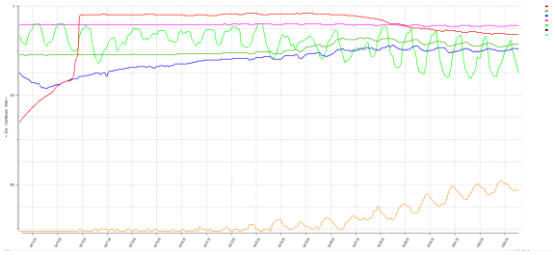
The charts below are examples from our soil moisture sensor program. The chart on the left shows a sharp decrease in soil moisture in the surface foot (red line) starting when snow melted in early March of 2022. The chart on the right shows that this year snow didn't melt until late April and soil moisture in the surface foot didn't begin to decrease until the end of the month – almost 6 weeks later than in 2022.

2022



^March 15 ^April 1

2023



^April 15 ^MAY 1

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.

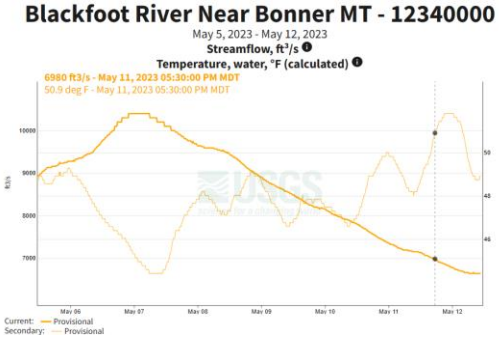
For further information contact Clancy Jandreau, Blackfoot Challenge Water Steward, 406-304-5423 or Barry Dutton, Professional Soil Scientist, 406-240-7798 barry@landandwaterconsulting.net

WEEKLY TIPS

SNOWPACK AND WATER SUPPLY

Our Blackfoot watershed snowpack is at 96% of average today which is up slightly from 81% last week. The storm last Friday fell as snow in parts of the higher mountains and melting slowed with cooler weather. Precipitation in the Blackfoot was 88% of normal in April. Reservoir storage is good at 97% of normal. Blackfoot river flows are predicted to be slightly above average this season but much of it seems to be coming right now due to warm weather.

STREAMFLOW



The Blackfoot river flow at Bonner is 6,640 CFS which is above average for this date (4,670 CFS) and above last year. The river peaked on Sunday at about 10,400 CFS. 2018 set the highest flow record on this date at 17,400 CFS while the lowest flow on this date was 975 CFS in 1941. Weather predictions for the next 30 days are for above average temperatures and average rainfall which should keep stream flows high. Predictions for the next 90 days are for average temperatures and below average rainfall.

LESS RUTS WITH NEW TIRE?

If you don't like ruts, Firestone is now selling a new design for pivots that is supposed to reduce rutting. This is not an endorsement, just a heads up for some who may seek an alternative to paving the wheel tracks. If nothing else, it produces a different pattern.

YOU CAN'T HACK A SHOVEL AND TARP

A recent hack of an extensive irrigation network in Israel shows the advantage of the shovel and tarp. A large acreage lost irrigation control when computer hackers took over the system which controls pumps, diversions, headgates, sprinkler and drip systems and other infrastructure. The soil moisture sensors installed with Challenge help are not connected to the internet (although the Chinese balloon may have downloaded our winter data as it passed by)?! When we consider connecting our sprinkler systems and our sensors with smartphones we need to remember to update our anti-virus software or just use a shovel.

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.