BLACKFOOT CHALLENGE
WEEKLY IRRIGATION REPORT
Friday May 7, 2021

Welcome to the 2021 irrigation season. We continue to be some of the luckiest socially-isolated folks on the planet. There are few places safer right now than an irrigated field in the Blackfoot. A few sprinklers are going, mainly in the lower drainage. In the early season things are more variable across Blackfoot croplands since low elevations and coarser soils warm up quicker. In these early reports, we list a range of crop water use to account for this variation. April rainfall was half of average and temperatures cool across Blackfoot croplands. Soil moisture levels at the start of this growing season are below average in most fields

The snowpack dropped this week from slightly above average on May 1 (102%) to slightly below average now (92%). This is similar to last year. Recent warm days have raised streamflows to slightly above average. There appears to be plenty of water for early season irrigation but the predicted hot, dry weather could change that later on. The 30-day forecast says above average rainfall and average temperatures. The 90-day forecast says above average temperatures and below average rainfall.

Less rain in April and some warm days dried out many surface soils especially in the lower drainage and on coarse soils. Although crop water use has been low each week, small amounts add up leaving some soils drier than usual for this time of year. Even when hay and pasture crops are barely greening up, they still use soil moisture. Irrigators should plan to fill up their soils during early irrigations. **Most local crops used less than half an inch of water this week and should use a little more next week.** Drought seems less likely this year but things can get hot and dry fast so be vigilant. Concentrate your efforts on early season irrigation (May-June) when irrigation is most effective.

Throughout the season we will provide weekly summaries of weather, crop water use and soil moisture conditions as well as tips for irrigation, soil health and crop production. Your suggestions are welcome. Weather last week started out cold and wet then warmed. Next week looks very similar. Crop water use is summarized below.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**0.2-0.5**	**0.3-0.6**	.04-.09	
PASTURE	**0.2-0.6**	**0.3-0.7**	.04-.10	1.7
SPRING GRAINS	**0.0**	**0.0**	.00	0.2
WINTER WHEAT	**0.2-0.7**	**0.3-0.8**	.04-.11	2.0
LAWNS	**0.2-0.7**	**0.3-0.8**	.04-.11	1.9

[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

CROP WATER USE – LOW – INCREASING SLOWLY

April was mostly cool and dry and crop water use was below average. However, even when low, it adds up and can dry out surface soils. Crop water use was low this week and looks to continue that way until warmer temperatures return later next week. Crop water use will even out when crops start actively growing across the entire drainage. Right now, lower elevations and coarser soils are using more water. People often think that crops use less water at higher elevations and it is true part of the time especially in spring. However, during peak periods (hot and windy) all elevations can use similar amounts. Yes, it's usually a little cooler as elevation increases which reduces crop water use but the vapor pressure at higher elevations which increases crop water use. 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 2021 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

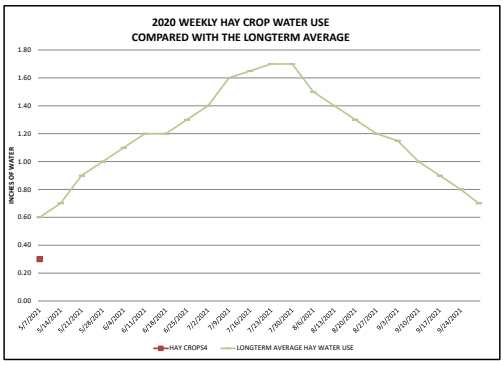
	RAIN[1]	2021 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/7/2021	0.40	0.30	0.40	0.00	0.00	0.50	0.50	0.60	1.00	0.30
5/14/2021								0.70	1.10	0.40
5/21/2021								0.90	1.20	0.50
5/28/2021								1.00	1.30	0.50
6/4/2021								1.10	1.50	0.60
6/11/2021								1.20	1.70	0.70
6/18/2021								1.20	1.90	0.70
6/25/2021								1.30	2.00	0.80
7/2/2021								1.40	2.00	0.90
7/9/2021								1.60	2.10	1.00
7/16/2021								1.65	2.20	1.00
7/23/2021								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	**0.40**	**0.30**	**0.40**	**0.00**	**0.00**	**0.50**	**0.50**	**26.00**	**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 – A BIT LOWER THAN AVERAGE!

Soil moisture levels throughout the drainage this week were lower than last year. Most soils are filled up to 50 to 75% of their water holding capacity throughout the 3-foot root zone. This means irrigators should check soil moisture levels and fill up soils during early irrigations. Those planting new crops show watch surface moisture to ensure good establishment. Some irrigation has begun, mainly in the lower drainage and on coarse soils. Now is the easiest time to fill up surface soils that have dried out in recent weeks (mostly in the lower drainage and on sandy/gravelly soils).

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 shiny surface. Bouncing the soil in the hand usually brings water to the surface. Soil near 75% of its water holding capacity also forms a ball and leaves the hand moist but no actual water is visible on the hand or soil when bounced. Call anytime if you have questions about evaluating your soil moisture content and irrigation options.

WEEKLY TIPS

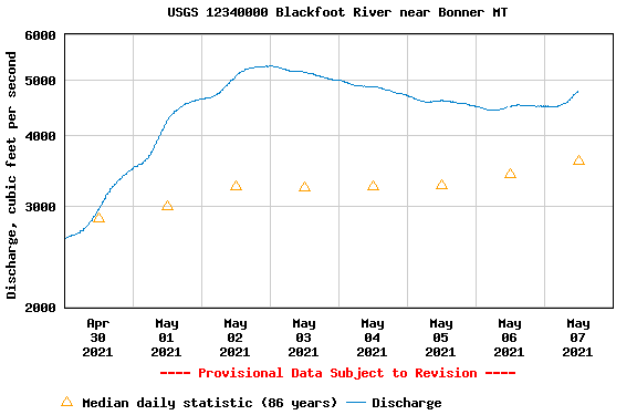
Water Supply

Blackfoot drainage snowpack is at 92% of average today down from 102% on May 1. This is similar to last year at this time. April precipitation in the Blackfoot was 64% of normal which combined with a few warmer days caused a drop in stored soil moisture. Nevada Reservoir storage is good at 115% of normal. Blackfoot river flows are predicted to be slightly above normal this season but watch for a change if the weather should turn hot and dry. Lukas Zukiewicz the NRCS water supply specialist who produces these data is moving on to a new post and we thank him for years of good work updating the system.

Streamflows

The Blackfoot river flow at Bonner is about 4,780 CFS today which is above average for this date (4,090 CFS) and about the same as last year. 2018 set the highest flow record at 15,500 CFS while the lowest flow on this date was 735 CFS in 1905.

Weather predictions for the next 30 days are for average temperatures and above average rainfall which should produce a nice even snowmelt with abundant irrigation water. Predictions for the next 90 days are for above average temperatures and below average and rainfall.



AN OPPORTUNITY TO FILL UP SOILS WITH EARLY SEASON WATER

At the start irrigation season, we encourage filling up soils to their moisture holding capacities. Stored soil moisture can last you for weeks and prevent crop loss during breakdowns, vacations or other distractions. Production is best if you keep the soil from falling below 50% of its water holding capacity. Remember that new seedings need monitoring to ensure the surface soil remains moist during germination and early establishment.

Roots and Deep Irrigation

We encourage deep irrigation at least once early in the season to promote deep root growth. Roots do not grow in search of water through dry soil, they spread through moist soil. You can therefore lead your roots deeper by irrigating deeper. Even grasses which are naturally shallow-rooted will expand into lower soil layers if water is present. This is one of those principles of Soil Health that is actually as old as the hills – grow your crop in a bigger volume of soil. Overall, this bigger soil volume provides more water holding capacity, more nutrients and more biological activity (those worms, bugs, fungi, bacteria and other critters that turn organic matter into crop nutrients).

SOIL YOUR UNDIES!

A SOIL HEALTH TEST YOU CAN DO YOURSELF

There are many soil health tests available. Most involve significant efforts and costs and some are difficult to interpret. In the past few years, Canadian soil health enthusiasts have promoted a method now being used around the world. This test simply buries cotton underwear (tighty whiteys) and exhumes them a few months later. The conditions of the underwear upon retrieval reflect soil heath. Cotton is a natural substance similar to common soil organic matter and its breakdown by earthworms, nematodes, fungi, bacteria and other soil organisms confirms active soil biology. This “test” has seen widespread use in Canada, the US, France, Australia and elsewhere. Soil Health trainers, agricultural organizations, schools and other interest groups are using it to promote the message of soil health. You can even compare different practices. Lots of descriptions are available on YouTube and the web. Here are links to a few examples of how to perform this new and exciting analysis:

Soil Your Undies Challenge - YouTube

Planning for a bumper crop of underwear | Manitoba Co-operator (manitobacooperator.ca)

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

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.