BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday May 22, 2020

Most Blackfoot Valley croplands had 1 to 1½ inches of rain this week. Crop water use was again low (<1 inch) but will increase next week with warmer temperatures. Surface soil moisture levels were mostly maintained or slightly increased due to more rain than crop water use. Irrigators seeking to boost soil moisture levels continued to apply water. Blackfoot River flows increased dramatically with a corresponding ***plunge in the snowpack - now half what we had last year*** *(see Page 3)*. Drought conditions and water restrictions are looking more likely this season with warm/dry weather expected in July-September.

We provide weekly summaries of weather, crop water use and soil moisture conditions as well as tips for irrigation, soil health and crop production. A condensed overview of suggestions for the entire irrigation season is presented on the last page of this report. Use it to look ahead and plan or to compare what you're doing now. If you would like other information please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).

WEATHER – COOL AND MOIST BUT NOW WARMING

This week had cool temperatures and lots of rain with most croplands getting 1 – 1 ½ inches. Temperatures varied widely this week with lows in the 30s and 40s and highs in the 50s to 70s. Next week looks warmer and drier with lows in the 40s and highs in the mid-70s. The 30-day forecast says average temperatures and rainfall. The 90-day forecast says above average temperatures and below average rainfall.

CROP WATER USE – LOW – INCREASING SLOWLY

Crop water use was low again this week except on a couple warm days. Note that at the start of the season, crop water use varies a little more across the drainage. Crop water use was below average at less than 1 inch for most crops. The table below provides a quick summary of crop water use this last week and an estimate for next week. The table and chart on Page 2 summarize the entire irrigation season and compare it with average, hot and cool conditions so you can plan ahead. This table and chart are updated weekly all season.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]		NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**0.8**	**1.0**	(0.9 - 1.2)	.14	3.5
PASTURE	**0.7**	**0.9**	(0.8 - 1.1)	.13	3.2
SPRING GRAINS	**0.2**	**0.4**	(0.4 - 0.6)	.06	0.6
WINTER WHEAT	**0.8**	**1.1**	(1.0 - 1.3)	.14	3.7
LAWNS	**0.8**	**0.9**	(0.8 - 1.1)	.14	3.6

[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

BLACKFOOT 2020 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

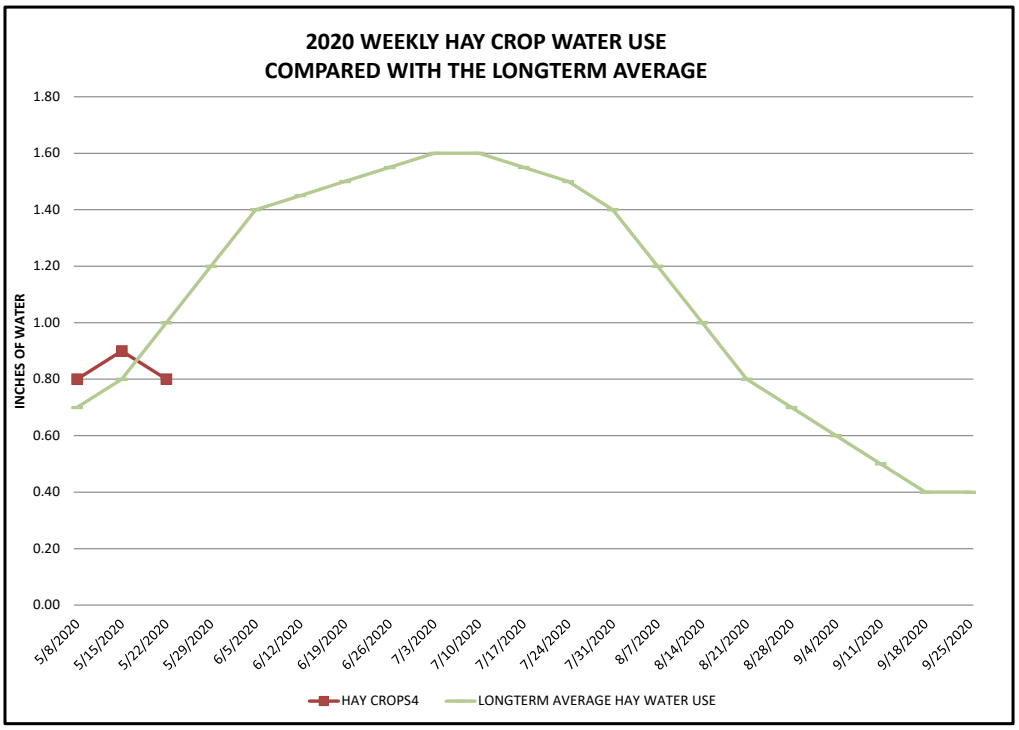
	RAIN[1]	2020 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/8/2020	0.01	0.80	0.70	0.10	0.10	0.90	0.90	0.70	1.00	0.30
5/15/2020	0.30	0.90	0.80	0.10	0.10	0.90	0.90	0.80	1.10	0.50
5/22/2020	1.25	0.80	0.70	0.30	0.20	0.80	0.80	1.00	1.20	0.60
5/29/2020								1.20	1.30	0.80
6/5/2020								1.40	1.50	1.00
6/12/2020								1.45	1.70	1.00
6/19/2020								1.50	1.90	1.10
6/26/2020								1.55	2.00	1.10
7/3/2020								1.60	2.10	1.30
7/10/2020								1.60	2.00	1.20
7/17/2020								1.55	2.00	1.20
7/24/2020								1.50	2.20	1.10
7/31/2020								1.40	2.20	1.10
8/7/2020								1.20	1.50	0.90
8/14/2020								1.00	1.30	0.70
8/21/2020								0.80	1.20	0.60
8/28/2020								0.70	1.10	0.50
9/4/2020								0.60	1.00	0.40
9/11/2020								0.50	0.90	0.40
9/18/2020								0.40	0.70	0.30
9/25/2020								0.40	0.70	0.30
TOTAL	**2.81**	**3.50**	**3.20**	**0.60**	**0.50**	**3.70**	**3.60**	**22.85**	**30.60**	**16.40**

[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 – MODERATE TO GOOD

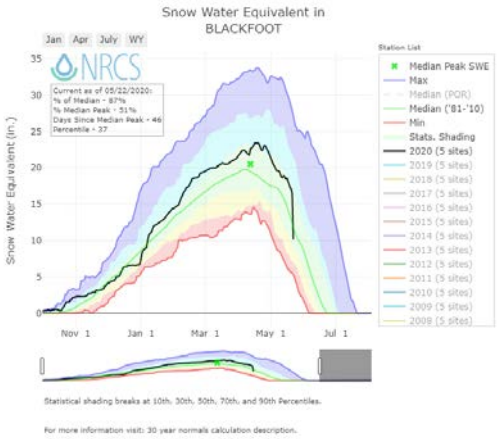
Soil moisture levels throughout the drainage are generally good. Surface soils were recharged slightly this week at most fields. Now is the easiest time to increase soil moisture where it is depleted and is not full to its water holding capacity.

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

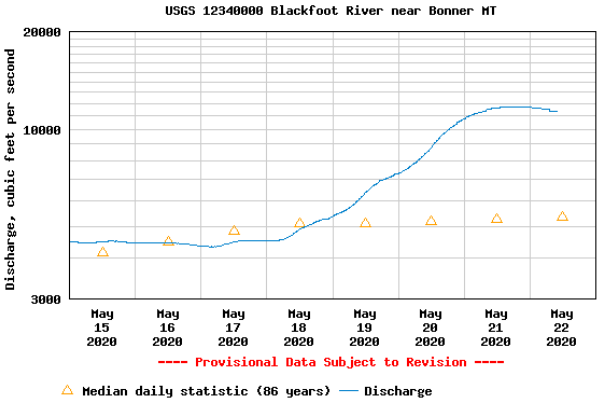
Water Supply Takes A Nosedive

A great deal of our Blackfoot drainage snowpack ran down the river this week. We went from above average snowpack to slightly below average (black line). We now have only about ½ the snowpack we had at this time last year. The hot/dry 90-day forecast suggests water supply shortages are likely later in the season.



Blackfoot River Flow Hits a Peak

TODAY:	**11,400 CFS**
AVERAGE:	**5,820**
HIGHEST:	**15,200 (1948)**
LOWEST:	**1,060 (1941)**



River flow surged this week due to rainfall and a melting snowpack but should drop next week due to less rain. Flows may remain near average through June but are likely to drop significantly later in the season.

Drought in 2020?

Even when we have above-average snowpack these days we seem to be more susceptible to drought. It would take a monsoon to make up for the snowpack we lost this week and such rain amounts just don't happen. Here are some options for reducing water use taken from our irrigation guide - available on the Blackfoot Challenge website https://blackfootchallenge.org/. Our weekly reports are not usually so long but we want you to have this extra drought information early this year. Let me know your favorite drought practices and I will spread them around.

Some strategies can be used immediately and others require planning ahead and can be used in future years. Some of these practices can have negative consequences for irrigators (usually lower yield).

Check your soil moisture to see what you have. Estimating soil moisture content is not rocket science and we provide guidance in these weekly reports and our irrigation guide.

Fill Up Your Soil and Try to Keep it Near Full as long as Water Supplies Last
Fill up your soils Available Water Holding Capacity (AWHC) so when you get asked to cut back you can do so knowing you have plenty of crop water stored. Sandy soils can store 2-4 inches in a 3 foot root zone. Local silty, loamy and clayey soils can store 4-6 inches in a 3 foot root zone.

Rotate Irrigation Systems During Low River Flows
Streamflows can be increased by reducing the amount of diverted irrigation water. Reduce the number of pivots, wheel lines, hand lines or other systems operating at one time in order to leave more water in the stream for other users.

Save Water for Critical Growth Periods
Each crop has critical growth periods when yield is most affected by a lack of water. For hay crops, this is during stand establishment and immediately after cutting. For small grains, this is during stand establishment, boot, blossom and early head stage. You can also consider the main growth period as a critical period for crops since this is the time when you get most of your production, especially for hay crops. For hay crops in the Blackfoot drainage, this period is the month of June (with a little of May and July thrown in during some years). If you want to get good production you must try to match your irrigation with crop water use during this period.

Reduce Irrigated Acreage
You can produce a larger crop by irrigating a smaller area ***well*** than by irrigating a larger area ***poorly***. If you reduce your acreage, you may also be able to reduce your costs for other inputs such as fertilizer, herbicides, seed, fuel and labor. This choice is tricky since it requires you to predict the future or take the work of weathermen.

Concentrate Your Efforts on the First Cutting
Most irrigators in the Blackfoot Drainage harvest one cutting on hay crops and then pasture the field or leave it to go dormant. Even if you manage to get a second cutting or some pasture, the first cutting is where most of your production comes from so make your best effort here. Begin irrigating in May if needed and make a real effort throughout June when most of your production occurs and when crop water use is lower than in July and August due to lower temperatures. Be sure to irrigate at least once after cutting to aid plant recovery from cutting stress.

Grow Your Crop During Cooler Periods
Plant annual crops early and harvest early before the hottest weather. For permanent crops, irrigate heavily during the most productive period for a first cutting (June). Reduce or stop irrigation during the hottest, driest period in July-August. Resume when crop water use is lower and more water is available.

Apply More Water At Each Application
Each time you irrigate you lose .10 - .25 inches of water from evaporation off crop leaves and the soil surface. The gross irrigation amount is how much comes out of the sprinklers. The net irrigation amount is how much makes it into the soil. If you apply ½ inches twice instead of 1 inch once, you lose twice as much to evaporation.

Plant Crops That Use Less Water
Alfalfa and hay crops use the most water (22 inches average in the Blackfoot drainage). Pasture uses slightly less (18 inches) and small grains or other annual crops use the least (15 inches).

Practice Irrigation Scheduling
Keep track of your irrigation and compare it with crop water use to maintain good soil moisture levels. Observe your soil moisture at the season start and during the main irrigation period. Apply the right amount of water at the right time for maximum crop yield especially during June when you get the biggest bang for your buck. Know your critical crop water periods and concentrate your efforts then.

Improve Irrigation System Performance
Irrigation is most effective when the system works properly. Know how much your system applies per irrigation. Check for proper operating pressures and flow rates from pumps and sprinklers. Adjust the application rate if necessary by changing pumping pressure and nozzle sizes/flow rates. Improve irrigation uniformity by keeping nozzles clear and replacing worn components.

Plan For a Lower Yield and Reduce Other Crop Inputs to Match
If irrigation water supplies are predicted to be low, then don't plan for a high yield crop. Choose a production target that is reasonable for the predicted water supply and adjust other crop inputs accordingly. Do not fertilize for a 100-bushel per acre grain crop if there will only be enough water to grow a 70-bushel per acre crop.

Stay Safe as Our Isolated Are Opens to the World
The Blackfoot Drainage has been about as safe a place as you can be these days. Montana has one of the lowest virus infection rates in the nation. When things open up this week and summer visitors/tourists arrive the risks increase significantly. Safety is in the details and generally related to personal contact and proximity. One early case was linked back to "please pass the salt". So be careful and we all will survive this together. Covid19 info is available on the Challenge web site https://blackfootchallenge.org/.

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.