BLACKFOOT CHALLENGE
WEEKLY IRRIGATION REPORT
Friday May 8, 2020

Welcome to the 2020 irrigation season. We have 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 Drainage.

The ditches are full, some pivots are turning and some sprinklers are going. Many in the upper drainage are waiting for a little more green-up. April saw average or lower rainfall and mostly cool temperatures across Blackfoot farmlands. Soil moisture levels here at the start of the growing season are good – above average mostly at 75% or more of their potential water holding capacities. The snowpack is currently above average (125%) compared to last year when it was average. The snow started coming off quickly with warm temps last week but has slowed to a more normal rate with the Blackfoot River now flowing at near its normal volume. 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 average rainfall and temperatures. The 90-day forecast says above average temperatures and below average rainfall.

Since nature has mostly recharged soil moisture, irrigators now just need to keep up with crop water use to see good crop yields. **Local crops used less than an inch of water this week and should use about the same next.** If your surface layer has dried out, now is the easiest time to fill it up while the crop is short and water use low. Drought seems less likely with an above average snowpack but recent years show how quickly things can get hot and dry. Concentrate your efforts on early season irrigation (May-June) when irrigation is most effective and you get the best production.

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. 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).

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**	**0.8** (0.6 - 1.0)	.11	1.8
PASTURE	**0.7**	**0.7** (0.6 - 1.0)	.10	1.7
SPRING GRAINS	**0.1**	**0.2** (0.1 - 0.3)	.03	0.2
WINTER WHEAT	**0.9**	**0.9** (0.7 - 1.1)	.13	2.0
LAWNS	**0.9**	**0.8** (0.6 - 1.0)	.13	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 cool and fairly dry so crop water use was below average and this continued into May. A couple warm, dry days were the exception when water use doubled that of the cool days. It looks like this week will have average or slightly below average 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 2020 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

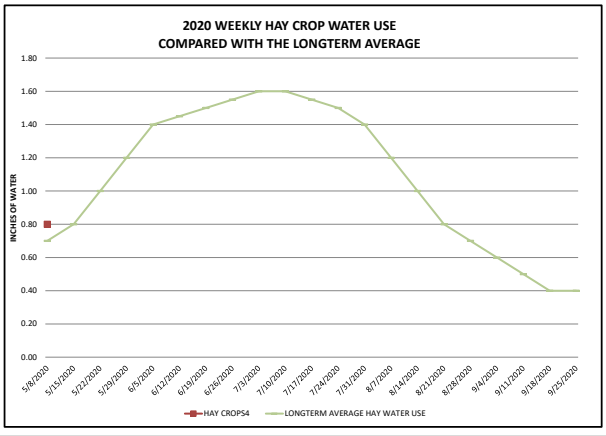
	RAIN[1]	2020 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	1.25	1.00	1.00	0.10	0.10	1.10	1.00			
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								0.80	1.10	0.50
5/22/2020								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	1.26	1.80	1.70	0.20	0.20	2.00	1.90	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)

[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 – GOOD!

Soil moisture levels throughout the drainage this week were great and almost as high as last year. Most soils are filled up to over 75% of their water holding capacity throughout the 3-foot root zone. This means most hay and pasture irrigators can still put out other fires for a week or so before irrigation gets critical. Many will start this week and some have already. 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.

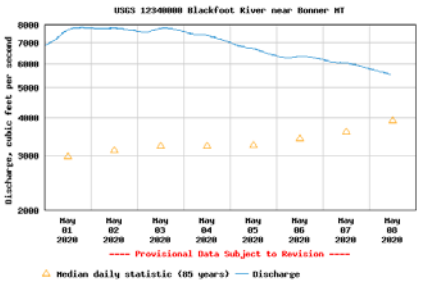
WEEKLY TIPS

Water Supply

Blackfoot drainage snowpack is at 124% of average according to the May 1 water supply forecast (thank you NRCS Water Supply Forecast). Last year at this time the snowpack was at 101% of average. April precipitation in the Blackfoot was 90% of normal which combined with mostly cool temperatures resulted on only a small loss of stored soil moisture. Reservoir storage is also good at 105% of normal for the Upper Clark Fork. Blackfoot river flows throughout May and June should remain above normal but the hot and dry weather in the long-range forecast could limit supplies in July and August.

Streamflows

The Blackfoot river flow at Bonner is about 5,550 CFS today which is slightly above average for this date (4,220 CFS) and about the same as last year. 2018 set the highest flow record at 16,200 CFS while the lowest flow on this date was 770 CFS in 1905. On a couple days this past week, flows were more than double the average due to some hot, clear weather.



We are not predicted to have serious flooding this year and the highest flows were likely those of last week (but anything could happen). Predictions for the next 30 days are for average temperatures and rainfall average which should produce a nice even snowmelt with abundant irrigation water. Predictions for the next 90 days are for temperatures well above average and rainfall below average.

Time to Keep Moisture Levels High.

At the start of a normal irrigation season we encourage filling up soils to their moisture holding capacities. This year nature mostly did it for us and now we just need to keep it up. Most folks have enough stored soil moisture for 2-3 weeks of crop water use. However, 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.

Don't get too complacent, crops are poised to grow quickly and use up available water when it warms up this week. If it is dry, warm and breezy, crops could use over an inch this week at some sites.

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 grow into 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).

Irrigation and the Coronavirus?

What could the Coronavirus have to do with irrigation?! Historian Stuart Borsch reports that a major factor in the decline of medieval Egypt was plague and its devastating effect on irrigation. Egypt's population and entire society depended on an elaborate irrigation system from the Nile. Annual floods destroyed control structures and filled canals and ditches with sediment. Each year an army of laborers cleaned out sediment and made repairs. When plague (black death) wiped out this labor pool in the 1500s, the irrigation system failed and the society with it.

It turns out that plagues and pandemics have been around throughout history and the ways to combat them are well known. Back to ancient Greece we have used face coverings, stay-at-home practices and quarantine. In the 1918 Pandemic where 50-100 million died worldwide those places that quarantined had few cases (Australia, individual US institutions). A valley in Gunnison County Colorado barricaded all the roads and kept virus-free. Places that held public events sparked huge outbreaks. Delays by President Wilson were blamed for hundreds of thousands of deaths especially among US servicemen. The flu came in three waves over 1918-1919 as precautions were relaxed and reestablished when flu resurged. There is actually an abundant literature about plague and pandemics as well as numerous projections and estimates of potential effects. **The Great Influenza** by John Barry and the Netflix special: **Pandemic** are good sources to start. *"Those who ignore history…."*

It's hard to feel the nation-wide and world-wide effects of the pandemic here in the Blackfoot. Unless you travel, know folks with high-risk conditions, own a restaurant or have yourself lived in a small apartment with children – it's hard to relate. So enjoy our isolation but keep yourself safe - for all of us. We want our irrigators healthy.

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.