

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday June 1, 2018



Welcome at last to the start of the 2018 irrigation season! Yeah, we know many of you have been out for a month with shovel and tarp but now the sprinkler phase has also arrived. Warm, sunny weather is forecast so crop water use should approach average levels of 1 – 1 ½ inches this coming week. Crop growth is still highly variable across the drainage due to weather, floodwaters and high soil moisture levels. Rain has continued to provide some lucky folks enough for both new plantings and established crops. Long-range forecasts predict a change to above average temperatures and below average rainfall for the rest of the season. Our suggestions for the entire irrigation season are presented on the last page of this report. Use these to look ahead and plan or to compare with what you're doing now. If you have questions or comment please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).



WEATHER - MIXED CLOUDY/COOL AND SPOTS OF SUN

Rainfall was scattered and variable over Blackfoot croplands this last week with most sites getting ¼ - ½ inch. A few spots had up to 1 inch so adjust for your site. The coming weeks forecast changes daily but now is mostly warm and sunny with showers possible a couple days. Highs next week will rise into the 70s. The 30- and 90-day forecasts continue to suggest above normal temperatures and below normal rainfall.



CROP WATER USE - STILL BELOW AVERAGE

Crop water use was again below normal this week but should come back up to near normal if the weather forecast is correct. Crop growth and water use is about as variable as it gets across the drainage with some spots taking off and others barely getting started. Adjust the figures below for your conditions as needed. The table and chart on Page 2 summarizes the entire irrigation season and compares it with average, hot and cool conditions.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS¹	SEASON TOTAL²
HAY CROPS	1.0	1.2 (1.0 – 1.4)	3.7
PASTURE	0.9	1.1 (0.9 – 1.3)	3.3
SPRING GRAINS	0.5	0.6 (0.4 – 0.8)	1.2
WINTER WHEAT	1.1	1.3 (1.1 – 1.5)	3.8
LAWNS	1.0	1.2 (1.0 – 1.4)	3.7

¹Expected water use (range if weather becomes cooler or hotter than expected)

²Beginning April 1 – note in 2010-13 we started our seasonal total on May 1 but since include April

BLACKFOOT 2018 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

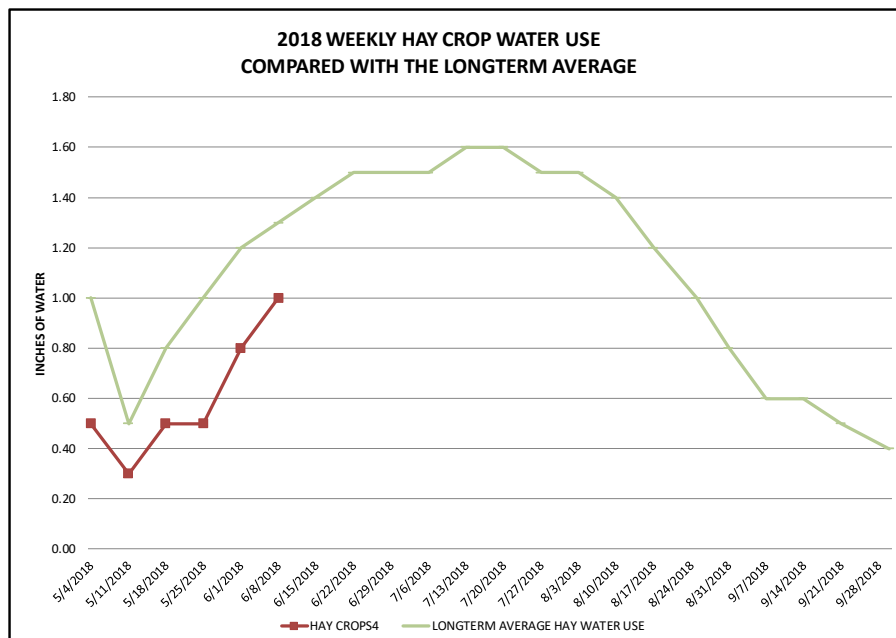
WEEK ENDING	RAIN ¹	2018 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE POTENTIAL CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	1.50	0.50	0.40	0.10	0.10	0.50	0.50	1.00	1.50	0.50
5/4/2018	0.50	0.30	0.20	0.10	0.10	0.30	0.30	0.50	0.80	0.30
5/11/2018	0.50	0.50	0.40	0.10	0.10	0.50	0.50	0.80	1.00	0.50
5/18/2018	0.50	0.50	0.40	0.10	0.10	0.50	0.50	1.00	1.10	0.60
5/25/2018	0.25	0.80	0.70	0.30	0.10	0.80	0.80	1.20	1.30	0.80
6/1/2018	0.25	1.00	0.90	0.50	0.30	1.10	1.00	1.30	1.40	0.90
6/8/2018								1.40	1.50	1.00
6/15/2018								1.50	1.70	1.00
6/22/2018								1.50	1.90	1.10
6/29/2018								1.50	2.00	1.20
7/6/2018								1.60	2.10	1.30
7/13/2018								1.60	2.00	1.20
7/20/2018								1.50	2.00	1.20
7/27/2018								1.50	2.20	1.10
8/3/2018								1.40	1.70	1.00
8/10/2018								1.20	1.50	0.90
8/17/2018								1.00	1.30	0.70
8/25/2018								0.80	1.00	0.50
8/31/2018								0.60	0.80	0.40
9/7/2018								0.60	0.70	0.30
9/14/2018								0.50	0.70	0.30
9/21/2018								0.40	0.60	0.20
9/30/2018								0.40	0.60	0.20
TOTAL	3.50	3.60	3.00	1.20	0.80	3.70	3.60	24.80	31.40	17.20

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.

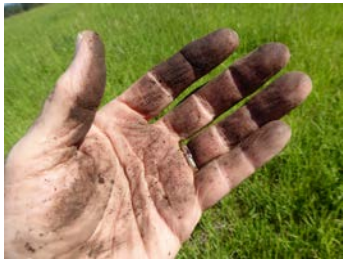
⁴ Hay Crop water use drops approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.





SOIL MOISTURE - TOO HIGH IN SOME FIELDS, DROPPING IN OTHERS

Soil moisture levels throughout the drainage began to drop significantly for the first time this season. Some sites had enough rainfall to keep soil moisture high and others still have very little crop growth so soil moisture remains high. But most surface soils dried enough to think about starting systems, especially on new plantings, sandy/rocky soils and warmer/sunnier/windier sites. It should be easy for most folks to keep soil moisture levels high in June with such a moist start.



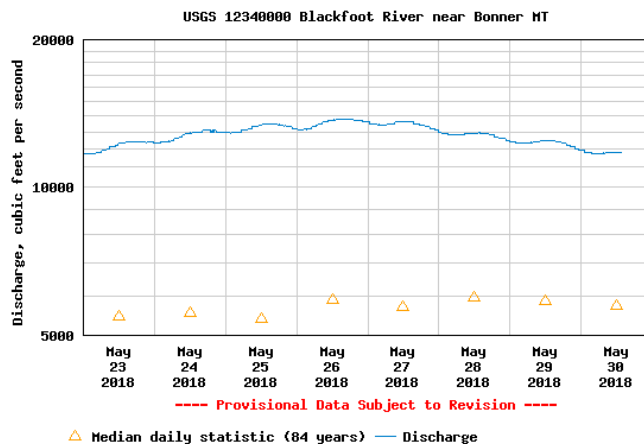
It's ideal to keep your soil moisture above 50% of water holding capacity for best production. This is a great goal for our peak production period of June when you literally make the most hay. This cool, wet year may extend that well into July. At 50% of water holding capacity the soil can be formed into a ball (top photo). The hand gets dirty and appears moist (bottom photo) but

not shiny wet. Call if you have questions about your soil moisture or visit the irrigation guide on the Challenge website.

WEEKLY TIPS

Flooding And Stream flows

Today the Blackfoot river flow is about 11,000 CFS at Bonner and has decreased slightly over the past week. The highest level ever recorded for this date was 13,600 (1899) and the lowest 1,060 (1941). The average flow is about 6,000. Historically, June is the month with the biggest floods and there is still sufficient snowpack and rainfall potential to have a record event this year.



Carcass Pickup Program 2018

The Blackfoot Challenge Annual Carcass Pick-up Program has ended for the year. For future carcass removals, you may deliver a carcass yourself to the MDT Composting Facility near Clearwater Junction (makes a good family outing) or call Jamie Jonkel, with MT Fish, Wildlife and Parks, at 406-544-1447.

Soil Health Laboratory Testing

Well, if you were not confused enough by soil testing in the past, get ready to interpret your levels of algae, fungi, bacteria and other organisms. What exactly does 4,327 nematodes mean? The good news is that you probably don't have to jump on the soil health testing wagon just yet unless you have a special interest and some extra time on your hands.

Over the past 50 years crop nutrient needs have become well established. We generally know how much of each major nutrient a crop needs. Over this same period, soil testing has been correlated reasonable well with fertilizer applications to produce target yields. This system emphasizes NPK (nitrogen, phosphorous, potassium) and then attempts to diagnose additional deficiencies if necessary.

One concept of **Soil Health** is to supply crop nutrients by enhancing natural biological processes in order to reduce or eliminate imported fertilizer. The primary mechanism is to mobilize more nutrients from the recycling of organic matter. To do this you need organic matter and lot of busy soil microbes. Soil tests (or more often – groups of tests) have recently evolved to meet this new interest. Most combine some traditional soil tests like total organic matter and water-extractable nutrients with measures of microbial numbers or activity levels. Many companies are trying to develop or refine tests of this type. Three of the most popular currently are:



Comprehensive Assessment of Soil Health (CASH). This test was developed by Cornell University and includes both traditional soil analyses and biological testing.

Haney Soil Health Test. This test is probable the most commonly used to date and is currently endorsed for cost share payments under NRCS programs including EQUIP.

Solvita Test. This is a do-it yourself testing kit and represents the current goal to develop relatively easy, quick and inexpensive tests.

All the current testing options have both promoters and critics. Everyone seems to agree that a biological component to testing is needed. However, there is not yet a large body of data from any of these new test procedures or good correlations to yield. There is also the inherent variability of biological systems. Changes in conditions like temperature, moisture content and soil texture directly affect biological activity and have been shown to produce highly variable results. As always, the location, date, moisture conditions and other variables must be carefully considered when taking soil samples for testing. Without these controls it may be difficult to compare results from one year to another. Hopefully, we can begin to collect baseline information to identify the range of local microbes and their activity levels. It also seems appropriate to conduct testing on paired sites to evaluate management or treatment effects.

You Don't Need a Test to Improve Soil Health

Remember that it doesn't take soil testing to improve soil health. We already know how to make soil microbes happy. Soil microbes want what we want – food (organic matter), air (they mostly breathe too and need good aeration), water (moist but not saturated).

Next week we will talk about some soil health testing you can do now yourself.

Irrigation History

The “first” water measurement device was the “*Nilometer*” – essentially a staff gauge placed in the Nile river about 5500 years ago. A variation of the staff gauge was a series of masonry steps on the bank where water height could be easily observed. The Egyptians thought their priests were pretty smart because they could predict floods. They did so by collecting flood data over long periods and analyzing it for patterns. By 4000 years ago there were about 20 million acres under irrigation worldwide. Now we have about 600 million with 2 million in Montana.



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.
- Stop irrigating small grains at the milk to soft dough stage but be sure there are 1- 2 inches of soil moisture left at this stage to prevent kernels from shrinking.

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.