

BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday June 29, 2018

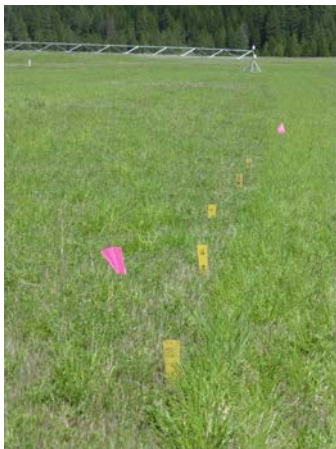


Rainfall was variable across Blackfoot drainage croplands this week with most sites getting about ¼ inch. Some folks had a little more while others had none. Weekly crop water use was again below average at about 1 inch. Long-range forecasts predict above average temperatures and average rainfall for the rest of the season. It still looks good for late season irrigation if you have a new planting, cover crop or other project in mind. General irrigation suggestions for the entire 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 comments please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).



WEATHER - SHOWERS AND SUN

It was another mixed week of weather that saw 0 – ½ inch of rain fall on Blackfoot croplands with most sites getting about ¼ inch. High temperatures next week should again be in the 70s. The 30- and 90-day forecasts suggest above normal temperatures and normal rainfall.



CROP WATER USE - STILL BELOW NORMAL

Crop water use was again below normal this week and will likely continue below normal next week. (chart page 2). It still is looking like a delayed hay harvest this year to let plants catch up and reach peak production. The table and chart on Page 2 summarize the entire irrigation season and compare it with average, hot and cool conditions.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS¹	SEASON TOTAL²
HAY CROPS	1.2	1.4 (1.3 – 1.5)	6.8
PASTURE	1.0	1.2 (1.0 – 1.3)	5.7
SPRING GRAINS	1.2	1.1 (1.0 – 1.3)	3.7
WINTER WHEAT	1.3	1.5 (1.3 – 1.6)	7.3
LAWNS	1.1	1.3 (1.0 – 1.4)	6.6
RAIN (Average across drainage croplands)	0.25	0.25	6.2
EFFECTIVE RAIN	0.10	0.10	4.8

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)

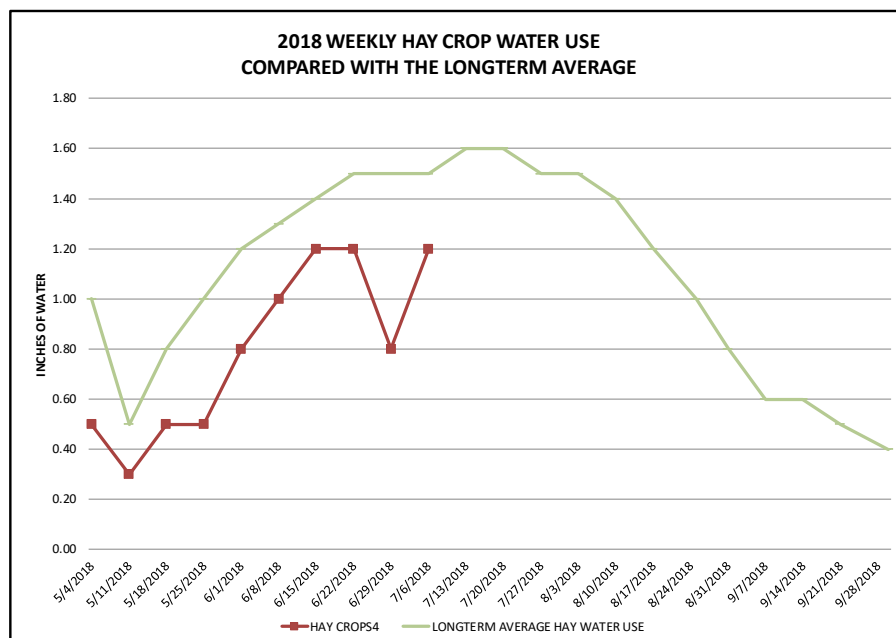
WEEK ENDING	RAIN ¹	2018 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE POTENTIAL CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	1.50	0.50	0.40	0.10	0.10	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	0.75	1.00	0.90	0.50	0.30	1.10	1.00	1.30	1.40	0.90
6/8/2018	0.20	1.20	1.00	0.80	0.50	1.30	1.10	1.40	1.50	1.00
6/15/2018	0.50	1.20	1.00	0.90	0.70	1.30	1.10	1.50	1.70	1.00
6/22/2018	1.25	0.80	0.70	0.80	0.60	1.00	0.80	1.50	1.90	1.10
6/29/2018	0.25	1.20	1.00	1.20	0.90	1.30	1.10	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	6.20	8.00	6.70	4.90	3.50	8.60	7.70	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 - DROPPING AS CROPS GROW

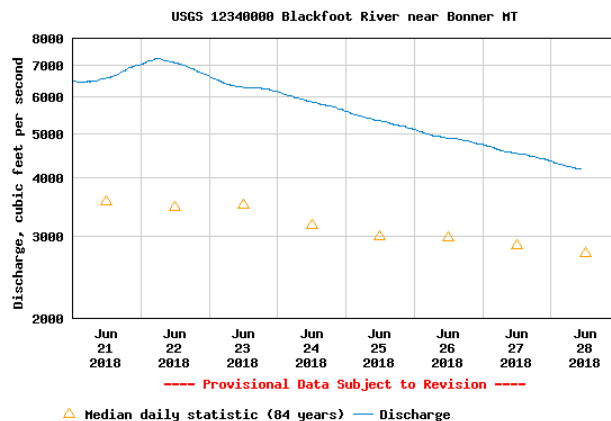
Soil moisture is dropping as crops accelerate growth. Most irrigators are still just topping off their soil moisture due to cool temperatures and a little rain. You can now expect rapid crop growth and soil moisture will drop quickly. Check surface moisture with a shovel or probe to confirm your expectations.

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. 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 Streamflows

Blackfoot river flows have dropped this week to about 4,200 CFS at Bonner compared with an average of about 3,300. The highest level recorded for this date was 12,100 (1899) and the lowest 660 (1977). The hydrograph below shows an increase from the last storm followed by a steady decline.



How Do Most Irrigators Decide When to Irrigate?

The table below has some numbers from the 2013 USDA Census of Agriculture on how folks decide when to irrigate¹. How do you compare? Are you a tech wizard with your own sensor system and computer model? Do you rely on a tingling in that big toe you stuck in the electrical socket as a kid? An irrigator once told me he irrigated when his wife kicked him out of the house.

It turns out that most people (¾) rely on crop observations to decide when to irrigate. Alfalfa and many other crops have distinct changes in color that suggest irrigation is needed. About a third of irrigators actually get out a shovel or soil probe to look at the soil. Quite a few use multiple methods (which is why the figures for each add up to more than 100%). About a quarter of Montana irrigators irrigate based on when the district delivers water. Montana irrigators are generally less likely to use the more complicated methods like sensors and computer models.

¹from: https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Farm_and_Ranch_Irrigation_Survey/

METHODS USED TO DECIDE WHEN TO IRRIGATE 2013	US %	MT %
CROP CONDITON	78%	77%
FEEL OF SOIL	39%	32%
SOIL MOISTURE SENSOR	10%	6%
PLANT MOISTURE SENSOR	2%	0%
IRRIGATION SCHEDULING SERVICE	8%	5%
REPORTS ON DAILY CROP WATER USE	8%	3%
SCHEDULED BY DELIVERY ORGANIZATION	16%	27%
PERSONAL CALENDAR SCHEDULE	21%	24%
COMPUTER SIMULATION MODEL	1%	0%
WHEN NEIGHBORS START	6%	9%

Quite a few irrigators decide based on what their neighbors are doing and Montanans are more likely to use this method. How can you expand your irrigation decision-making tools and skills? We include hints on crop condition and soil moisture evaluation in our weekly reports and irrigation guide. Soil moisture sensors are now widely available and cost-shared through the NRCS EQUIP program. Call if we can help with installation or calibration. The Challenge has offered irrigation scheduling services and help with personal

calendar schedules to individual irrigators across the drainage. Contact Jennifer if you're interested. Watching what the neighbors do is not spying but is good sense if it leads to better communication, cooperation and crops. Past experience combined with current observations is the road to success. Recognize that conditions seem to be changing rapidly (30% increase in seasonal water us by hay over the past 20 years according to the Deer Lodge Agrimet station). Ask neighbors what they see happening in this changing climate.

Where Do Irrigators Get Information on How to Reduce Irrigation Costs or Conserve Water?

Most irrigators say they get irrigation cost and water conservation information from the Extension

SOURCES OF INFORMATION ON REDUCING IRRIGATION COSTS AND CONSERVING WATER	US %	MT %
Extension or University	41%	40%
Private Consultants	26%	12%
Irrigation Equipment Dealers	28%	26%
Irrigation District or Water Supplier	18%	26%



Service or Universities. Equipment dealers are the next main source. Private consultants are used widely across the US but are less common in Montana, mainly due to our lower-value irrigated crops. Blackfoot irrigators have their own source of information so tell us what you need to know or what methods you want to try. We will try to help you be successful and spread word of your success to others. You will also find lots of great information from the Montana Extension Service at:

<http://waterquality.montana.edu/farm-ranch/irrigation/>

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.