



BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

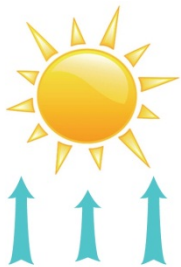
Friday August 26, 2016

This last week had cooler temperatures, scattered thunderstorms and little rain across Blackfoot drainage croplands. Next week looks similar. Weekly potential crop water use remained above average last week at about 1 inch and will be similar next week. Low river flow continues to prompt drought response and drought management plans are in effect – call Jennifer with questions. The last page of this report is a summary of recommendations for the entire irrigation season.



WEATHER - WARM AND DRY

Warm temperatures dominated this last week mixed with a few thunderstorms and a little scattered rain. Similar weather is forecast again for next week with high temperatures in the 70s. The 30 day forecast predicts above normal temperatures and normal rainfall. The 90 day forecast says above normal temperatures and rainfall. This year is the hottest on record worldwide since reliable records started in the 1880s.



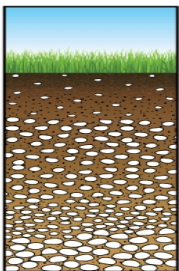
CROP WATER USE - SLIGHTLY ABOVE NORMAL NEXT WEEK

Crop water use will again be above the seasonal normal next week with warm temperatures, thunderstorms and little or no rainfall. Crop water use was above average throughout April, below average in May, bounced around average in June and stayed above average for most of July and August (chart page 3).

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS¹	SEASON TOTAL²
HAY CROPS	1.2	1.2 (1.1 - 1.4)	23.5
PASTURE	1.1	1.1 (1.0 - 1.3)	20.6
SPRING GRAINS	0.5	0.25 (0.2 - 0.4)	19.8
WINTER WHEAT	0.1 (Harvested)	0.1 (0.0 - 0.1)	13.5
LAWNS	1.1	1.1 (1.0 - 1.3)	22.0

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 now include April

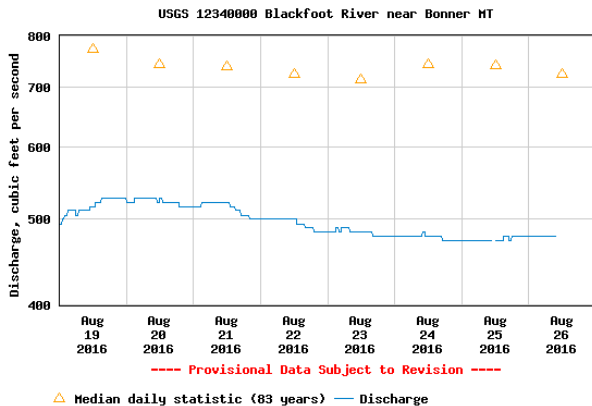


SOIL MOISTURE - LOW UNLESS IRRIGATED

Most folks are letting soil moisture fall after cutting. Some are applying one irrigation after cutting or even filling up the soil moisture holding capacity before shutting down for the season. Those with available water are mostly irrigating less frequently with smaller amounts which penetrate only into the surface soil. These efforts are mainly to keep alfalfa from dying out and pastures from going dormant. Irrigation is less efficient during this hot part of the summer - less of the applied irrigation water actually gets into the soil for crop use.

WEEKLY TIPS

DROUGHT 2016



The Blackfoot River flow at Bonner remains below 500 cfs - the main flow trigger in Blackfoot drought management. Today's flow is near 470 cfs compared with an average of 730 cfs. The low flow for this date was 341 cfs in 1941 and the high was 1,580 cfs in 1899.

Low flows and predictions of hot, dry weather in the 30 day weather forecast suggest that drought conditions will continue to worsen.

DROUGHT-RESISTANT SOIL

Ok, so it's starting to sink in. Every year is the hottest year ever. Four of the last five years have been drought years. Besides short-term concerns over today's river levels, we might need to start planning for a drier future.

Improving your soils ability to absorb and hold water will help future water management and crop production. It's often a difficult tradeoff – the short-term loss of effort, expense and current crop production against the long-term gains of improved soil health, water management and future crop production. Adding organic matter is the number one method for improving soil health and water management. Organic matter increases surface infiltration so water moves quickly into the soil before evaporation. It also increases the available water holding capacity so you can store more water for crop use. Organic matter increases aeration promoting biological activity that makes nutrients available. Besides the agricultural benefits, sequestering organic matter in soils may prove to be one of the main ways to solve world carbon problems. There is extensive literature singing the praises of soil organic matter. Here are two examples that discuss organic matter in soils:

Sullivan, P. 2002. **Drought Resistant Soil**. National Center for Appropriate Technology. Tech Note IP169. 7p. (processed) Available on the web at: <http://www.attra.ncat.org/attra-pub/PDF/drought.pdf>

Sullivan, P. 2004. **Overview of Cover Crops and Green Manures**. National Center for Appropriate Technology. Tech Note IPO24. 16p. (processed) Available on the web at: <http://www.attra.ncat.org/attra-pub/PDF/drought.pdf>

IRRIGATION SYSTEM MAINTAINENCE

So you're beat from haying and sick of looking at that irrigation system - but now might be the time to knock off needed maintenance. It's much more pleasant to change sprinkler heads and check pressure regulators on August mornings instead of March mornings. Dig out those tests from John Heffernan and decide what improvements make sense this year. Contact Jennifer about the potential for additional testing. Remember to think about the entire system from *diversion* to inlet to *fish screen* to *ditch* to *pipe* to *pump* to *sprinklers* to *runoff*. Also - low summer stream flows may make work on diversions easier and less disruptive.

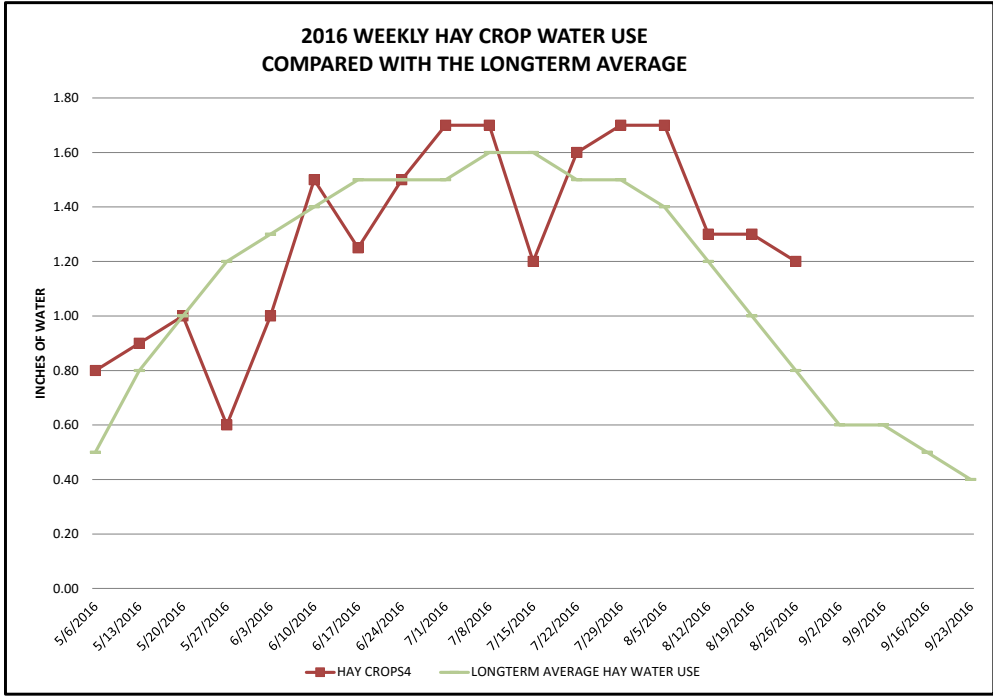
For further information contact Jennifer Schoonen, Blackfoot Challenge Water Steward, 406-360-6445 or Barry Dutton, Professional Soil Scientist, 406-240-7798 barry@landandwaterconsulting.net

BLACKFOOT 2016 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

	RAIN ¹	2016 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
5/6/2016	0.20	0.80	0.70	0.25	0.25	0.90	0.70	0.50	0.80	0.20
5/13/2016	0.30	0.90	0.80	0.25	0.25	1.10	0.80	0.80	1.00	0.50
5/20/2016	0.01	1.00	0.90	0.50	0.25	1.10	1.00	1.00	1.10	0.70
5/27/2016	1.00	0.60	0.50	0.30	0.25	0.70	0.60	1.20	1.20	0.80
6/3/2016	0.20	1.00	0.90	0.70	0.40	1.10	1.00	1.30	1.30	0.90
6/10/2016	0.10	1.50	1.40	1.25	0.70	1.60	1.50	1.40	1.50	1.00
6/17/2016	0.20	1.25	1.20	1.30	0.70	1.40	1.20	1.50	1.70	1.10
6/24/2016	0.10	1.50	1.40	1.60	1.20	1.50	1.50	1.50	1.90	1.10
7/1/2016	0.01	1.70	1.50	1.80	1.80	1.10	1.60	1.50	2.00	1.20
7/8/2016	0.01	1.70	1.60	1.80	1.80	0.50	1.50	1.60	2.10	1.30
7/15/2016	1.25	1.20	1.00	1.30	1.30	0.10	1.20	1.60	2.00	1.20
7/22/2016	0.10	1.60	1.40	1.90	2.00	0.10	1.50	1.50	1.90	1.20
7/29/2016	0.00	1.70	1.50	1.90	1.90	0.10	1.60	1.50	2.20	1.10
8/5/2016	0.00	1.70	1.50	1.90	1.90	0.10	1.60	1.40	1.70	1.00
8/12/2016	0.25	1.30	1.00	1.00	1.20	0.10	1.20	1.20	1.50	0.90
8/19/2016	0.01	1.30	1.00	0.75	0.50	0.10	1.20	1.00	1.30	0.70
8/26/2016	0.10	1.20	1.00	0.50	0.25	0.10	1.10	0.80	1.00	0.50
9/2/2016								0.60	0.80	0.40
9/9/2016								0.60	0.70	0.30
9/16/2016								0.50	0.70	0.30
9/23/2016								0.40	0.60	0.20
9/30/2016								0.40	0.60	0.20
TOTAL	4.54	23.45	20.55	19.75	17.40	13.45	22.05	24.80	31.10	17.30

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)
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 is reduced by approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.

CROP WATER WAS SLIGHTLY ABOVE NORMAL AGAIN THIS WEEK (RED LINE)



THE BLACKFOOT DRAINAGE IRRIGATION SEASON IN BRIEF

This is a summary of general activities and recommendations with more detail provided throughout our 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 and water availability. Irrigate new plantings as needed.
- Some folks irrigate for pasture following their one hay cutting. Irrigate according to pasture needs and with consideration for other water users.
- Reduce river withdrawals by rotating systems, reducing the amount area irrigated at one time and by delaying irrigation until streamflows recover.



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 and water availability. Irrigate new plantings as needed. Plan for higher temperatures, earlier springs and less water. Next year put some acres in lower water use crops including annual crops, alter rotations, reseed/inter-seed or come up with your own ideas to reduce overall ranch water use.