



BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

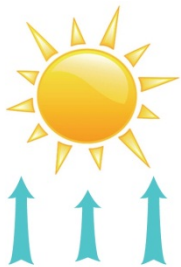
Friday August 19, 2016

This last week had quite warm temperatures and little or no rain across Blackfoot drainage croplands. Next week looks sunny but not quite as warm. Weekly potential crop water use was near average last week at about 1¼ inches. Crop water use will be similar to slightly lower this next week. Low river flows continue to prompt drought response and drought management plans are being implemented – call Jennifer with questions. The last page of this report is a summary of recommendations for the entire irrigation season.



WEATHER - WARM AND DRY

Hot temperatures dominated this last week mixed with a few thunderstorms and a little scattered rain. Warm, dry weather is forecast again for next week. The 30 day forecast predicts normal temperatures and below normal rainfall. The 90 day forecast says above normal temperatures and normal rainfall.



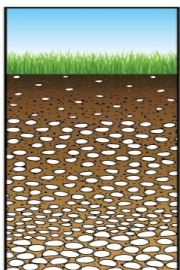
CROP WATER USE - SLIGHTLY ABOVE NORMAL NEXT WEEK

Crop water use will be slightly above the seasonal normal next week with warm temperatures 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	1.3	1.3 (1.2 - 1.5)	22.3
PASTURE	1.1	1.1 (1.0 - 1.3)	19.6
SPRING GRAINS	1.2	0.9 (0.7 - 1.0)	19.3
WINTER WHEAT	0.1 (Harvested)	0.1 (0.0 - 0.1)	13.3
LAWNS	1.2	1.2 (1.0 - 1.5)	21.0

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

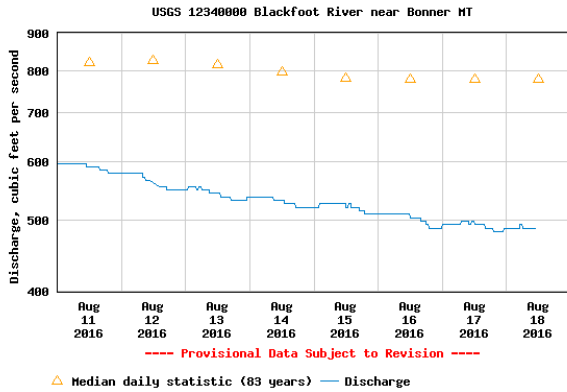


SOIL MOISTURE - LOW UNLESS IRRIGATED

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. 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 has now fallen below 500 cfs - the main flow trigger in Blackfoot drought management. The river is now at less than half of its average flow. Today's flow is near 488 cfs compared with an average of 776 cfs. The low flow for this date was 365 cfs in 1941 and the high was 1,720 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.

DO IRRIGATE AFTER CUTTING

- If you have alfalfa you want to preserve in the stand
- If you have new seedlings you need to irrigate up (but consider a planting delay until fall)
- If you do, reduce irrigated acreage and irrigate that well
- If you do, only apply a fraction (25-50%) of the potential crop water use each week
- If you do, rotate systems to reduce your total river withdrawal rate
- If you do, reduce the number of heads running at once

DON'T IRRIGATE AFTER CUTTING

- If you don't need fall pasture
- If you are reseeding in the fall
- If you are out of water

HOW MUCH WATER DOES IT TAKE?

There are many ways to calculate water use but a recent book tries to put things in perspective and make some comparisons. For the details see: *Your Water Footprint: The Shocking Facts About How Much Water We Use* by Stephen Leahy. He reports that 70% of fresh water use worldwide goes to irrigation. He calculates that a vegetarian diet requires half the water use of a non-vegetarian diet. Here are some examples for specific crops:

<u>CROP</u>	<u>APPROXIMATE GALLONS OF WATER NEEDED TO PRODUCE</u>
Beef (1oz)	50
Chicken	35
Rice (1oz)	7
Almond (1)	1
Avocado (1)	50
Melon (1)	50
Egg (1)	18
Orange (1)	20-75
Olive (1)	.75
Bread (1 slice)	3
Strawberry	.25
Apple (1)	5
Onion (1)	8
Blueberry (1)	.04

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								0.80	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	4.44	22.25	19.55	19.25	17.15	13.35	20.95	24.80	31.10	17.30

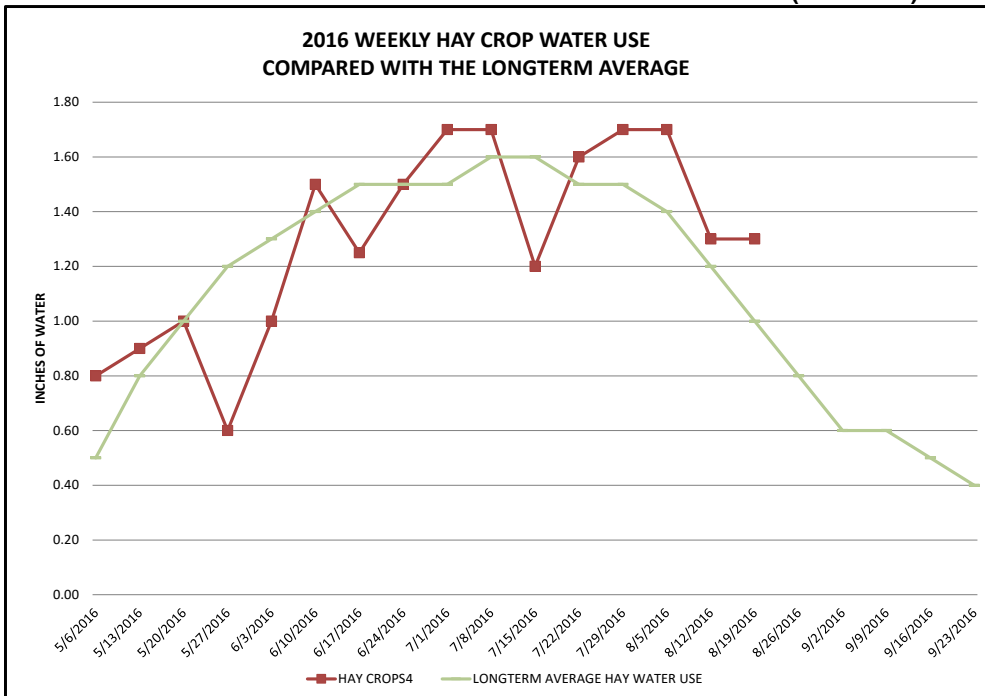
¹ Rainfall should be reduced to account for immediate evaporation from crop and soil surfaces (0.1-April,May and Sept, 0.15-June and August, 0.2-July)

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.