



BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

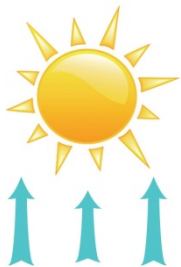
Friday July 1, 2016

It was a hot week with only a trace of rain. Crop water use rose to its highest levels this week to match the hottest, driest weather. Most crops used about 1¾ inches of water. Hot and dry weather is forecast for next week so crop water use will continue to be high. Drought conditions are expected to develop soon - check your drought management plan and be ready. The last page of this report is a summary of recommendations for the entire irrigation season.



WEATHER - "SLIGHTLY" COOLER BUT STILL HOT AND DRY

It was hot and dry last week. The coming week will have only slightly cooler temperatures and little rainfall. The 30 and 90 forecasts indicate far above normal temperatures and far below normal rainfall.



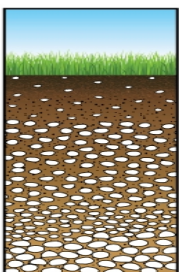
CROP WATER USE - CONTINUED HIGH NEXT WEEK

Hot, dry weather and maturing spring grains boosted crop water use last week. Most crops used about 1¾ inches. It will continue next week with conditions cooling only slightly. Crop water use was above average throughout April then below average in May and has bounced around average in June (chart page 3). When hay is cut, crop water use will drop by about 2/3 the first week and 1/3 week the second after cutting.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS¹	SEASON TOTAL²
HAY CROPS	1.7	1.6 (1.4 - 1.7)	11.8
PASTURE	1.5	1.4 (1.3 - 1.5)	10.6
SPRING GRAINS - EARLY PLANTED	1.8	1.7 (1.5 - 1.9)	8.7
WINTER WHEAT	1.1	1.0 (0.8 - 1.2)	12.3
LAWNS	1.6	1.5 (1.4 - 1.7)	11.2

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 - STILL TIME TO FILL IT UP

Rain? Ha! You're dreaming. Cropland soil moisture is now completely dependent on irrigation so get to it.

WEEKLY TIPS

BUILD UP SOIL MOISTURE BEFORE CUTTING!

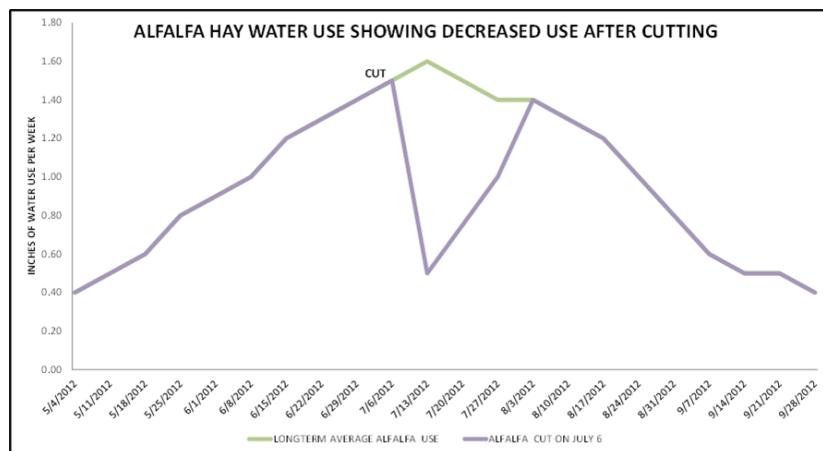
The highest stress period for hay crops is at harvest so try to store up soil moisture before cutting. Leave time after your last irrigation to let the surface soil dry out. Get back across the cut field as soon as possible. If you want to build up your soil moisture after cutting, you will need to apply **more** than the 1 ½ – 2 inches crops are using each week. This assumes you actually have water after cutting. Otherwise, relax and sit in the shade.

REMEMBER TO LET THE SURFACE SOIL DRY OUT BEFORE HARVEST!

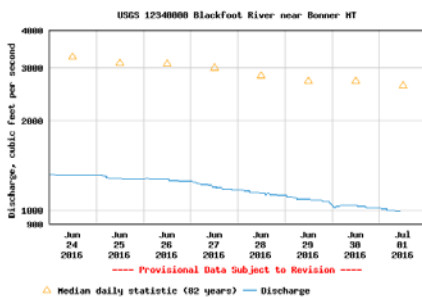
Remember to stop irrigating and let the surface soil dry before harvest. The surface layer of sandy soils may dry out in a few days but clayey soils may take 7-10 days. Irrigate as close to harvest as possible and then getting back across the field quickly. Even if you do not go for a second cutting or pasture, apply at least one irrigation after cutting to help plants recover.

CROP WATER USE DECREASES WITH CUTTING

Crop water use decreases with cutting by approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third. This is the best time to increase soil moisture - while crop use is reduced. Since less gets used by the crop, more goes into soil storage.



DROUGHT 2016!



The Blackfoot River at Bonner continues to drop and is now flowing at less than 1/3 of average. Today's flow is about 996 compared with an average of 3,080 cfs. The low flow for this date was 612 cfs in 1977 and the high was 12,100 cfs in 1899.

Low flows and predictions of hot dry weather in the 30 and 90 day weather forecasts suggest that drought plans will be implemented in July.

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

MEASURING HAY AND PASTURE CROP PRODUCTION



While most folks have a general idea of their crop production, sometimes it is important to measure precisely. This is especially true when comparing year-to-year changes or the results from different treatments.

Here is a 'simple' procedure for measuring crop production that you can do yourself. It includes making a sample hoop the size of 1/10,000 of an acre, clipping 10 hoops to the height you cut or graze, then weighing and drying the samples to determine moisture content or simply drying the samples to your desired moisture content and weighing them. You then convert the results to tons per acre.

MAKE A SAMPLE HOOP

Make a round sampling frame the size of 1/10,000th of an acre. The circumference is 7 feet 4 ³/₄ inches so you can cut a piece of 1/4 inch steel or aluminum rod to this length and weld the ends to make a hoop. The diameter of this hoop is 2.35 feet. You can also use stiff wire held together with a wire clamp – just make sure the circumference and diameter are correct. It doesn't have to be a perfect circle. You can also use a hula-hoop or any size or shape that you can accurately calculate the area of (area of a circle = pi x radius²) (pi=3.14).

CLIP 5-10 HOOPS

Place the hoop down at 10 locations across a representative place in the field and clip down to your normal cutting or grazing level. Place clipped material in a large paper bag (grocery bags can be purchased at any store for about \$.05). Fewer hoops may be needed in uniform crops such as small grains under pivots. More hoops may be needed where production varies more widely including hay and pasture crops and flood-irrigated fields.

WEIGH EACH ENTIRE SAMPLE BAG

Weigh each bagged sample to get a wet weight in ounces. Open the bag tops and air-dry the samples in a warm, dry place until you reach the moisture content you like to bale. Or, weigh and dry the samples until they reach a constant weight.

CALCULATE PRODUCTION

Add up the dry weight of crop from each bag and divide by the number of bags to get an average dry weight per bag in ounces.

Multiply the average weight in ounces times 10,000 to get ounces per acre.

Divide by 16 to get pounds per acre.

Divide by 2000 to get tons per acre.

For additional information including a microwave oven method for immediate results see:

T. Wilson, C. Sanders, J. Breman, and L. Sollenberger. 2015. Estimating Amount of Forage in Hay Fields and Pastures. University of Florida Extension Pub: SS-AGR-360

Y.C. Newman and J. Vendramini. 2014. Forage Moisture Testing. University of Florida Extension Pub: SS-AGR-178

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								1.60	2.10	1.30	
7/15/2016								1.60	2.00	1.20	
7/22/2016								1.50	1.90	1.20	
7/29/2016								1.50	2.20	1.10	
8/5/2016								1.40	1.70	1.00	
8/12/2016								1.20	1.50	0.90	
8/19/2016								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	2.82	11.75	10.55	8.70	6.55	12.25	11.15	24.80	31.10	17.30	

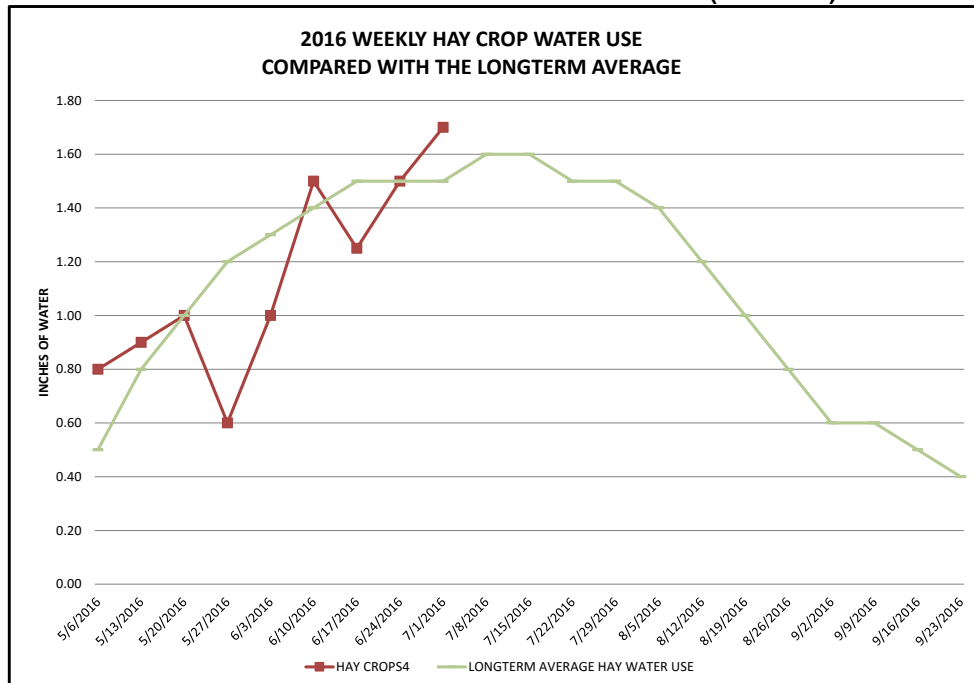
¹ Rainfall should be reduced to account for immediate evaporation from crop and soil surfaces (0.1-April,May and Sept, 0.15-June and August, 0.2-July)

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 INCREASED TO ABOVE AVERAGE 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. 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.



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.