



# BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

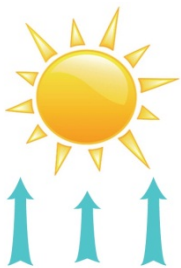
Friday June 5, 2015

Cool temperatures and higher humidity kept **crop water use at about 1 inch this week** for most crops (Chart Page 3). Lower drainage croplands had about ¼ inch of rain. Upper drainage croplands had 1 – 1 ½ inches which mainly fell in short cloudburst events. When rainfall comes so quickly, much runs off and doesn't infiltrate the soil but is still good news for those below reservoir supplies like Nevada Lake. It was a great week to boost soil moisture levels and those who kept the sprinklers on and headgates open made real progress. A condensed overview of the entire irrigation season is presented on the last page of this report as a reminder to plan ahead. More information about irrigation is available on the Challenge website.



## WEATHER - COOL LAST WEEK AND HOT NEXT

In traditional Montana weather style, last week was cooler than normal and next week will be hotter than normal – we are the land of extremes. It was great to see some real rain this week and the more permeable soils on level areas soaked it up. Runoff raised streamflows and reservoir levels. Temperature approaching 90 are expected in the lower drainage next with little rainfall. The 30 and 90 day forecasts continue to indicate above normal temperatures and normal rainfall. Low streamflow conditions are predicted to continue except following large rain events.



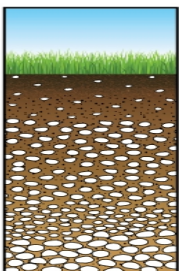
## CROP WATER USE - MODERATE (NEAR NORMAL)

Crop water use was about 1 inch for all crops last week - near normal - due to cool temperatures and higher humidity. It will increase to about 1 ¼ inch next week with much warmer temperatures and few if any showers. The table and chart on Page 3 illustrate crop water use throughout the whole season.

<b>WATER USE IN INCHES</b>	<b>LAST 7 DAYS</b>	<b>NEXT 7 DAYS<sup>1</sup></b>	<b>SEASON TOTAL<sup>2</sup></b>
<b>HAY CROPS</b>	<b>0.9</b>	<b>1.3</b> (1.1 - 1.4)	<b>6.7</b>
<b>PASTURE</b>	<b>0.8</b>	<b>1.1</b> (0.9 - 1.2)	<b>6.0</b>
<b>SPRING GRAINS</b> (planted May1)	<b>0.5</b>	<b>0.7</b> (0.6 - 0.8)	<b>1.7</b>
<b>WINTER WHEAT</b>	<b>1.0</b>	<b>1.4</b> (1.1 - 1.4)	<b>7.8</b>
<b>LAWNS</b>	<b>0.9</b>	<b>1.2</b> (1.0 - 1.3)	<b>6.8</b>

<sup>1</sup>Expected water use (range if weather becomes cooler or hotter than expected)

<sup>2</sup>Beginning April 1 – note in 2010-13 we started our seasonal total on May 1 but now include April



## SOIL MOISTURE - THE RACE TO FILL IT UP!

Rainfall at lower-drainage fields was only ¼ inch while crop water use was nearly 1 inch so without irrigation soils continued to dry out. Cool temperatures and rainfall made it easier to boost soil moisture last week by irrigating. Irrigating during rainy periods is more effective (more water goes into the soil and less evaporates). Irrigating on a developed crop on a hot day with a wind can result in ¼ - ½ inch of water loss. On a cool calm day with a short crop this loss may be only 1/10 inch.

## WEEKLY TIPS

### Keep Irrigating While Water Supplies Last – Yes I Am Still Putting This First!

The best thing irrigators can do for their crops and basin-wide water supply is to irrigate well now and be prepared to cut back when streamflows fall to critical levels. This month is the most important growth period of the season so make your best effort to irrigate well. Check your soil moisture with a soil probe or shovel and if it looks and feels moist – you’re good. If it’s dusty and dry – keep irrigating. This applies to both sprinkler and flood systems. Then give it a few days and look again - you will be surprised how much water a crop can use and how quickly soils dry out!

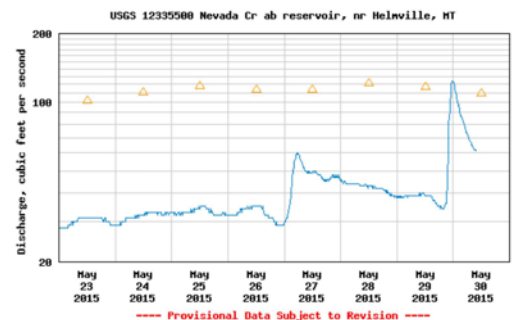
### Irrigation History

We might all be living in an Arabic world if Genghis Khan has not destroyed the irrigation infrastructure and expertise of Iraq in the 1200s. Arabic culture, science, astronomy, navigation, mathematics, etc. were far more advanced than Europe at the time. Such an elaborate culture was only made possible by a complex irrigation system based on the Tigris and Euphrates rivers and the engineering/operation expertise to support it. The Khan of Khans wiped out much of the physical infrastructure as well as a generation of irrigation engineers, consultants and irrigators. The area never recovered. Drought, deforestation and a general lack of good land management turned the “garden of Eden” and “cradle of civilization” into a desert. Cities that supported hundreds of thousands with irrigated agriculture now support huts and goats. The morale of the story: *Speak softly, irrigate well and carry a big shovel.*

### Drought in 2015

Wow - 1 ½ inches of rain or more in the upper drainage this week. It was not a monsoon and didn’t solve the drought but it did help. The lower Blackfoot streamflow remains at half the normal level although it did come up for a few days from rain. Streamflow effects were much more dramatic in the upper drainage and on smaller streams. Nevada Creek went from 30 to 120 CFS due to a couple of cloudbursts and a landscape dominated by clay-rich soils that encourage runoff (chart at right). That’s good news for reservoir storage. *Water Supply Forecasts* are available on the Website <http://blackfootchallenge.org/Articles/?p=1589>.

Discharge, cubic feet per second  
Most recent instantaneous value: 61 05-30-2015 09:45 MDT



Here are some hints for reducing water use taken from our irrigation guide that has more detail and is available at: <http://blackfootchallenge.org/Articles/wp-content/uploads/2013/06/BFIrrigationGuideFinalv3.0.pdf>

- Fill Up Your Soil - NOW - and Try to Keep it Near Full
- Know how much you apply – check with rain gauges or flow meter
- Apply More Water At Each Application
- Improve Irrigation System Performance
- Save Water for Critical Growth Periods

For more information contact Jennifer Schoonen, Blackfoot Challenge Water Steward, 406-360-6445 or Barry Dutton, Professional Soil Scientist, 406-240-7798 [barry@landandwaterconsulting.net](mailto:barry@landandwaterconsulting.net)

**BLACKFOOT 2015 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)**

	RAIN <sup>1</sup>	2015 WEEKLY POTENTIAL CROP WATER USE <sup>2</sup>						AVERAGE POTENTIAL CROP WATER USE <sup>3</sup>		
	RAIN	HAY CROPS <sup>4</sup>	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	0.50	0.90	1.00	0.00	0.00	1.20	1.10			
5/1/2015	0.01	0.80	0.90	0.10	0.00	1.10	0.90	0.50	0.80	0.20
5/8/2015	0.01	1.10	1.00	0.20	0.00	1.20	1.10	0.70	0.90	0.30
5/15/2015	0.10	1.10	0.90	0.20	0.00	1.20	1.00	0.80	1.00	0.50
5/22/2015	0.25	0.80	0.60	0.25	0.20	0.90	0.80	1.00	1.10	0.70
5/29/2015	0.25	1.10	0.80	0.40	0.30	1.20	1.00	1.20	1.20	0.80
6/5/2015	0.50	0.90	0.80	0.50	0.40	1.00	0.90	1.30	1.30	0.90
6/12/2015								1.40	1.50	1.00
6/19/2015								1.50	1.70	1.10
6/26/2015								1.50	1.90	1.10
7/3/2015								1.50	2.00	1.20
7/10/2015								1.60	2.10	1.30
7/17/2015								1.60	2.00	1.20
7/24/2015								1.50	1.90	1.10
7/31/2015								1.50	2.20	1.10
8/7/2015								1.40	1.70	1.00
8/14/2015								1.20	1.50	0.90
8/21/2015								1.00	1.30	0.70
8/28/2015								0.80	1.00	0.50
9/4/2015								0.60	0.80	0.40
9/11/2015								0.50	0.70	0.30
9/18/2015								0.50	0.70	0.30
9/25/2015								0.40	0.60	0.20
9/30/2015								0.40	0.60	0.20
<b>TOTAL</b>	<b>1.62</b>	<b>6.70</b>	<b>6.00</b>	<b>1.65</b>	<b>0.90</b>	<b>7.80</b>	<b>6.80</b>	<b>24.40</b>	<b>30.50</b>	<b>17.00</b>

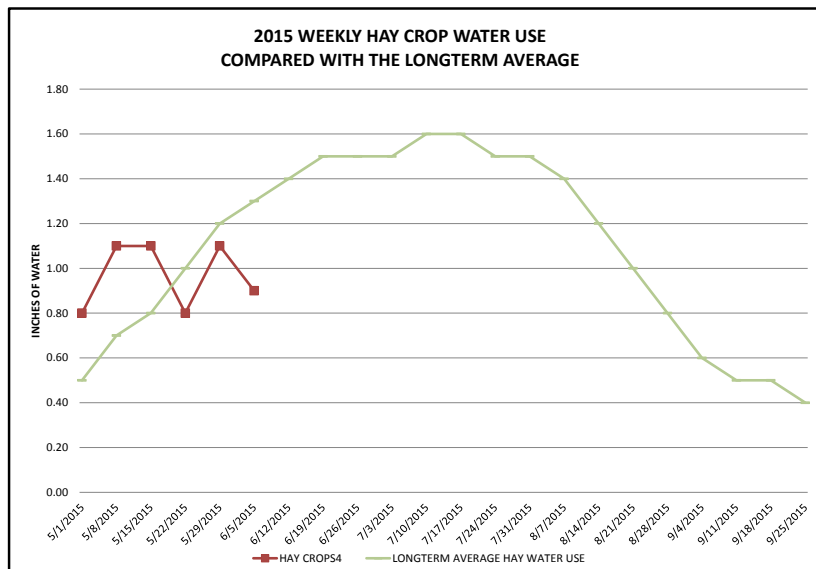
<sup>1</sup> Rainfall should be reduced to account for immediate evaporation from crop and soil surfaces (0.1-May and Sept, 0.15-June and August, 0.2-July)

<sup>2</sup> This years maximum water use by healthy crops that are well-fertilized and irrigated, disease and insect-free. Will vary across the drainage.

<sup>3</sup> Average water use for each crop each week based on long-term historic data.

<sup>4</sup> Hay Crop water use should be reduced by approximately 2/3 the first week after cutting, 1/2 the second and 1/3 the third.

**WEEKLY CROP WATER USE STARTED OUT ABOVE AVERAGE THIS YEAR BUT DROPPED BELOW AVERAGE FOR THE PAST THREE WEEKS (RED LINE = 2015, GREEN LINE = LONG TERM AVERAGE)**



## 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 weather conditions and predictions then plan for 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 (May 1) 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.