BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday July 14, 2017

It was another hot, dry week in the Blackfoot drainage and next week looks the same. Only a few spots had a minimal shower which didn't contribute to soil moisture. Crop water use was high last week and may be even higher next. Mature hay crops used up to 1.7 inches of water while just-cut hayfields used only about 1/3 this amount. Hay harvest has begun throughout the drainage and the crop looks good. Blackfoot River flows continue to drop far below average and it looks like drought restrictions will be implemented in the next couple weeks. A condensed overview of the entire irrigation season is on the last page of this report so you can plan ahead. Please contact Jennifer Schoonen - Blackfoot River Steward (406-360-6445) for more information on this and other Challenge programs.

WEATHER – HOTTER, SUNNIER

Last week saw no rain on most croplands in the drainage. A few folks had scattered showers. Sunny conditions and hot temperatures were great for growing irrigated crops. The coming week is looking sunny and hot again (90s). The 30-day forecast indicates above normal temperatures and normal rainfall. The 90-day forecast indicates above normal temperatures and rainfall.

CROP WATER USE – VERY HIGH - PEAKING

Just when you think crop water use has reached its peak it gets even hotter and drier. Crop water use will likely increase even more next week to near 2 inches for mature hay and spring grains. Water use drops for wheat as it matures and hay crops when they are cut.

Folks often ask "How long will my irrigation last?" instead of "How much do I need to fill up the soil completely?" You can tell how long your latest irrigation will last by dividing the amount of water you applied by the daily forecast for your crop. For instance, 1 inch applied to a hay crop with a pivot equals about 0.8 inch in the soil (Pivots are 80% efficient). This 0.8 inch divided by 0.27 inches per day (see chart below) equals 3 days. You might have to reduce this further if it is especially hot and/or windy.

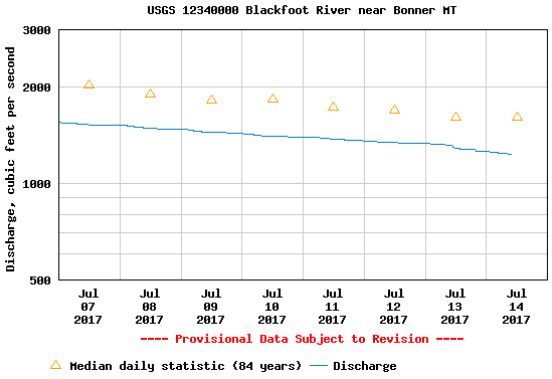
WATER USE IN INCHES[1]	LAST 7 DAYS	NEXT 7 DAYS[2]		SEASON TOTAL[3]	DAILY FORECAST[4]
HAY CROPS	**1.8**	**1.9**	(1.7 - 2.0)	13.9	.27
PASTURE	**1.6**	**1.65**	(1.4 - 1.7)	12.8	.23
SPRING GRAINS	**1.9**	**2.0**	(1.8 - 2.2)	10.3	.29
WINTER WHEAT	**1.0**	**1.0**	(0.7 - 1.0)	13.8	.14
LAWNS	**1.7**	**1.75**	(1.4 - 1.9)	13.9	.27

[1]Potential maximum water use for a well-irrigated crop without fertility, insect or disease restrictions
[2]Expected water use (range if weather becomes cooler or hotter than expected)
[3]April 1 – September 30 (note in 2010-13 we started our seasonal total on May 1 but now include April)
[4]Predicted average daily crop water use over the next week.

SOIL MOISTURE – IF IT LOOKS DRY IT IS!

Checking you soil moisture is not rocket science. If it looks dry, if it doesn't form a ball when squeezed, if it doesn't get your hand moist when squeezing - then it probably has little or no moisture. Soil near 50% of its water holding capacity forms a ball when squeezed but leaves only a little moisture on the hand (middle photo). Soil near 100% of its water holding capacity forms a ball and leaves your hand moist (right photo). Contact us if you need help evaluating soil moisture.

WEEKLY TIPS



WATER SUPPLY AND STREAMFLOW

Blackfoot River flows continue to fall rapidly and rising water temperatures are a concern. Current flow at Bonner is only **1,230 CFS** compared with the average for this date of **1,830 CFS**. The lowest flow on July 7 was 547 CFS in 1977 and the highest 7,400 CFS in 1899. It appears that drought restrictions may be implemented in the next couple weeks so start planning ahead.

DROUGHT 2017!!

A couple months ago I did not expect much talk about drought this year in the Blackfoot Drainage. The May outlook reported Blackfoot snowpack at 120% of normal plus we had a 1-2 inch rainstorm in June. This looked like a "normal" year for a change instead of the past five years of drought conditions. However, temperatures have soared and snows have melted. It seems prudent to plan for a dry summer and a dry future where drought restrictions become the norm every year. Listed below are some ideas for conserving water during dry times. Not all of them will work for everyone.

What You Should Keep Irrigating – Alfalfa, New Seedings, Pasture

It's important to irrigate alfalfa after cutting to prevent plant deaths. New grass seedings should also be irrigated until crop plants cover the soil surface and develop good root systems. Pastures and harvested hayfields that will be pastured should be irrigated regularly. However, irrigation can be reduced to ¼ to ½ of the weekly potential crop water use to keep plants alive but not produce maximum forage.

Irrigate Hay Crops After Cutting

If you do irrigate hay crops later in the season, the best time to recharge soil moisture is right after cutting when crop water use is reduced to 1/3 of normal the first week and 2/3 of normal the second week. There is also less foliage to catch water which then evaporates before ever reaching the soil. If you want to build up your soil moisture after cutting, you will need to apply **more** than the ½ – ¾ inches just-cut hay crops are using each week.

Ways to Reduce Irrigation

The methods listed below won't work for everyone but some should apply to most irrigators.

Build Up Soil Moisture Before Cutting Hay

The highest stress period for hay crops is at harvest. Try to store up soil moisture before cutting while leaving enough time after your last irrigation to let the surface soil dry out. Get back across the cut field as soon as possible.

Stop Irrigating and let Soil Moisture Drop after Grain Harvest

If you are growing grass hay or small grains you can simply stop irrigating after harvest. You can then replant the grain crop during the fall or spring.

Reduce or Stop Irrigation on Grass Hay

You can reduce the amount of water you put on Grass Hay and still maintain its health, it simply will not produce as much. Grasses are tolerant to drought and fluctuating moisture. The simply go into dormancy when water is not available.

Irrigate on Cooler, Less-windy Days or At Night

Look ahead and irrigate on the cooler days each week. Some irrigators also have the flexibility to irrigate at night and should consider it, especially when crops are thick and can intercept a lot of moisture.

Stop Irrigating Until Cooler Weather

Grass Hay crops and pastures can be allowed to dry out and go dormant during the hottest weather. When temperatures moderate and stream flows revive, grass hay can be irrigated and will respond.

Rotate Irrigation Systems

You can reduce your withdrawal from the river or stream by operating only some of your systems at a time. If you have 6 pivots, operate 2 at a time instead of all 6.

Apply More Water Per Irrigation

You lose water to evaporation each time you irrigate so applying a larger amount once will get more water into the soil than applying a smaller amount twice. Slow down your system and apply more if you can. However, also be sure not to go so slow the soil dries out before you get back around.

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 2017 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

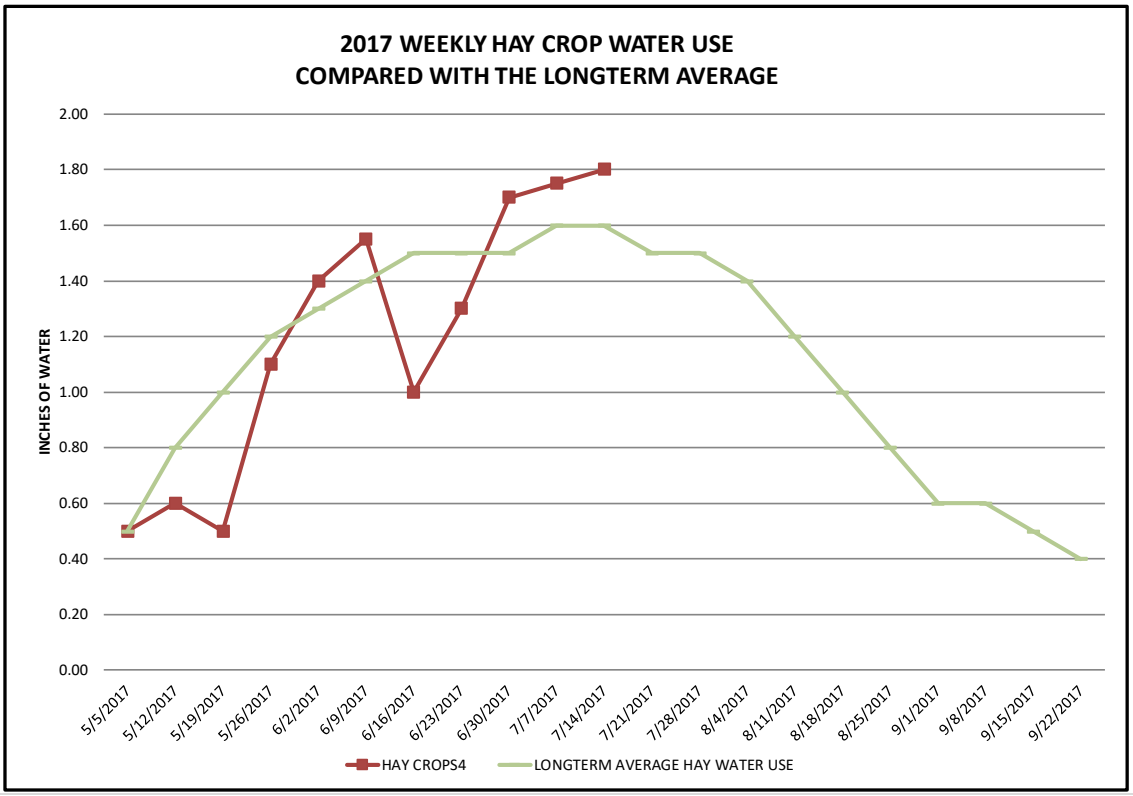
	RAIN[1]	2017 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE POTENTIAL CROP WATER USE[3]		
	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/5/2017	0.02	0.50	0.40	0.10	0.10	0.50	0.50	0.50	0.80	0.20
5/12/2017	0.25	0.60	0.70	0.10	0.10	0.90	0.70	0.80	1.00	0.50
5/19/2017	1.00	0.50	0.60	0.10	0.10	0.60	0.50	1.00	1.10	0.60
5/26/2017	0.00	1.10	1.00	0.20	0.10	1.10	1.10	1.20	1.30	0.80
6/2/2017	0.25	1.40	1.30	0.60	0.20	1.50	1.40	1.30	1.40	0.90
6/9/2017	0.50	1.55	1.35	1.00	0.30	1.60	1.45	1.40	1.50	1.00
6/16/2017	1.50	1.00	0.90	1.20	0.60	1.20	1.00	1.50	1.70	1.00
6/23/2017	0.00	1.30	1.20	1.40	0.80	1.40	1.30	1.50	1.90	1.10
6/30/2017	0.25	1.70	1.60	1.80	1.20	1.80	1.70	1.50	2.00	1.20
7/7/2017	0.00	1.75	1.55	1.80	1.80	1.25	1.70	1.60	2.10	1.30
7/14/2017	0.00	1.80	1.60	1.90	1.90	1.00	1.75	1.60	2.00	1.20
7/21/2017								1.50	1.90	1.20
7/28/2017								1.50	2.20	1.10
8/4/2017								1.40	1.70	1.00
8/11/2017								1.20	1.50	0.90
8/18/2017								1.00	1.30	0.70
8/25/2017								0.80	1.00	0.50
9/1/2017								0.60	0.80	0.40
9/8/2017								0.60	0.70	0.30
9/15/2017								0.50	0.70	0.30
9/22/2017								0.40	0.60	0.20
9/29/2017								0.40	0.60	0.20
TOTAL	**5.27**	**13.90**	**12.80**	**10.30**	**7.30**	**13.75**	**13.90**	**24.80**	**31.30**	**17.10**

[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.



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.