BLACKFOOT CHALLENGE
WEEKLY IRRIGATION REPORT

Friday May 18, 2018

Floodwaters and high soil moisture levels continue to delay the irrigation season, especially in the upper drainage. Cool, moist weather has slowed plant growth and crop water use to a minimum. Some sites with gravelly and sandy soils have warmed up quicker and limited irrigation has begun. Long-range forecasts predict a change to above average temperatures and below average rainfall for the rest of the season. Most local cropland soils remain recharged to 75 - 100% of their water holding capacities throughout the hay crop root zone (3 feet). A condensed overview of suggestions for the entire irrigation season is presented on the last page of this report. Use it to look ahead and plan or to compare what you're doing now. If you have questions or comment please contact Jennifer Schoonen - Blackfoot River Steward (360-6445) or Barry Dutton – Soil and Irrigation Consultant (240-7798).

WEATHER – ANOTHER MIX OF SUN & CLOUDS

Most Blackfoot croplands received ¼ to ½ inch of rain this week. However, some lucky folks in the upper drainage had almost 2 inches. The chart on page 2 lists average rainfall for the drainage and you should adjust for your site accordingly. Let me know if you need a new rain gauge. The forecast is for another week of mixed sun and showers with temperatures in the low 70s. The 30- and 90-day forecasts suggest above normal temperatures and below normal rainfall so anything could happen later in the season.

CROP WATER USE – VERY LOW – READY TO EXPLODE

Crop water use was again below average this week but should increase next week to near-normal. The table below estimates average crop water across the entire drainage but it does vary somewhat by area, especially early in the season. Sites that usually start growing earlier and use more water are those with sandy and gravelly soils as well as those in the lower drainage. Sandy and gravelly soils warm up quicker than the better loamy and clayey soils, mostly because they hold less water. Water has a very high specific heat meaning it takes a lot of calories to warm it. The slowest sites to warm up are those with shallow groundwater. The table and chart on Page 2 summarizes the entire irrigation season and compares it with average, hot and cool conditions.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS[1]		SEASON TOTAL[2]
HAY CROPS	**0.5**	**0.7**	(0.6 – 0.9)	1.8
PASTURE	**0.4**	**0.6**	(0.5 – 0.8)	1.4
SPRING GRAINS	**0.1**	**0.2**	(0.1 - 0.2)	0.4
WINTER WHEAT	**0.5**	**0.8**	(0.7 – 1.0)	1.8
LAWNS	**0.5**	**0.7**	(0.6 – 0.9)	1.8

[1]Expected water use (range if weather becomes cooler or hotter than expected)
[2]Beginning April 1 – note in 2010-13 we started our seasonal total on May 1 but since include April

BLACKFOOT 2018 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

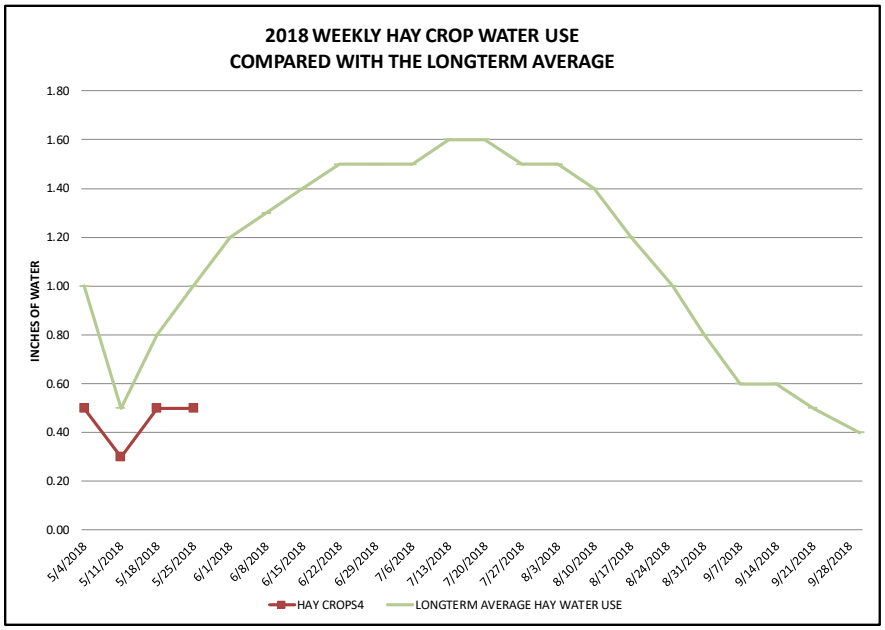
	RAIN[1]	2018 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE POTENTIAL CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
APRIL	1.50	0.50	0.40	0.10	0.10	0.50	0.50	1.00	1.50	0.50
5/4/2018	0.50	0.30	0.20	0.10	0.10	0.30	0.30	0.50	0.80	0.30
5/11/2018	0.50	0.50	0.40	0.10	0.10	0.50	0.50	0.80	1.00	0.50
5/18/2018	0.50	0.50	0.40	0.10	0.10	0.50	0.50	1.00	1.10	0.60
5/25/2018								1.20	1.30	0.80
6/1/2018								1.30	1.40	0.90
6/8/2018								1.40	1.50	1.00
6/15/2018								1.50	1.70	1.00
6/22/2018								1.50	1.90	1.10
6/29/2018								1.50	2.00	1.20
7/6/2018								1.60	2.10	1.30
7/13/2018								1.60	2.00	1.20
7/20/2018								1.50	2.00	1.20
7/27/2018								1.50	2.20	1.10
8/3/2018								1.40	1.70	1.00
8/10/2018								1.20	1.50	0.90
8/17/2018								1.00	1.30	0.70
8/25/2018								0.80	1.00	0.50
8/31/2018								0.60	0.80	0.40
9/7/2018								0.60	0.70	0.30
9/14/2018								0.50	0.70	0.30
9/21/2018								0.40	0.60	0.20
9/30/2018								0.40	0.60	0.20
TOTAL	**3.00**	**1.80**	**1.40**	**0.40**	**0.40**	**1.80**	**1.80**	**24.80**	**31.40**	**17.20**

[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.



SOIL MOISTURE – STILL TOO HIGH IN SOME FIELDS

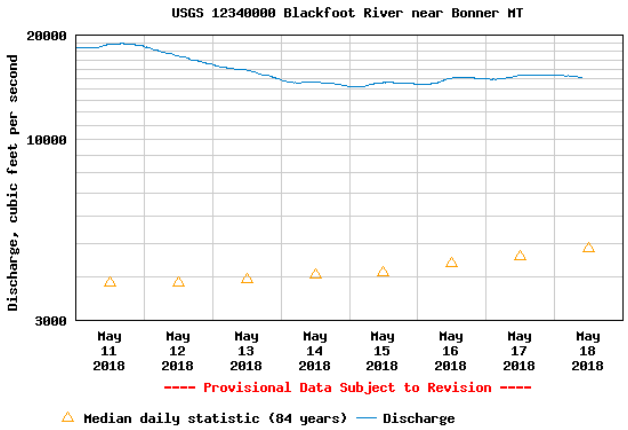
Soil moisture levels throughout the drainage this week remain the highest we've seen in the 8 years of this program. Many sites that have not yet been irrigated are still at 75 to 100% of their soil moisture holding capacity. Sites in the lower drainage especially those with rocky/sandy soils saw a slight drying trend this week. Current conditions look a lot like the start of 2011 and 2017 when cool moist weather dominated the early growing season. This year however, has even higher snowpack and flood levels.

Soil near 100% of its water holding capacity forms a ball when squeezed and leaves the hand wet. Water is visible on both the soil surface and the hand as a shiny surface. Bouncing or striking the soil can often bring a sheen of water to the surface. At 50% of water holding capacity the soil also forms a ball (top photo). The hand appears moist (bottom photo) but not shiny wet. Call if you have questions about your soil moisture or visit the irrigation guide.

WEEKLY TIPS

Flooding And Stream flows

Today the Blackfoot river flow is about 15,000 CFS at Bonner which is three times the average. The highest flow yet this year was 19,000 CFS on May 11 which matches the highest flow ever recorded (1964). The Blackfoot flow was higher during the 1908 flood but no official flow record was made. The lowest flow recorded on May 18 was 1,250 CFS (1941).



Keep Moisture Levels High. Nature gave us high soil moisture levels to start this growing season so let's keep it up! Most folks have enough stored soil moisture for several weeks of crop water use. But don't get too complacent, crops are poised to grow quickly and use up available water as soon as it warms. Some crops could use over an inch this week at some sites if it gets dry, warm and breezy.

Options for a Wet Year?

Drought didn't look very likely last year either so be ready for anything. But this might be the year to do those things that require a little more water or water later in the season. This looks like a good year to reseed, even late.

It also looks like a good year for cover crops. Cover crops can provide a range of benefits including:

- Additional forage late in the season – many cover crops are planted after the main crop is harvested.

- Soil health benefits – Cover crops can include many different plants which stimulates a more diverse microbiological community and improves nutrient availability.

- Soil health benefits – Cover crops can include plants that improve moisture penetration and soil aeration such as radishes, beets and other tubers. Alfalfa can also be beneficial in a cover crop since its large roots penetrate deeply. Planting deep-rooted grasses and irrigating them deeply can also help.

- Soil health benefits – Cover crops can act as a "green manure" crop to increase organic matter content. Organic matter improves nutrient cycling, water infiltration, water holding capacity, and aeration.

- Disease prevention/reduction – Cover crops interrupt disease and pest life cycles by changing the host plants available.

- Cover crops are often grown after other crops are harvested. Unfortunately, this is the time when stream flows are the lowest and of greatest concern. Watching for wet years to grow cover crops will provide soil health benefits while preserving streamflows during dry years. Remember to be flexible and change plans if conditions change to drought.

You may also have time this year to attend a cover crop meeting, soil health seminar, field visit or other opportunity to share experiences and learn something new. Look over the fence and talk to your neighbors. All of us together can make a better future.

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

THE BLACKFOOT DRAINAGE IRRIGATION SEASON IN BRIEF

This is a summary of general activities and recommendations for the whole season (more detail in the 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. Stop irrigating if you can.

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.