

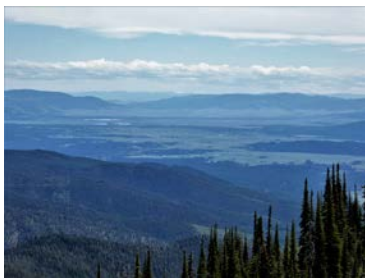


BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday June 9, 2017

Crops had another great week of growth fueled by a little rain and some warm, sunny weather. Now is the time for all good irrigators to pour it on – while water is plentiful and crop growth is accelerating. Fill up your crops root zone and add enough for weekly crop use. Watch that you don't add too much, especially to sandy and rocky soils. Snowpack and streamflow predictions continue to look good. For a condensed overview of suggestions for the entire irrigation season see the last page of this report. Please contact Jennifer Schoonen - Blackfoot River Steward (406-360-6445) for more information on this and other Challenge programs.



WEATHER - SLIGHTLY COOLER WITH SHOWERS

It was another week of warm and mostly dry conditions with a few significant rainstorms. Most areas had ¼ to ½ inch of rain and a few spots had up to ¾ inch. Most of this rain fell during one brief downpour on Sunday. Next week looks like mostly scattered thunderstorm and fewer sunny days. Temperatures will be cooler. The 30-day forecast still indicates normal temperatures and above average rainfall. The 90-day forecast indicates above normal temperatures and normal rainfall.



CROP WATER USE - UP TO NORMAL

Crop water use continued to be slightly above average this week due to mostly warm, dry and clear conditions. Crop water use was slightly above average (table and chart page 3). A mix of thunderstorms and warm/sunny weather will dominated the coming week so it should be another good one to make hay. A **daily forecast of average crop water use** column has been added to the table below³ so you can easily calculate how long an irrigation will last (ie. You put on 1 inch which at a pivot efficiency of 80% is 0.8 inches divided by 0.2 inches per day for hay means it will only take 2 days to use up half of it and 4 to use it all). Ideally you will get back around to this spot in 2 days, 4 at the latest. If you have stored soil moisture you also consider it in your calculations. Remember that these are water amounts needed to maximize production when nothing else is limiting. Your goals and situation may be met using much less water.

| WATER USE IN INCHES | LAST 7 DAYS | NEXT 7 DAYS¹ | SEASON TOTAL² | DAILY FORECAST³ |
|--------------------------------|------------------------|------------------------------------|-------------------------------------|---------------------------------------|
| HAY CROPS | 1.55 | 1.6 (1.4 - 1.7) | 6.4 | .23 |
| PASTURE | 1.35 | 1.4 (1.2 - 1.5) | 6.0 | .20 |
| SPRING GRAINS | 0.5-1.0 | 0.6-1.2(0.3-1.2) | 2.2 | .05-.17 |
| WINTER WHEAT | 1.60 | 1.7 (1.1 - 1.7) | 1.6 | .24 |
| LAWNS | 1.45 | 1.5 (1.3 - 1.6) | 6.5 | .21 |

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

³Predicted average daily crop water use over the next week.



SOIL MOISTURE - DROPPED QUICKLY AGAIN

Cropland soil moisture levels again dropped fast this week due to continued hot, dry weather. Most sites with hay, pasture or winter wheat crops saw almost 1½ inches of soil moisture use. Now is the time to fill up your soil root zone while water supplies are plentiful and crop water use has not yet reached its peak. See the *Weekly Tips* below for more info.



When is your soil full? Soil near 50% of its water holding capacity soil forms a ball when squeezed but leaves only a little moisture on the hand (top photo). Soil near 100% of its water holding capacity forms a ball and leaves your hand moist (bottom photo). Call anytime if you have questions about evaluating your soil moisture content and irrigation options.

Look in front of your pivot and behind to get a better idea of what soils look like when near 100% of water holding capacity. Walking around the pivot gives you a good idea how quickly the surface soil dries after irrigation.

WEEKLY TIPS

Water Supply and Streamflows

Blackfoot streamflow predictions for June-July are 109% of normal so water should be available throughout the main irrigation season. This prediction is slightly lower than the 120% of normal last month due to rapid melting caused by warm temperatures throughout May.

Snow water equivalents in the Upper Clark Fork are at 111% of normal. Precipitation for May was 95% of normal and reservoir storage at 109% of average in the UCF. Snowpack in the Blackfoot Drainage is at 122%

of normal. Nevada Creek Reservoir is at 105% of normal storage.

Current Blackfoot river flow is about 6,500 CFS at Bonner, down about 1,500 CFS since last week. The average flow for this date is about 5,800 CFS. The lowest flow was 1,340 CFS in 1987 and the highest was 14,100 CFS in 2011.

REMEMBER - JUNE CROP WATER USE IS 6-8 INCHES!

June is the main growing season for all local crops and the time to pour on the water! The best thing irrigators can do for both crops and the general water situation is to irrigate well now and be prepared to cut back if stream flows fall too low. Hay and pasture crops will use 6-8 inches in June and small grains 5-8 inches. Know your soil water holding capacity and crop water use so you don't over-irrigate – or just monitor and stop irrigating when water has penetrated your entire crop root zone (2-3 feet).

Watch Soil Moisture in New Plantings

With hot, dry conditions continuing, new plantings have required careful irrigation for good germination and emergence. It only takes a day or two for the surface few inches of soil to dry out considerably. You need multiple small irrigations to achieve ideal results.

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)

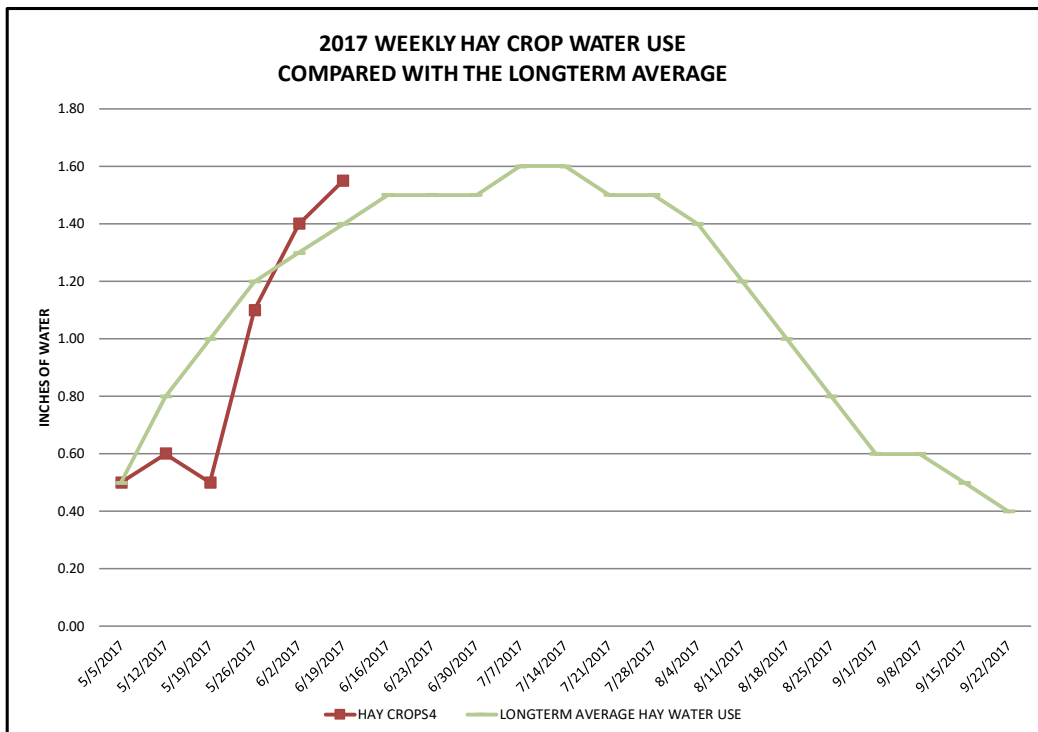
| | RAIN ¹ | 2017 WEEKLY POTENTIAL CROP WATER USE ² | | | | | | AVERAGE POTENTIAL CROP WATER USE ³ | | |
|--------------|-------------------|---|-------------|-------------------------|--------------------------|--------------|-------------|---|------------------------|-------------------------|
| | 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 | 1.70 | 1.10 |
| 6/23/2017 | | | | | | | | 1.50 | 1.90 | 1.10 |
| 6/30/2017 | | | | | | | | 1.50 | 2.00 | 1.20 |
| 7/7/2017 | | | | | | | | 1.60 | 2.10 | 1.30 |
| 7/14/2017 | | | | | | | | 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 | 3.52 | 6.35 | 5.95 | 2.20 | 1.00 | 7.10 | 6.45 | 24.80 | 31.30 | 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 is reduced by 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.