



BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday August 18, 2017

Slightly cooler temperatures this week but still no rainfall or dramatic cooling in the forecast. Crop water use has dropped due to slightly cooler temperatures. Irrigation has declined across the drainage due to crop harvest and low water levels. The potential water use by hay crops was near 1.4 inches this week and is decreasing with cooler temperatures. Blackfoot River flows have dropped below 700 CFS meaning *Drought Management Plans* are now implemented, FWP is making call on junior water rights and irrigators are asked to reduce or cease irrigation. 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 - SLIGHTLY COOLER AND SMOKY

It was a bit cooler this week but still smoky. Rain – what’s that? No moisture in the forecast for next week either. The smoke is now coming mainly from local fires near Lolo, Superior and Seeley Lake. You can view satellite fire images (at left) at:

<https://fsapps.nwcg.gov/afm/imagery.php?op=fire&fireID=id-mt-000>. This is today's image with Ovando and Missoula marked (blue dots).

Temperatures are predicted with highs in the 80s. The 30-day and 90-day forecasts still indicate above normal temperatures and normal rainfall.

CROP WATER USE - HIGH - BUT NOW DROPPING

Crop water use has peaked but remains above average. Water use has dropped near zero for most small grains and other annual crops as they mature and are harvested. Irrigation water use across the drainage has dropped following harvest and since water is no longer available to many.

| WATER USE IN INCHES¹ | LAST 7 DAYS | NEXT 7 DAYS² | SEASON TOTAL³ | DAILY FORECAST⁴ |
|--|---|--|---------------------------------|-----------------------------------|
| HAY CROPS | 1.4 | 1.3 (1.2 – 1.4) | 22.5 | .20 |
| PASTURE | 1.1 | 1.0 (0.9 - 1.1) | 19.8 | .17 |
| SPRING GRAINS | 0.0 (HARVESTED) 0.5 (LATE PLANTED) | 0.0 (0.0 - 0.0) 0.0 (0.0 - 0.3) | 15.3 | .00 |
| WINTER WHEAT | 0.0 (HARVESTED) | 0.0 (0.0 - 0.0) | 15.3 | .00 |
| LAWNS | 1.3 | 1.2 (1.0 - 1.4) | 21.9 | .19 |

¹Potential maximum water use for a well-irrigated crop without fertility, insect or disease restrictions

²Expected water use (range if weather becomes cooler or hotter than expected)

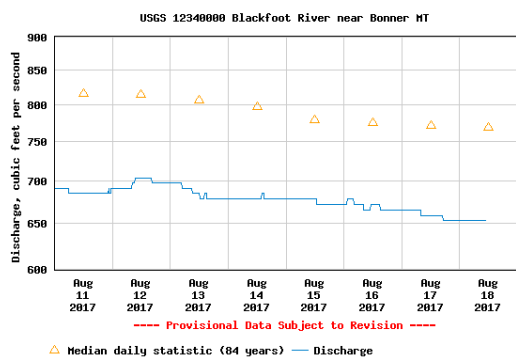
³April 1 – September 30 (note in 2010-13 we started our seasonal total on May 1 but now include April)

⁴Predicted average daily crop water use over the next week.

SOIL MOISTURE – NONE FOR MANY, DROPPING FOR MOST

Most cropland soils across the drainage are very dry with little or no soil moisture since there has been no rain, irrigation has ceased and crops are mostly harvested. Irrigators who are out of water now rely on stored soil moisture. Irrigators with senior water rights and new seedings, pasture crops or aspirations of a second cutting will mostly apply a fraction of the *potential* weekly crop water. This will not boost soil moisture but will help plants get through the dry period and put on some growth while we wait for fall rains. Those with clay soils and/or high organic matter content will have stored 6 inches in a three-foot root zone which should last 4 weeks or so before exhaustion. Those with very sandy and rocky soils have only half this amount.

WEEKLY TIPS



BLACKFOOT RIVER FLOWS NOW CRITICAL

Blackfoot River flows have fallen below the 700 CFS level. **Drought Management Plans** must now be implemented. FWP is making call on junior water rights and irrigators are being asked to reduce or cease irrigation. On September 1, the FWP Murphy Right trigger level goes to 650 CFS. With current flow only about **653 CFS** it is likely that restrictions will continue into September. The average flow for this date is **772 CFS**, the lowest 365 CFS (1941) and the highest 1,720 CFS (1899). There is no significant precipitation in the

forecast, so the downward trend may continue until we get some. Temperatures in the Blackfoot River have not reached the action level (exceeding 70 degrees for 3 days in a row).

SOIL HEALTH INFORMATON

Soil Health Bus Tour: The Montana chapter of the Soil & Water Conservation Society (SWCS) is hosting a bus tour to Dakota Lakes Research Farm (Pierre, S.D.), Menoken Farms, and Gabe Brown's Farm/Ranch on September 12th-14th. We invite everyone interested in Soil Health to join the Soil Health listserv to keep informed or go to MTSWCS.org. The Challenge will be there!

Maughn Farm Tour: There will be a tour of the Foust Farm in the Moeise Valley of Lake County on August 29 at 2:30pm. Take the Moeise Valley Road across from the Bison Range entrance and watch for the Foust Farm sign at the 90 degree corner. The Fousts are cover-crop enthusiasts and have planted a wide variety of "alternative forage" including collard greens. More info at <http://lakecountyconservationdistrict.org/>.

SOIL HEALTH INFORMATON – LISTSERV: We invite everyone interested in Soil Health to join the Soil Health listserv and receive announcements about this important topic. Anyone who wants to sign up can contact (jennifer@blackfootchallenge.org) or Brad (brad@blackfootchallenge.org).

PLANNING FOR A WARMER, DRIER FUTURE

This week our Montana state climatologist commented that the future is going to look a lot like this year. Warmer temperature, less runoff, earlier snowmelt and more fires are now the norm, not the exception. Meanwhile the USDA/NRCS is discussing how to avoid using the term Climate Change in its reports and daily work.

| AVERAGE POTENTIAL CROP WATER USE ³ | | |
|---|------------------------------|-------------------------------|
| LONGTERM AVERAGE HAY WATER USE | HOT WEEK HAY WATER USE | COOL WEEK HAY WATER USE |
| 0.50 | 0.80 | 0.20 |
| 0.80 | 1.00 | 0.50 |
| 1.00 | 1.10 | 0.60 |
| 1.20 | 1.30 | 0.80 |
| 1.30 | 1.40 | 0.90 |
| 1.40 | 1.50 | 1.00 |
| 1.50 | 1.70 | 1.00 |
| 1.50 | 1.90 | 1.10 |
| 1.50 | 2.00 | 1.20 |
| 1.60 | 2.10 | 1.30 |
| 1.60 | 2.00 | 1.20 |
| 1.50 | 2.00 | 1.20 |
| 1.50 | 2.20 | 1.10 |
| 1.40 | 1.70 | 1.00 |
| 1.20 | 1.50 | 0.90 |
| 1.00 | 1.30 | 0.70 |
| 0.80 | 1.00 | 0.50 |
| 0.60 | 0.80 | 0.40 |
| 0.60 | 0.70 | 0.30 |
| 0.50 | 0.70 | 0.30 |
| 0.40 | 0.60 | 0.20 |
| 0.40 | 0.60 | 0.20 |
| 24.80 | 31.40 | 17.10 |

For the past 8 years I provided a table of potential weekly crop water use (page 4 of this report). For comparison and future planning, I also list the long-term hay water use for an average, hot and cool week (reproduced at left).

The last year dominated by “cool” weeks was 2011 when hay used about 19 inches of water. Every year since has been above average (in the *Hot Week* column).

Irrigators need to consider that the *Hot Week* Figures may now be the average. This is supported by the Deer Lodge Agrimet Weather Station which shows a **30% increase** in hay crop water use over the past **20 years**. We likely need to dramatically adjust our approach to irrigation and drought planning.

It’s probably time to take a hard, dry look at your drought plan to ensure future success. Many plans were compiled when it was cooler and wetter (not so long ago). What began as a more casual commitment to use water efficiently and/or cut back voluntarily, is becoming one of your most important management documents.

It’s time to have some options in your front pocket to deal with less water and an earlier/later/longer growing season. How will you change crop choices, planting date, irrigation timing, irrigation methods, acreages, soil health and other factors as it gets even warmer and drier? Now is the time for all good irrigators who expect to be around in 5, 10 or 20 years to help make a better plan for the ranch and the river.

You are the brains that will help identify and implement the answers that save both the ranch and the landscape. Help us with your ideas by contacting: [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)

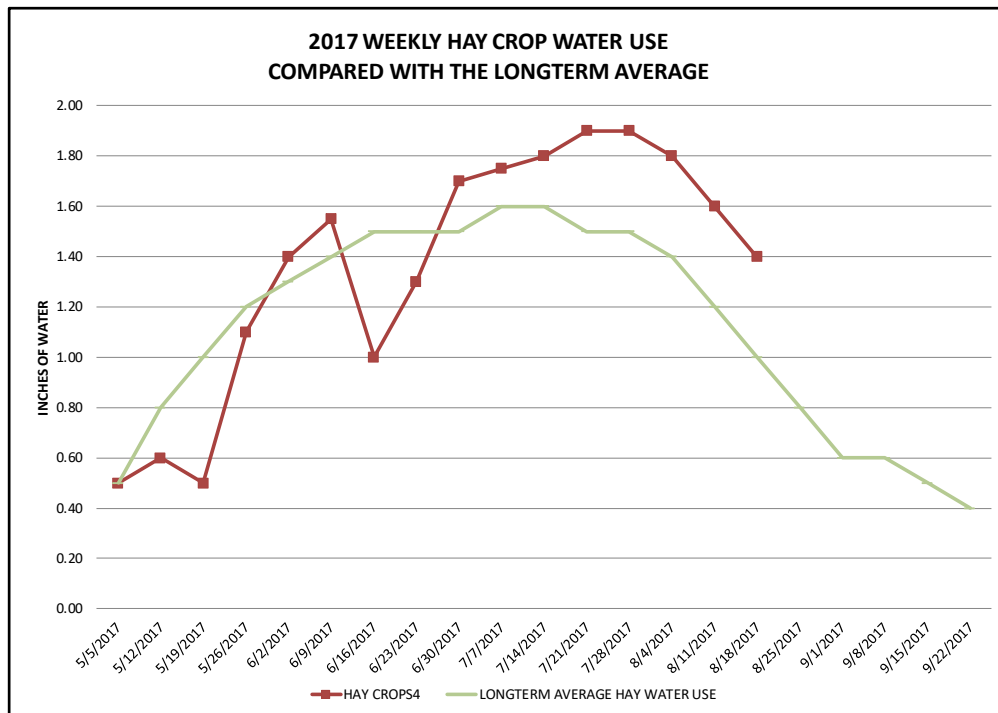
| | RAIN ¹ | 2017 WEEKLY POTENTIAL CROP WATER USE ² | | | | | | AVERAGE POTENTIAL CROP WATER USE ³ | | |
|--------------|-------------------|---|--------------|-------------------------|--------------------------|--------------|--------------|---|------------------------|-------------------------|
| | 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 | 0.00 | 1.90 | 1.60 | 2.00 | 2.00 | 1.00 | 1.80 | 1.50 | 2.00 | 1.20 |
| 7/28/2017 | 0.00 | 1.90 | 1.60 | 2.00 | 2.00 | 0.50 | 1.80 | 1.50 | 2.20 | 1.10 |
| 8/4/2017 | 0.00 | 1.80 | 1.50 | 1.00 | 1.80 | 0.00 | 1.70 | 1.40 | 1.70 | 1.00 |
| 8/11/2017 | 0.00 | 1.60 | 1.20 | 0.00 | 0.50 | 0.00 | 1.40 | 1.20 | 1.50 | 0.90 |
| 8/18/2017 | 0.00 | 1.40 | 1.10 | 0.00 | 0.00 | 0.00 | 1.30 | 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 | 22.50 | 19.80 | 15.30 | 13.60 | 15.25 | 21.90 | 24.80 | 31.40 | 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. 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.