

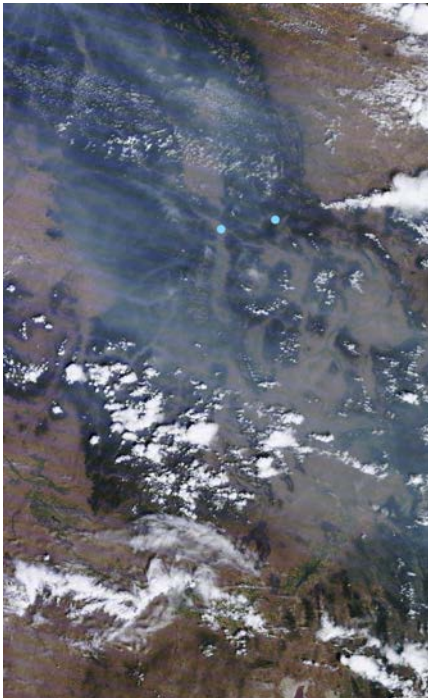


# BLACKFOOT CHALLENGE

## WEEKLY IRRIGATION REPORT

Friday August 11, 2017

First the Good News! Cooler temperatures are finally in the forecast starting this weekend with highs in the 70s to low 80s next week. Hopefully this will reduce fire activity and smoke. Crop water use has begun to drop due to slightly cooler temperatures. Irrigation has declined across the drainage as small grains and single hay cuttings are harvested or water is no longer available. The potential water use by mature crops was near 1.6 inches this week and will be lower next week. Blackfoot River flows have dropped below 700 CFS meaning *Drought Management Plans* are being implemented, FWP is making call on junior water rights and irrigators are being 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 - HOT & SMOKEY BUT COOLING

It was another smoky week with no significant moisture and none in the forecast. The smoke is coming from local fires as well as from large areas burning in British Columbia. You can view satellite 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 to drop this weekend with highs in the 70s and low 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 for mature hay and spring grains. 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 is dropping as small grains and single hay cuttings are harvested or water is no longer available.

| <b>WATER USE IN INCHES<sup>1</sup></b> | <b>LAST 7 DAYS</b>                    | <b>NEXT 7 DAYS<sup>2</sup></b>     | <b>SEASON TOTAL<sup>3</sup></b> | <b>DAILY FORECAST<sup>4</sup></b> |
|--|---------------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| <b>HAY CROPS</b>                       | 1.6                                   | 1.4 (1.2 - 1.6)                    | 21.1                            | .27                               |
| <b>PASTURE</b>                         | 1.2                                   | 1.3 (1.1 - 1.5)                    | 18.7                            | .23                               |
| <b>SPRING GRAINS</b>                   | 0.0 (HARVESTED)<br>1.0 (LATE PLANTED) | 0.0 (0.0 - 0.0)<br>0.5 (0.0 - 0.6) | 15.3                            | .29                               |
| <b>WINTER WHEAT</b>                    | 0.0 (HARVESTED)                       | 0.0 (0.0 - 0.0)                    | 15.3                            | .14                               |
| <b>LAWNS</b>                           | 1.7                                   | 1.6 (1.4 - 1.8)                    | 20.6                            | .27                               |

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

<sup>2</sup>Expected water use (range if weather becomes cooler or hotter than expected)

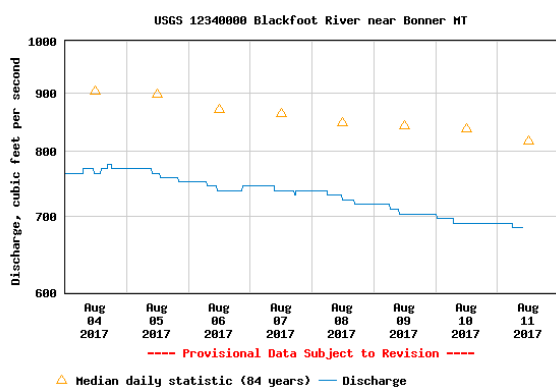
<sup>3</sup>April 1 - September 30 (note in 2010-13 we started our seasonal total on May 1 but now include April)

<sup>4</sup>Predicted average daily crop water use over the next week.

## SOIL MOISTURE – MOSTLY REAL DRY OR REAL WET

Most cropland soils across the drainage are real dry with little or no soil moisture since there has been no rain, irrigation has ceased and crops are mostly harvested. On the other hand, irrigators with new seedlings, pasture crops or aspirations of a second cutting have been trying to fill up their soil profiles before the water runs out. The best most irrigators can do during dry periods is apply a fraction of the *potential* weekly crop water use to keep the plants alive but not expect to boost soil moisture. What you apply will not penetrate deeply and will be used quickly by plants. Soil near 50% of its water holding capacity forms a ball when squeezed but 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).

## WEEKLY TIPS



## BLACKFOOT RIVER FLOWS NOW CRITICAL

Blackfoot River flows have fallen below the critical 700 CFS level. Drought management plans are being implemented, FWP is making call on junior water rights and irrigators are being asked to reduce or cease irrigation. Current flow at Bonner is only about **685 CFS** compared with the average for this date of **844 CFS**. The lowest flow on this date was 368 CFS in 1988 and the highest 2,100 CFS in 1899. With no significant precipitation in the forecast, this downward trend may continue for weeks. Temperatures in the Blackfoot River

have not reached the action level (exceeding 70 degrees for 3 days in a row). Highs were 65 - 66 degrees the past few days and dropping. Concerns are for increased fishing pressure caused by restriction on other area streams.

## SOME GOOD THINGS ABOUT OUR BLACKFOOT WATER FUTURE

I started writing this as a Good, Bad & Ugly comparison but decided we needed a more positive boost during this week of drought-heavy news. So here are some reminders of how great it is to be a Blackfoot drainage irrigator:

### LOCATION-LOCATION-LOCATION

There are lots of GOOD things about the future of water management in the Blackfoot drainage and the first is that we are at the top of the Columbia River system touching the continental divide. There's no one upstream from here to try and take our water or to argue over management (at least until they start talking about transcontinental water pipelines). Downstream are millions of water users that are potential future customers/clients/leases/purchasers of our water. We will also have the potential to influence, contribute to, or direct a wide range of future downstream natural resource projects needing water.

### STORAGE

Another good thing is that we have a large reservoir at Nevada Creek and numerous smaller reservoirs. These are dependable, drought-busting sources of water that can store spring runoff for use in even the driest years. Even if you don't have direct access to stored water, we all benefit from leakage and late season flow enhancements similar to what wetlands provide.

## **WETLANDS, AQUIFERS, LAKES AND STREAMS**

A tremendous volume of water is stored by wetlands and slowly released to surface and groundwater systems. This keeps rivers flowing and lakes full. Some flood irrigation systems act in a similar manner by soaking up and slowly releasing water not used by crops. Water is also stored in shallow stream-side aquifers and deeper valley aquifers which contribute to stream flows, especially late in the season. Our abundant lakes and streams also represent huge volumes of water and the more water in the system the more resilient is the entire hydrologic system.

## **VEGETATION**

The Blackfoot Drainage has a diverse and abundant vegetation cover from forests to rangelands to riparian areas, croplands and wetlands. There is an incredible amount of water contained in this vegetation which adds to our overall hydrologic health. This vegetation provides a buffer to rapid desertification (if you don't know this word, search and read about how much of the world such as the *Garden of Eden* is now desert).

## **FUTURE DEMAND**

Water is an essential part of human existence and the demand will likely increase for some time while the supply will continue to diminish in the Blackfoot Drainage and beyond. Agriculture will continue to be scrutinized for water conservation opportunities and the value of that water will increase. For the past couple decades, Los Angeles has paid tens of millions for water use and conservation measures in the Irrigated Imperial Valley. In return, they get to use the conserved water without being able to claim it as a water right. Similar options will occur for Blackfoot irrigators as people from here to Portland need more water.

## **GROWING SEASON**

As every year is warmer and the growing season lengthens, our crop choices will increase. Over my career I have seen small grains become dependable and expect we will be growing pineapples soon. More folks are talking about two cuttings instead of one plus maybe some pasture. Unfortunately, these new crop options and longer seasons will need more water to exploit. It is unlikely there will be more and very likely there will be less water. Since the drainages water rights are now adjudicated, less water means junior rights will be affected more often and more severely – probably most years. The best solutions seem to be improving irrigation water use efficiency, developing crop choices that need less water, improving soil health and accepting limited production in dry years.

## **WHEN WILL MANKIND SOLVE CLEAN FRESHWATER FOR ALL?**

The ultimate future? We already have desalinization technology. The current barrier is the cost of energy. It is virtually certain that improved technology and energy options will dramatically increase seawater use by coastal cities thereby reducing demand on river systems. Other technologies may produce water anywhere from other materials (rocks?). This will probably occur just before your grandkids sell some of their water right to Acme Electric Coop for a bazillion dollars.

## **IS IT TIME FOR SOME IRRIGATION ACTIVISM?**

Irrigators and Ski Areas have been two of my largest client groups as a consultant and usually are the easiest to convince of climate change. Most western US ski areas used to open for business by Thanksgiving, now they feel lucky to open fully by Christmas. The end of the season used to last until late April or May, now even March can be disappointing. November World Cup ski events have been forced north to places like Lake Louise, Canada - places cold enough to make sufficient snow. Throughout the 1980s and 90s I tried to console my ski area clients that nature goes in cycles and

during our lifetime we were due for some swings back to *above average snow years*. Unfortunately, it just kept getting warmer and more erratic. The UN did a study not long ago predicting that the minimum elevation of skiable snow would rise 1000 feet in 20 years across Europe. That prediction applied to Montana suggests that we soon may be left with only the highest elevation north slopes at Big Sky and Moonlite Basin. Lower elevation ski areas may only operate a few years of each decade. In response, ski areas have diversified into year-round recreation/event centers adding biking, zip-lining, hiking, weddings and other activities. They also created public awareness campaigns including “Keep Winter Cool” which educates visitors about climate change and how they can help.

Perhaps it’s time for irrigators to play a more active role in educating government officials and the public about what we see out here on the ground:

- More dry years than wet
- Earlier and longer growing seasons
- Hotter temperatures
- Higher crop water use – more needed to grow a crop
- Less water and shorter irrigation periods
- More potential conflicts with other water users

## **SOIL HEALTH INFORMATON - EVENTS**

**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 12<sup>th</sup>-14<sup>th</sup>. We invite everyone interested in Soil Health to join the Soil Health listserv to keep informed or go to [MTSWCS.org](http://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](mailto:jennifer@blackfootchallenge.org)) or Brad ([brad@blackfootchallenge.org](mailto:brad@blackfootchallenge.org)).

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](mailto:barry@landandwaterconsulting.net)

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

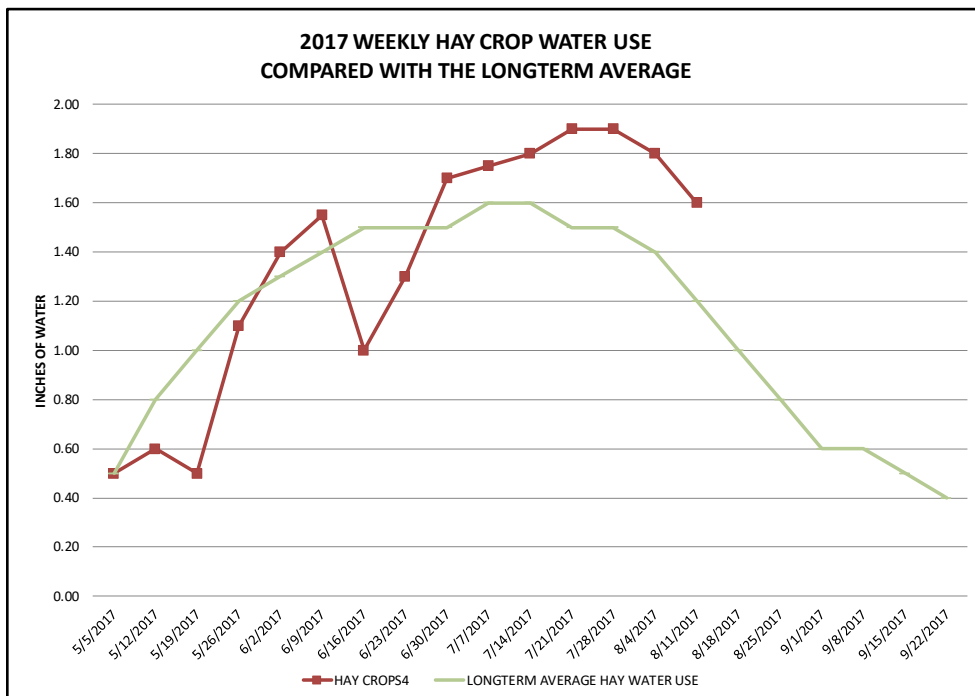
|              | RAIN <sup>1</sup> | 2017 WEEKLY POTENTIAL CROP WATER USE <sup>2</sup> |              |                         |                          |              |              | AVERAGE POTENTIAL CROP WATER USE <sup>3</sup> |                        |                         |
|--------------|-------------------|---|--------------|-------------------------|--------------------------|--------------|--------------|---|------------------------|-------------------------|
|              | 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 |
| 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    |                   |   |              |                         |                          |              |              | 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                    |
| <b>TOTAL</b> | <b>5.27</b>       | <b>21.10</b>                                      | <b>18.70</b> | <b>15.30</b>            | <b>13.60</b>             | <b>15.25</b> | <b>20.60</b> | <b>24.80</b>                                  | <b>31.40</b>           | <b>17.10</b>            |

<sup>1</sup> 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)

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

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

<sup>4</sup> 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.