



BLACKFOOT CHALLENGE

WEEKLY IRRIGATION REPORT

Friday September 1, 2017

Warm temperatures, no rain and smoke continued throughout last week. Next week will be similar but with cooler temperatures. Crop water use continues to drop with cooler temperatures. The potential water use by hay crops was near 1.4 inches this week. Blackfoot River flows have dropped below 650 CFS meaning *Drought Management Plans* will remain in effect with no change expected in September unless we get significant rain. 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 warm again this week and still smoky. Rain – what’s that? No moisture in the forecast for next week either. The smoke is coming from local fires and from Washington, Oregon and Canada. You can view satellite fire images (at left) at:

<https://fsapps.nwcg.gov/afm/imagery.php?op=fire&fireID=id-mt-000>.

This is Friday's image with Ovando and Missoula marked (blue dots).

High temperatures next week will be 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 ended 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. Most irrigators are practicing deficit irrigation – applying only about half of the potential crop water use.

WATER USE IN INCHES¹	LAST 7 DAYS	NEXT 7 DAYS²	SEASON TOTAL³	DAILY FORECAST⁴
HAY CROPS	1.4	1.4 (1.1 - 1.5)	25.2	.20
PASTURE	1.1	1.1 (0.8 - 1.2)	21.9	.16
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	1.2	1.2 (0.9 - 1.3)	24.3	.17

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)

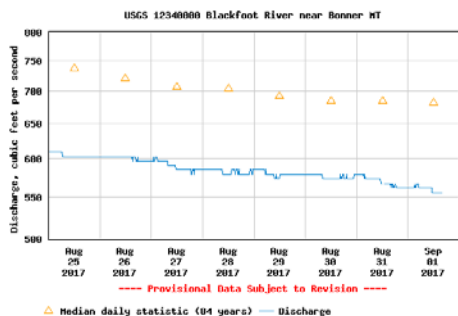
³April 1 – September 30 (note in 2010-13 we started our seasonal total on May 1 but now include April)

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 must rely on stored soil moisture. Irrigators with senior water rights and new seedlings, pasture crops or aspirations of a second cutting are mostly applying only a fraction of the *potential* weekly crop water. This will not boost stored 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 can store 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 about half this amount.

WEEKLY TIPS



BLACKFOOT RIVER FISH EVACUATED TO TEXAS

The Blackfoot River flow at Bonner continues well below 650 CFS and **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 where possible. With current flow only about **555 CFS** it is likely that restrictions will continue into late September. The average flow for this date is **695 CFS**, the lowest 332 CFS (1988) and the highest 1,380 CFS (1899). There is no significant precipitation in the forecast.

SOIL HEALTH/COVER CROP TOUR

Foust Farms and the Lake County NRCS hosted a cover crop tour this week and participants were amazed at what you can grow in western Montana and how livestock react to diverse cover crops. The Foust Farm is in the Moeise Valley just west of the National Bison Range. This area has one of the mildest climates and longest growing seasons in the state. It may take a few more decades of warming for the Blackfoot drainage to match their current growing season, but much of what they are learning can be applied here immediately.

Foust Farms has grown most crops that can be grow in western Montana with small grains, alfalfa and feed corn their focus. Seed potatoes were also grown until a few years ago. They have cattle and grow most of their hay and pasture.

COVER CROPS

For the past few years Foust Farms has worked with the Lake County NRCS office to evaluate cover crop options and alternative forages. Their work is some of the most important and timely for local farmers and ranchers. Their cover crop work has focused on producing a useful crop during the period when fields usually lie dormant – after small grain harvest and before spring planting of the next crop. Since this period is the peak of summer they have evaluated both *warm season* and *cool season* crops. The warm season crops include:

- | | | | | | | |
|---------|-----------|------------|------------|---------|----------|--------|
| Sorghum | Sunflower | Collards | Radish | Turnips | Rapeseed | Millet |
| Corn | Buckwheat | Teff Grass | Mung beans | | | |

HAY/PASTURE MIXES

In addition to annual cover crops, Foust Farms is also testing some more diverse hay and pasture mixes for long-term plantings. In the past, many local producers planted a mix of two or three grasses and perhaps a clover. Alfalfa or alfalfa + orchardgrass has been another common hay and pasture crop. Foust Farms is evaluating a number of species including:

Tall wheatgrass	Pubescent wheatgrass	Thickspike wheatgrass	Basin wildrye
Alfalfa	Flax	Coneflower	Hairy vetch
Western yarrow	Phacelia	Milkvetch	Chicory
Sainfoil	Rubber rabbitbrush		

This work is on-going and further information is/will be available from the Lake County NRCS/Conservation District. Several case study reports have been completed. I will try to summarize this work as it becomes available. There was a lot of information presented at the tour and I can't cover it all but here are some highlights:

- A wide range of cover crop plants can be grown successfully in western Montana and these fields are impressive in the amount and diversity of forage. It is great to see a field with corn, collards, turnips, sunflowers, radishes and more, as well as traditional grasses.



- The cows seem to love these diverse cover crops and can't wait to get at them. We watch cows given access to the next electric-fenced paddock - they RAN into it and then were completely silent as they munched enthusiastically. Cows are rotated to a new paddock every 2 days.
- Arnold Foust reports that when given the choice of the diverse cover crop and a field next door with Roundup-ready alfalfa, they choose the cover crop.



- No-till is a viable option, even for those who have not had good experiences in the past. Arnold Foust said they tried no-till when it came out but went back to conventional tillage. Because of their rocky, sandy soils with low organic matter contents they are trying it again with much greater success. They purchased a new no-till drill and experienced planting problems until as Arnold described “we decided to read the manual.”



- The soil health benefits of these diverse cover crops and perennial plantings are many. Root crops like radishes and turnips add lots of organic matter and reduce soil compaction. This increases soil water holding capacity and aeration. Beets, potatoes and other root crops might be alternatives. Diakon radishes promote deep soil aeration due to their length. Each crop has an array of microbes associated with it and diverse crops means a more diverse and abundant soil microbiology.



Thanks to Arnold Foust and Foust Farms as well as Ben Montgonery and his NRCS crew in Lake County! This is work that will help all western Montana producers and all proponents of soil health.

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

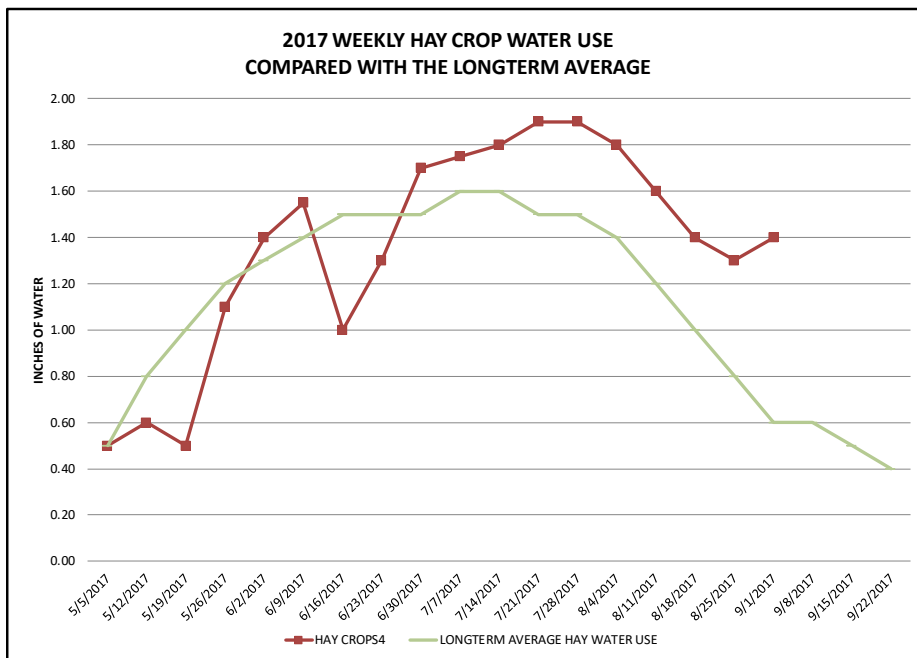
	RAIN ¹	2017 WEEKLY POTENTIAL CROP WATER USE ²						AVERAGE POTENTIAL CROP WATER USE ³		
	RAIN	HAY CROPS ⁴	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/5/2017	0.02	0.50	0.40	0.10	0.10	0.50	0.50	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	0.00	1.30	1.00	0.00	0.00	0.00	1.20	0.80	1.00	0.50
9/1/2017	0.00	1.40	1.10	0.00	0.00	0.00	1.20	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	25.20	21.90	15.30	13.60	15.25	24.30	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.