BLACKFOOT CHALLENGE WEEKLY IRRIGATION REPORT

Friday July 2, 2021

It was hot and dry this week on Blackfoot croplands with many sites reporting 98F on Tuesday. Next week looks hot and sunny again with slight cooling late in the week. Crop water use this week reduced soil moisture levels by almost 2 inches unless irrigated. The Deer Lodge Agrimet Weather Station reports that **alfalfa used almost ½ inch of water in one day** (Tuesday June 29)! Next week crop water use will again approach 2 inches. Blackfoot River streamflows continue to dip far below average. The NOAA US Drought Monitor Map of the western United States still shows the Blackfoot Drainage as one of the only spots not in drought across the entire western US!

WEATHER – HOT AND DRY AGAIN NEXT WEEK

Hot, sunny weather last week with little or no rain will repeat again next week. Highs will mostly be in the 90s and lows in the 50s. Late in the week it will dip into the 80s with lows in the 40s. Both the 30-day and 90-day forecasts say **below average rainfall and above average temperatures.** The highest temp ever in Montana was 117F at Medicine Lake (1937) and Glendive (1893).

Your own rain gauge is your best source of rainfall information.

CROP WATER USE – ABOVE AVERAGE – ¼ INCH PER DAY NEXT WEEK

Warm temperatures and sunny skies kept crop water use above average again this last week. **Hay crops used about 1.8 inches of water and will use about the same next week.** The table below provides a quick summary of crop water use this last week and an estimate for next week. We also list season totals and compare them with past years in our annual reports available on the Challenge website.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**1.8**	**1.8**	.26	9.7
PASTURE	**1.5**	**1.5**	.23	8.5
SPRING GRAINS	**1.7 – 1.9**	**1.9**	.27	7.9
WINTER WHEAT	**1.9**	**1.9**	.27	10.8
LAWNS	**1.7**	**1.7**	.24	9.8

[1]Expected water use over the next week (range if weather becomes cooler or hotter than expected)
[2]Expected average daily water use over the next week (compare this with your soil moisture content
[3]Beginning April 1 – note in 2010-13 we started our seasonal total on May 1 but since include April

The table and chart below summarize the entire irrigation season and compare it with average, hot and cool conditions so you can plan ahead. This table and chart will be updated weekly all season.

BLACKFOOT 2021 GROWING SEASON WEEKLY RAINFALL & CROP WATER USE (INCHES OF WATER)

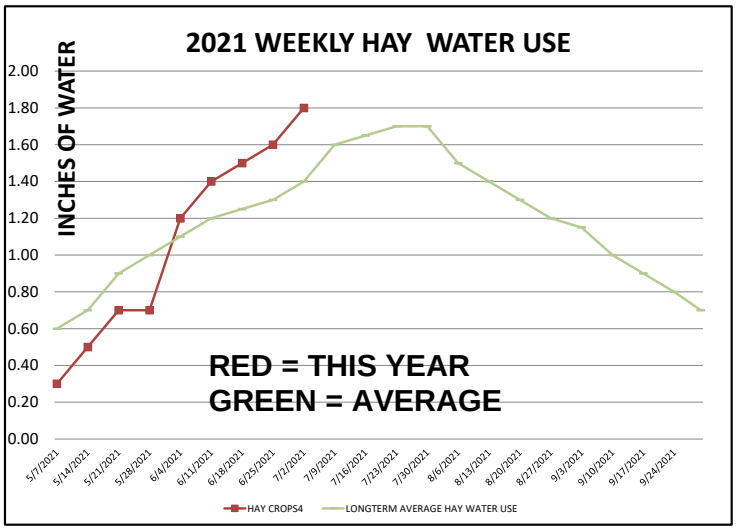
	RAIN[1]	2021 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/7/2021	0.40	0.30	0.40	0.00	0.00	0.50	0.50	0.60	1.00	0.30
5/14/2021	0.20	0.50	0.50	0.10	0.00	0.70	0.70	0.70	1.10	0.40
5/21/2021	0.50	0.70	0.60	0.30	0.10	0.80	0.80	0.90	1.20	0.50
5/28/2021	2.00	0.70	0.60	0.60	0.20	0.80	0.70	1.00	1.30	0.50
6/4/2021	0.10	1.20	1.00	0.90	0.60	1.30	1.20	1.10	1.50	0.60
6/11/2021	0.10	1.40	1.20	1.10	0.80	1.50	1.30	1.20	1.70	0.70
6/18/2021	0.20	1.50	1.30	1.40	1.10	1.60	1.40	1.25	1.90	0.70
6/25/2021	0.20	1.60	1.40	1.60	1.40	1.70	1.50	1.30	2.00	0.80
7/2/2021	0.10	1.80	1.50	1.90	1.70	1.90	1.70	1.40	2.00	0.90
7/9/2021								1.60	2.10	1.00
7/16/2021								1.65	2.20	1.00
7/23/2021								1.70	2.20	1.00
7/30/2021								1.70	2.00	1.00
8/6/2021								1.50	1.80	0.90
8/13/2021								1.40	1.70	0.80
8/20/2021								1.30	1.60	0.80
8/27/2021								1.20	1.40	0.70
9/3/2021								1.15	1.40	0.70
9/10/2021								1.00	1.30	0.60
9/17/2021								0.90	1.20	0.50
9/24/2021								0.80	1.10	0.50
9/30/2021								0.70	1.00	0.40
TOTAL	**3.80**	**9.70**	**8.50**	**7.90**	**5.90**	**10.80**	**9.80**	**26.05**	**34.70**	**15.30**

[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) (This rainfall figure is an average across all Blackfoot croplands - use your own rain gauge for better accuracy)

[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 – DROPPED ABOUT 2 INCHES IF NOT IRRIGATED

Soil moisture dropped almost 2 inches this week in fields not irrigated due to higher crop water use and almost no rain. This dried out surface soils unless irrigated. **Now is the last chance for many irrigators to pour on the water while it is still available!** Those with great water rights and availability are also irrigating heavily now since this is the most effective time to irrigate for maximum crop production. Hay crops yields are highest for the first cutting and local small grain crops produce most of their growth in June. Check soil moisture and keep it above 50% of Water Holding Capacity to get the best yields. Remember that Silty, Clayey and Loamy soils with good organic matter content can hold 2 inches of water per foot of soil. Sandy and rocky soils can hold up to 1.5 inches of water per foot but many only hold ¾ to 1 inch per foot.

Soil near 100% of its water holding forms a ball when squeezed and leaves the hand visibly moist. Water is visible on the surface of the soil and the hand is moistened. Soil near 50% of its water holding capacity also forms a ball but leaves little moisture on the hand.

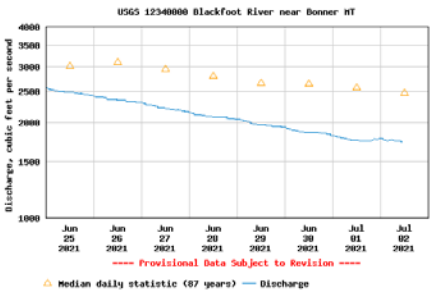
WEEKLY TIPS

Water Supply – Snowpack Gone, Streams Dropping and Drought Surrounds Us!

The water supply, which has held up well this year, is now going fast. Streamflows are diminishing and warming. Most of Montana is listed in *Drought* conditions. The Blackfoot drainage is almost the only part of the state not currently listed in drought. If you have limited water availability, it's time to fill up your soil to its water holding capacity.

Streamflows – Way Below Average and Falling Fast

After starting the irrigation season well above average, Blackfoot river flows have now dropped to only 60% of average. Today flow at Bonner is **1,740 CFS** compared with an average of 2,930 CFS. The highest flow ever recorded was 11,300 CFS in 1899 while the lowest flow was 602 CFS in 1977. Streamflows will continue to drop this week with no predicted rain.



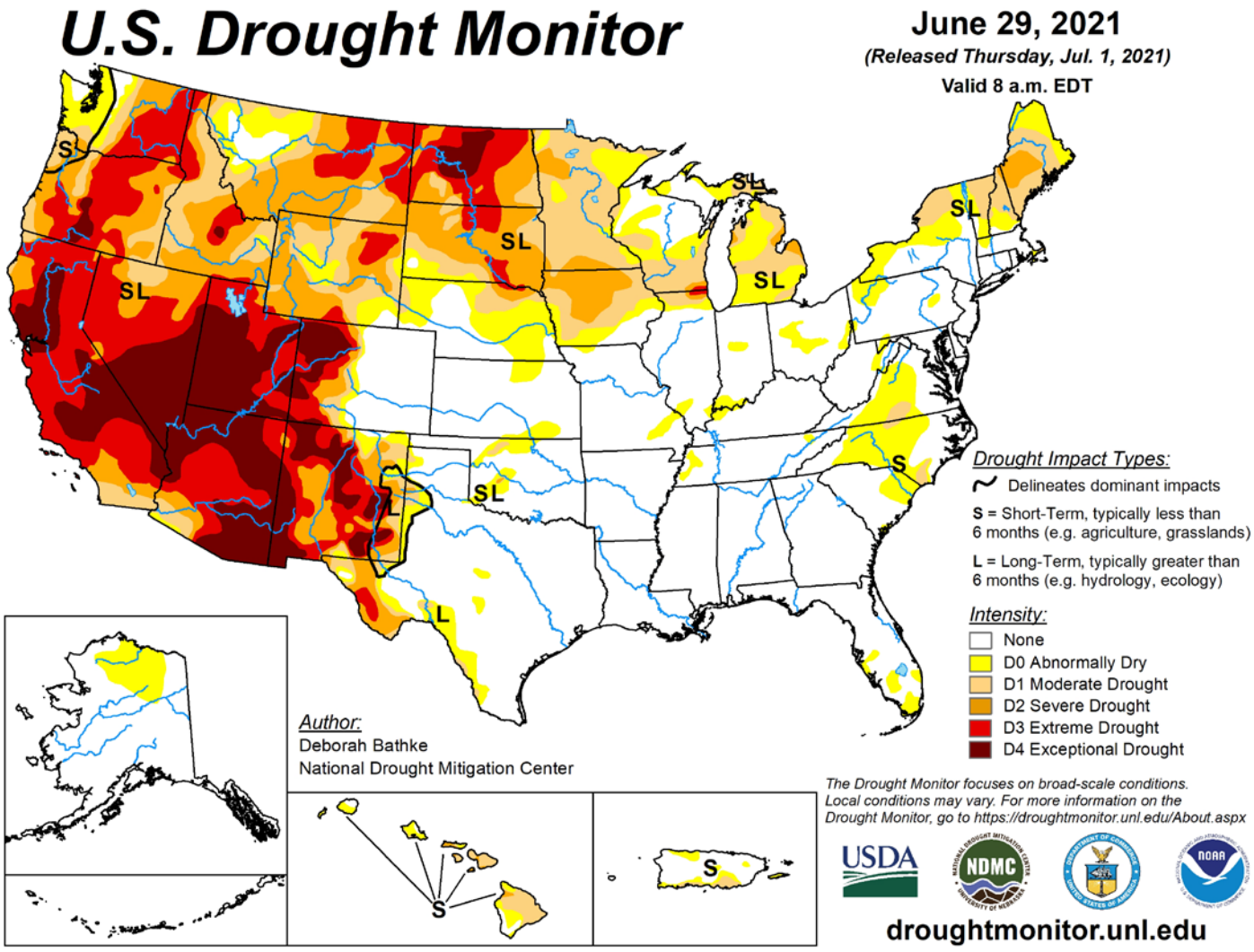
Hot Weather Irrigation

As crops mature and there is more leaf area to intercept irrigation water, less water reaches the soil. Only the water that gets into the soil and is taken up by the crop produces yield. Water on the plant surface only cools so make sure you apply enough water to reach the soil and penetrate.

- Apply more water per irrigation – slow down the pivot, change out nozzles
- Keep irrigating until soil moisture shows an increase
- Shut off during peak afternoon heat when water just evaporates from crop leaves
- Irrigate at night and early morning if possible
- Stagger start times to alternate the area irrigated during peak afternoon heat
- Irrigate a smaller area well instead of a large area poorly for best yeild
- You tell me your ideas so I can inform others

Prepare Yourself for Drought

I put off this topic as long as possible so we could bask in our good fortune this year. We enjoyed above-average snowpack and streamflows which allowed a pretty good irrigation season so far. But then came some of the hottest weather ever in the Blackfoot drainage with temperatures approaching 100F in June. It's now time to dust off those drought plans. Starting next week, we will again explore the world of drought management options for irrigators. The great news is that there are some excellent crops to be harvested from early-season efforts throughout the Blackfoot drainage.



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. Small grains harvested for seed are usually irrigated up to the milk to soft dough stage but be sure soil moisture remains to prevent kernel shriveling. Small grains for forage are often harvested earlier when plants are less dry and seeds soft.

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.