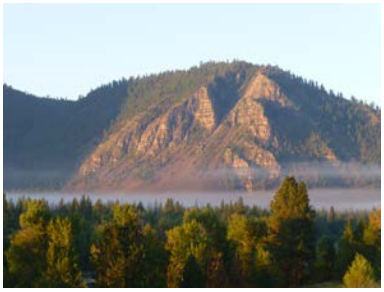
BLACKFOOT CHALLENGE
WEEKLY IRRIGATION REPORT
Friday May 28, 2021

Last week gave us snow, rain and cool temperatures but next week will be warm and sunny so stand back as crops spring from the ground. Most Blackfoot croplands had about 2 inches of rain this week and some snowflakes. Surface soil moisture levels rose significantly and it proved a great time to irrigate soils to their full moisture holding capacities.

The snowpack jumped from good (96% of average) to great (140%). Streamflows surged above average and will increase further with warm weather this week. There appears to be plenty of water for early season irrigation and storage but predicted hot, dry weather could change that later on. The NOAA US Drought Monitor Map shows all Blackfoot croplands to be out of drought conditions!

WEATHER – MONSOON/SNOWSTORM TURNS TO SUN AND WARMTH



Cool, wet weather last week raised the 30-day rainfall to 170% of normal for the Blackfoot. This week will be mostly sunny with highs in the 70s and 80s. Lows will be in the 40s. The 30-day forecast says above average rainfall and average temperatures. The 90-day forecast says below average rainfall and above average temperatures.

CROP WATER USE – LOW LAST WEEK, JUMPING NEXT

Last week, crop water use remained below average due to cool weather and slow crop development. This coming week that should change with warm sunny weather. **Hay crops used less than ¾ of an inch of water last week and will use about 1 inch next week.** Note that in these early season reports, we list a range of crop water use for spring grains planted at different dates. Crop water use will even out as spring grains mature. The table below provides a quick summary of crop water use this last week and an estimate for next week.

WATER USE IN INCHES	LAST 7 DAYS	NEXT 7 DAYS TOTAL[1]	NEXT 7 DAYS DAILY AVE[2]	SEASON TOTAL[3]
HAY CROPS	**0.7**	**1.0**	.13	2.2
PASTURE	**0.6**	**0.9**	.11	2.1
SPRING GRAINS	**0.2 - 0.6**	**0.4 - 0.8**	.06 -.11	1.0
WINTER WHEAT	**0.8**	**1.1**	.14	2.8
LAWNS	**0.7**	**1.0**	.13	2.7

[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)

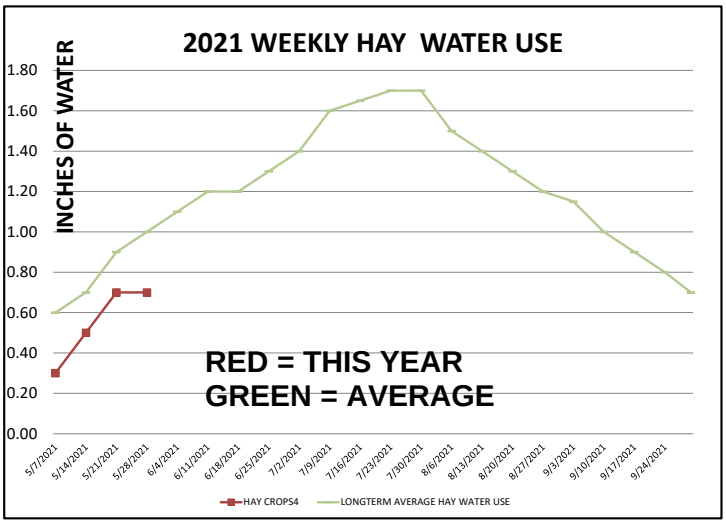
	RAIN[1]	2021 WEEKLY POTENTIAL CROP WATER USE[2]						AVERAGE WEEKLY CROP WATER USE[3]		
WEEK ENDING	RAIN	HAY CROPS[4]	PASTURE	SPRING GRAINS 5-1 START	SPRING GRAINS 5-15 START	WINTER WHEAT	LAWNS	LONGTERM AVERAGE HAY WATER USE	HOT WEEK HAY WATER USE	COOL WEEK HAY WATER USE
5/7/2021	0.40	0.30	0.40	0.00	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								1.10	1.50	0.60
6/11/2021								1.20	1.70	0.70
6/18/2021								1.20	1.90	0.70
6/25/2021								1.30	2.00	0.80
7/2/2021								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	**3.10**	**2.20**	**2.10**	**1.00**	**0.30**	**2.80**	**2.70**	**26.00**	**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 – GETS A BIG BOOST THIS WEEK!

Soil moisture gained lots this week with 2 inches of rain across most cropland areas. This moistened dry surface soils 9 to 10 inches deep and boosted subsoil moisture as well for those who were irrigating. Silty, Clayey and Loamy soils with good organic matter content can hold 2 inches of water.

WHAT HAPPENS WHEN IT RAINS 2 INCHES (OR YOU IRRIGATE)

OF YOUR 2 INCHES:	COOL DAY YOUNG CROP	HOT DAY MATURE CROP
INTERCEPTED BY CROP LEAVES AND EVAPORATES	.1 - .3	.3 - .5
EVAPORATES FROM SOIL SURFACE	.1 - .2	.3 - .5
INFILTRATES SOIL	1.5 - 1.8	1.0 - 1.4

CLAYEY, SILTY, LOAMY SOIL DEPTH OF INFILTRATION	9 INCHES
ROCKY, SANDY SOIL DEPTH OF INFILTRATION	10 INCHES

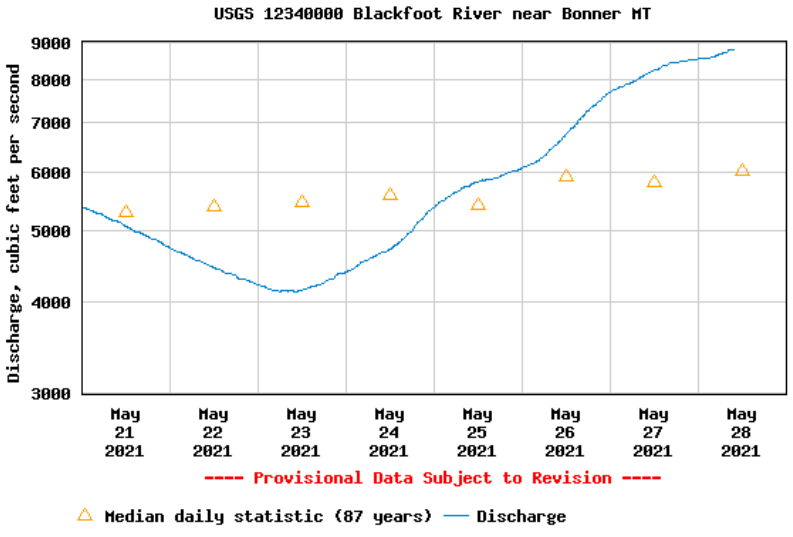
WEEKLY TIPS

Water Supply – Big Boost From Rain and Snow!

The Blackfoot drainage snowpack increased dramatically this week to 140% of average from 94% last week. Warm temperatures this week should bring that number back down rapidly. Blackfoot precipitation was up to 170% of normal in the last 30 days, an increase from 75% last week. Reservoir storage remains good. Blackfoot river flows are predicted to be slightly above normal this season but watch for a change with the hot, dry weather.

Streamflows – Running High Higher To Come

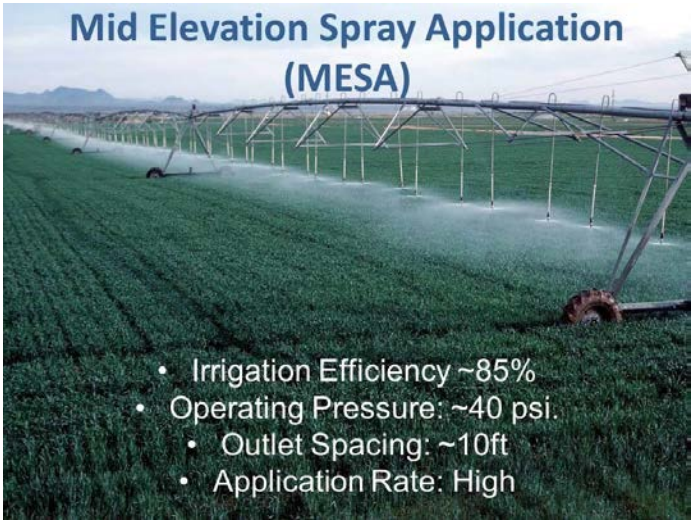
The Blackfoot river flow at Bonner is about **8,800 CFS today** which is way above average for this date (6,110 CFS). 1899 had the highest flow record at 14,500 CFS while the lowest flow was 1120 CFS in 1941. **Streamflows will increase** even more this week with warm temperatures and sunny skies.



LEPA AND LESA ARE IN YOUR FUTURE

We used to mount sprinkers high in the sky – on top of the pivot pipe and spray far with high pressures. This was High Elevation, High Energy Irrigation. But then someone noticed that when it was hot and the wind blew – much of the spray evaporated. They also noticed their energy bills were going up. And besides, what water made it to the crop often didn't make it to the soil.

We started using drop tubes to get the sprinklers closer to the crop and rotator designs with larger drop sizes to get the water to the soil more efficiently. This is called MESA Mid-Elevation Spray Application. Now irrigators are going even closer to the ground with even lower pressures and energy use.



Low Elevation Spray Application (LESA) ideas have been around for years. This simply means getting the water emitters closer to the ground usually within the crop canopy in order to reduce evaporation. **The goal of irrigation is to get water <u>into the soil</u>** where is can turn into crop biomass. Spraying it on leaves may cool them down but doesn't grow more crop. In a demonstration, I once set rain gauges above an alfalfa crop and at ground level then applied ½ inch of irrigation before getting any significant water at ground level. This means you must monitor **soil moisture** and not just **how much you apply.**

Low Energy Precision Application (LEPA) means using closely-spaced sprinkler heads (<5 feet) at low pressure (15 PSI) to apply water more quickly saving energy and increasing the amount infiltrating the soil. This doesn't always work for clay soils and steeper fields with runoff concerns.

Read more about LEPA and LESA in the other attachment to our weekly email or email me and I'll send it to you again.

This information on LESA and LEPA was provided by our former Blackfoot Challenge Intern Joseph Zimbric who finished a Masters degree in Agronomy at U of Wisconsin, worked as a County Agent and now works in sustainable ag at Michigan State – go Joseph! And Thanks!

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

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.