

# PURPOSE

**Analyze** the impacts of removing late season irrigation (split-season water leasing) on three ranches in the Deer Lodge valley with three cooperating producers.

**Evaluate** the agronomic effect, over time (three years), of withholding irrigation water from hay crops (alfalfa and grass hay) for two months at the end of irrigation season (late July to early September).

**Quantify** economic effects of partial season irrigation on hay production and production costs under various scenarios, considering lease prices as a variable.



Study conducted by Montana State University, Powell County Extension in partnership with six ranches and the Clark Fork Coalition. This study was made possible through the support of the Western Sustainable Agricultural Research and Education (SARE) grant program.



# PARTIAL SEASON IRRIGATION

A summary of alfalfa responses to partial season irrigation

MSU Powell County Extension





## METHODS

**Soil Moisture** – probes were deployed at 30” and 12” depths to monitor soil moisture differences between irrigated and non-irrigated fields.

**NRCS Irrigation Water Management** was utilized to track irrigation inputs, evapotranspiration, precipitation and soil moisture.

**Production records and clippings** were collected to observe differences in hay yields (tons/acre) between irrigated and non-irrigated fields.

**Nutrient Analysis** was performed by MSU Extension to assist producers with decisions regarding soil and crop health improvements.

**Power Records** were analyzed to quantify annual power savings of reducing irrigated acreages during July/August.

**Ranch Manger Interviews** were performed to quantify increased pest or weed activity in non-irrigated areas.



## RESULTS

**Irrigated alfalfa yields** decreased 0 to 0.8 tons per acre for second cutting, with losses averaging around 0.5 tons per acre.

**Electrical savings** was increased \$42 to \$58 per acre. One Ranch was able to reduce a single pump from a 75HP to a 25HP by reducing the second crop irrigated acreage by 37 acres.

**Irrigation water management** combined with soil moisture tracking and more precise water application resulted in improved yields by up to 0.8 tons per acre.

**Soil moisture** in non-irrigated fields declined more quickly in the shallower (12”) probes than the deeper (30”). Some deeper probes saw little to no change in soil moisture as a result of the non-irrigation during second crop.

**Improved soil health** and hay nutrient composition was achieved through split-season leasing and the use of cover crops.



## CONCLUSIONS

**Partial Season Irrigation** can be a beneficial tool for decreasing labor and pumping costs while diversifying income from leased water.

**The largest economic impact** from partial season irrigation is the loss in yield from the second cutting, which ranged from \$0 to \$120 per acre, with an average of \$75 per acre, but lease payments exceeded losses on all ranches.

**Fields best suited** for partial season irrigation are aging alfalfa stands with high pumping costs and relatively low productivity.

**Little to no loss** in second crop yield was observed on fields with elevated water tables.

**Irrigation water management** and soil moisture tracking alone can conserve water, reduce pumping costs, and improve yields.

**1-2 years** of partial season irrigation had little impact on alfalfa health.

**Alfalfa is a good crop** for saving water as it is drought tolerant.