

IRRIGATION INTERNSHIP WELD COUNTY

PROJECT INTRODUCTION

This internship was in support of irrigation research being conducted at a SIEP (Subsurface Irrigation and Efficiency Project) field site in Kersey, CO.

The location in Kersey is an 82 acre farm that is divided into 19 different “zones”. Each zone is irrigated using subsurface drip irrigation. Various crops are grown at this site, but my internship was mainly concerned with alfalfa. Alfalfa was grown in 8 of the 19 zones.

This is the first year of the alfalfa crop being grown in these current zones. Previously this farm had been used for a 5-year study in which the alfalfa had been grown in different zones. Establishing a healthy crop of alfalfa for future research was a priority this summer.

INTERNSHIP GOALS

- 1) Manage irrigation schedule for 8 zones of alfalfa and 2 zones of dry beans.
- 2) Monitor crop water use and alfalfa biomass production to determine water use efficiency (WUE)
- 3) Install sensors for future research (soil moisture sensors and neutron probe tubes)

HOW DOES THIS APPLY TO YOUR EDUCATION

I am a Soil and Crop Science major, and this job allowed me to use my knowledge of the subject and apply it to irrigation, which is an important part of agricultural production

Doing research in the field allowed me to practice valuable skills like data collection.

WHAT YOU DID

Installing Sensors:

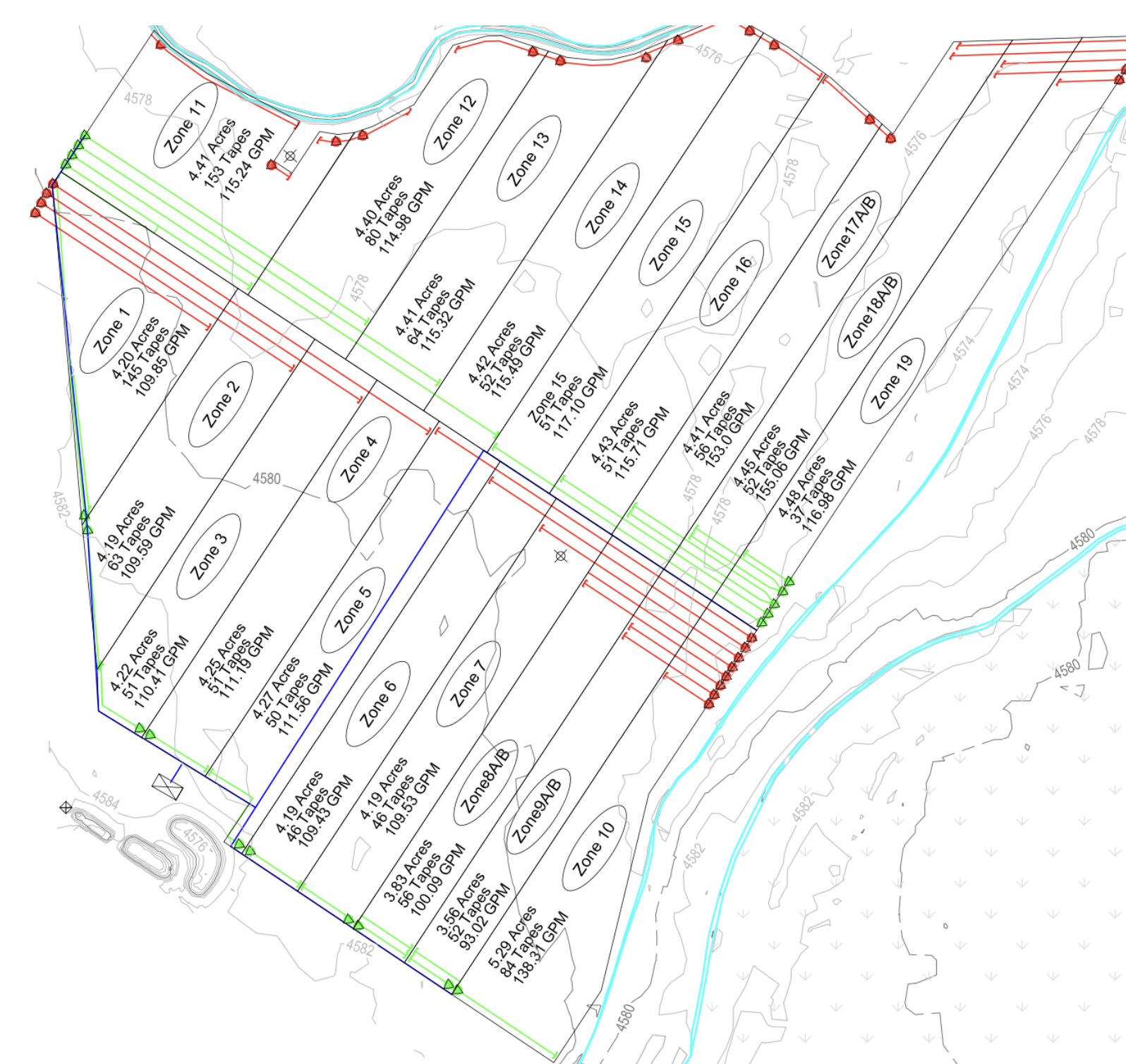
Using sensors for data collection is an important part for a lot of agricultural research. I installed soil moisture sensors in strategic zones throughout the farm. These sensors monitor soil moisture, soil temperature, and soil electro-conductivity. I also installed neutron probe tubes which will be used for data collection in future research.

Irrigation scheduling:

Part of my responsibilities were to set an irrigation schedule using the farms irrigation system. This involves using weather data from a nearby weather station, data from soil sensors and soil samples, and irrigation scheduling programs like ERAMS/WISE. Information from these sources was used to derive an irrigation schedule for when and how long each zone should be irrigated. The goal was to keep the soil moisture above the max allowable depletion (MAD).

Monitoring alfalfa production:

Monitoring how the crop is performing, in this case alfalfa, is an important part of irrigation research. This is how we determine how efficient the irrigation method is. I took weekly measurement of alfalfa heights as well as monthly biomass measurements. Alfalfa will usually be cut and baled about 4 times throughout the growing season. Before the whole field is harvested, I would cut a 1x1 meter sample from each zone. These samples are bagged, weighed, and dried. The dry weights are used to estimate the total biomass of each zone. Then I compare the total biomass to the crops water use (evapotranspiration/ET) and determine the water use efficiency.



WHAT YOU LEARNED

I learned how to install and collect data from sensors.

I learned how to use ERAMS/WISE programs to develop a reliable irrigation schedule.

I learned how to collect soil samples in the field using a variety of methods including a hand operated probe as well a soil sample probe mounted to a drill rig. This also involved weighing and drying soil samples in an oven.

I learned a method for collecting alfalfa biomass samples and how to process the samples. Alfalfa samples need to be weighed, dried, and weighed again.

$$WUE = \frac{\text{Biomass} \left(\frac{Kg}{ha} \right)}{ET (mm)}$$

CROP WATER USE EFFICIENCY CALCULATION EXAMPLE

Zone	Harvest Date	Wet Weight (g)	Dry Weight (g)	Avg weight of bag (g)	Net Weight (g)	Alfalfa Biomass (Kg/ha)
2	27-Jul	1515	492	236.5	254.5	2,545 Kg/ha

Total ET Zone 2 (15JUN23 - 27JUL23) = **277.83 mm**

$$WUE = \frac{\text{Biomass} \left(\frac{kg}{ha} \right)}{ET (mm)} = \frac{2,545 Kg/ha}{277.83 mm} = 9.16 \frac{kg/ha}{mm}$$

NEXT STEPS

The next steps for this project are to:

- Continue installing sensors, mainly neutron probe tubes.
- Establish Alfalfa crop in the new zones
- Continue to monitor WUE to build data over time