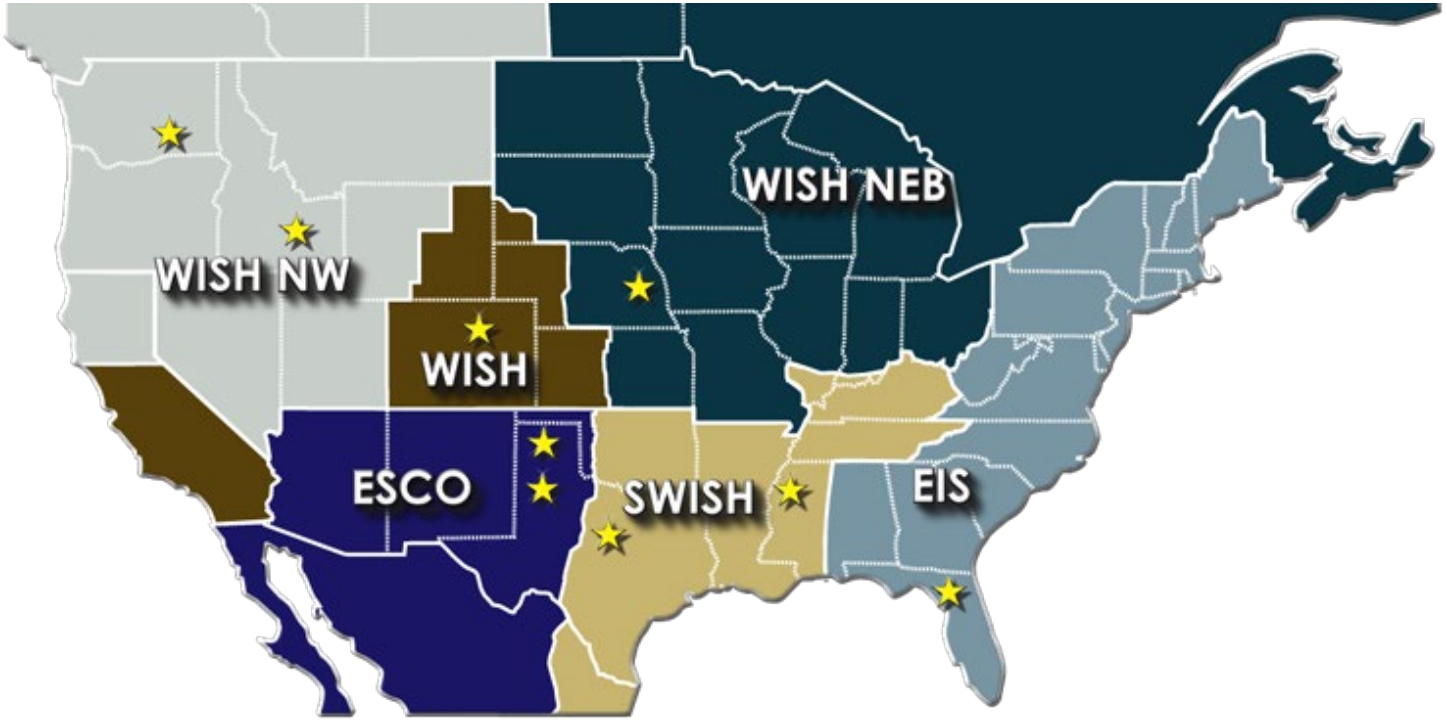
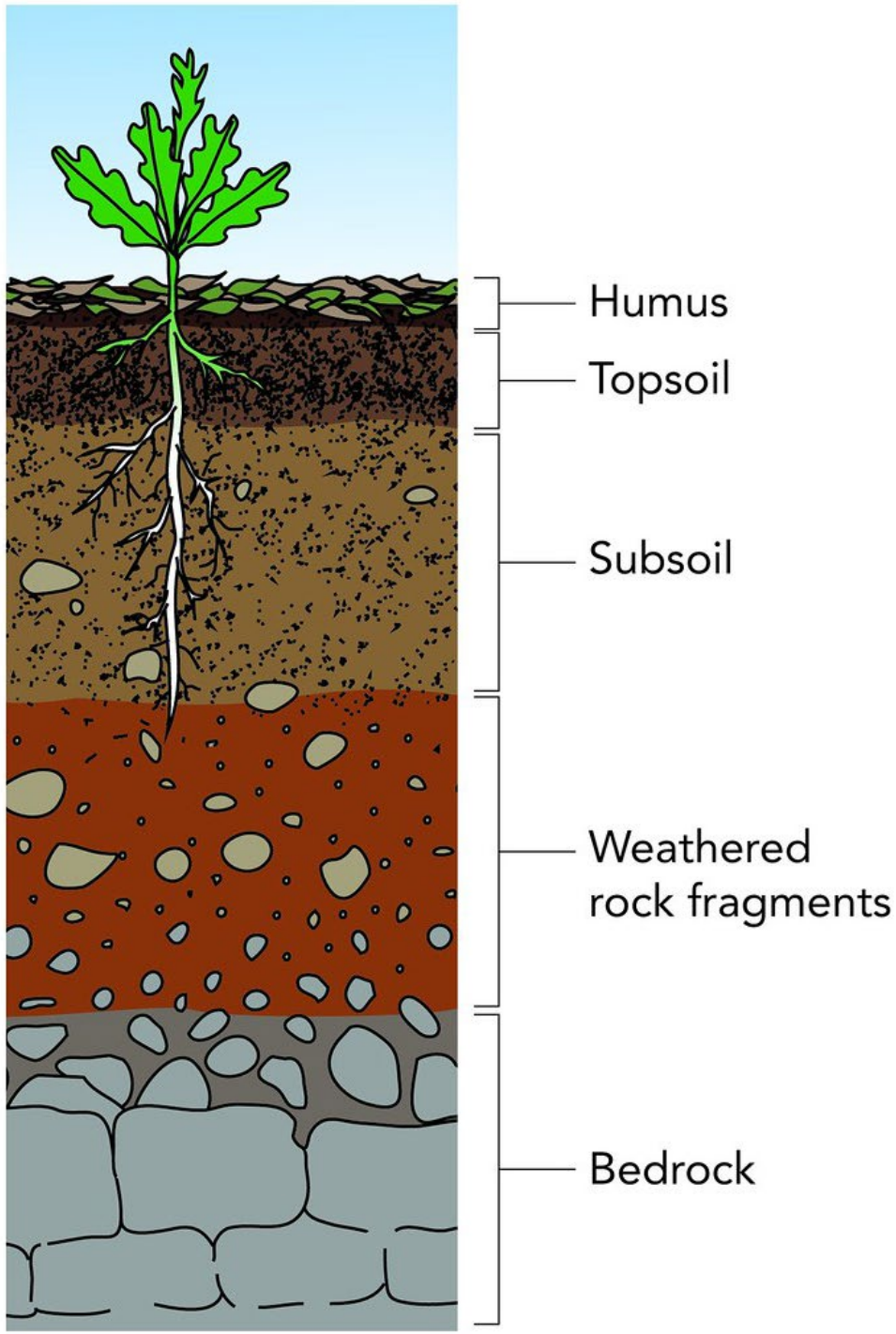
Alfalfa Congress 2022

Dustin Larsen – WISH Northwest

WISH Northwest

- WHOLESALE DISTRIBUTOR
- WORK WITH MANUFACTURES DIRECTLY
- CUSTOM DESIGN SOFTWARE
- DEDICATED TEAM
- EXPERIENCE IN MANY REGIONS, CROPS, AND MARKETS





Goal of Irrigation

- Apply the right amount of water at the right time
- Too much water and you waste water and money – leach chemical/fertilizer right past root zone
- Too little of water will result in crop loss
- Water is susceptible to greater loss higher in the soil profile
- Weather, crop maturity, root depth, all affect irrigation needs

Types of Irrigation

- Flood
- Hand line
- Wheel line
- Pivot
- Subsurface drip
- Focusing on Pivot Irrigation
- Principles of irrigation are the same for each

Designing Center Pivots Charts – Basics

Basic Information needed for a nozzle chart

- Total length of structure
- Flow rate
- Pressure
- Pivot model, spacing between sprinklers
- Sprinklers being used

Designing for Limiting Factors

What are the limiting factors for a perfect irrigation system?

- Available water
- Water quality
- Soil/Infiltration Rate
- Pressure
- Terrain
- Cost
- Crop
- Climate

Limiting Factors: Available Water

Water is limited, how can every drop be used efficiently?

- Application efficiency vs use efficiency

95% application efficiency does not equal use, over watering, run-off, evaporation

- Updated equipment & design

Worn equipment will result in inefficiency, common to irrigate based off of driest sections of field

Limiting Factors: Available Water

- More important to design for what available, not what's desired

Know what water and pressure is available

- Monitor soil moisture and crop yields

More likely to see reduced water use from monitoring than forms of irrigation equipment

- Dual nozzle packages

Design for needs of crop or available water

- Right amount of water at the right time

Make the best use of what's available

Limiting Factors: Water Source & Quality

Water quality and source of water affect how we irrigate

- Salts and minerals in water

Generally requires high application rates, reduced number of applications

- Waste water application

Larger nozzles by spacing sprinklers wide, large droplet sprinklers

- Choose sprinklers/nozzle sizing to match solids in water

Adjust sprinkler models and regulator pressure to accommodate needs

Limiting Factors: Soils

- Holding capacity

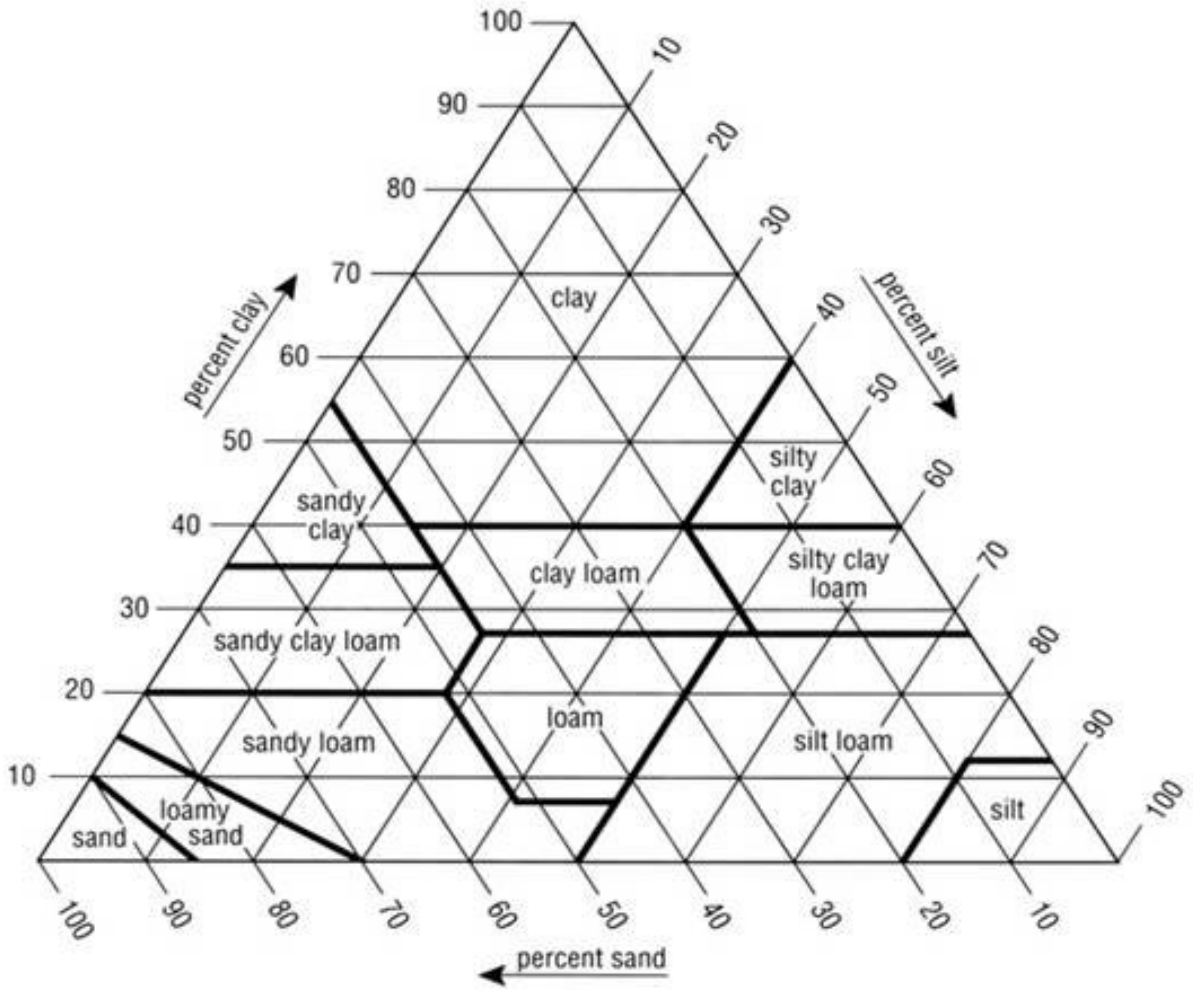
Adjust scheduling to holding capacity

- Structure

droplet size(kinetic energy) affects soil structure, type of sprinkler, operating pressure, and drop height affect kinetic energy

- Maintain soil composition

Reduce standing water and compaction



Limiting Factors: Infiltration Rates

Keeping water where its been applied

- Application rate vs instantaneous rate

1000 GPM pivot x 1300’

Applying 1 inch , first span 1.5 GPM, last span 11.5 GPM per sprinkler

- Longer machines have higher Instantaneous rates

Limiting Factors: Infiltration Rates

- Wetted diameter – AREA

Greater Area that water is applied reduces instantaneous rate

Type of sprinkler, truss rod slings, boombacks

- Drop height

Decrease kinetic energy(balance)

Limiting Factors: Pressure

How does pressure affect sprinkler performance?

- Pressure affects droplet size and throw
- Pressure affects flow

20/64 nozzle 20 PSI =12.5 GPM, 10 PSI=8.85 GPM

- When to use regulators
- How regulators work

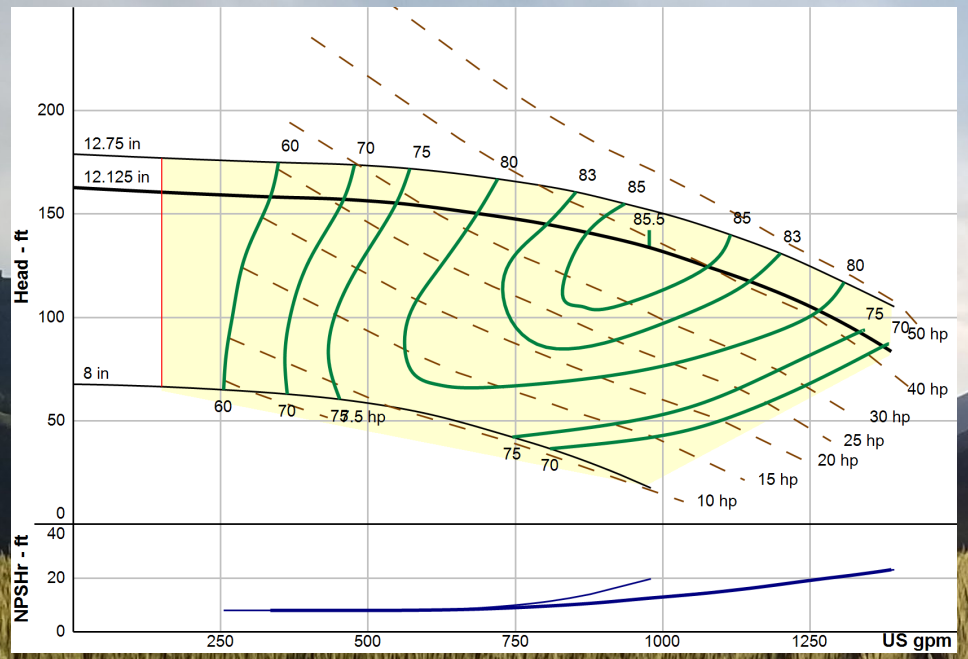
5 PSI over rated regulator pressure

- Elevation affects pressure

2.31 ft = 1 PSI

Regulator PSI+5+friction loss + elevation=Operating Pressure

15 PSI +5+9+(23/2.31)=39 PSI needed



Limiting Factors: Pressure

- Worn nozzles and pumps reduce pressure – use a pressure gauge
- Pump curve design
- Pivot point pressure
- Low pressure options available

1110 GPM = 52 PSI

888 GPM = 61 PSI

Limiting Factors: Terrain

- Slope

Reduce chances of standing water

If application rate is higher than intake rate there will be standing water, slope = runoff

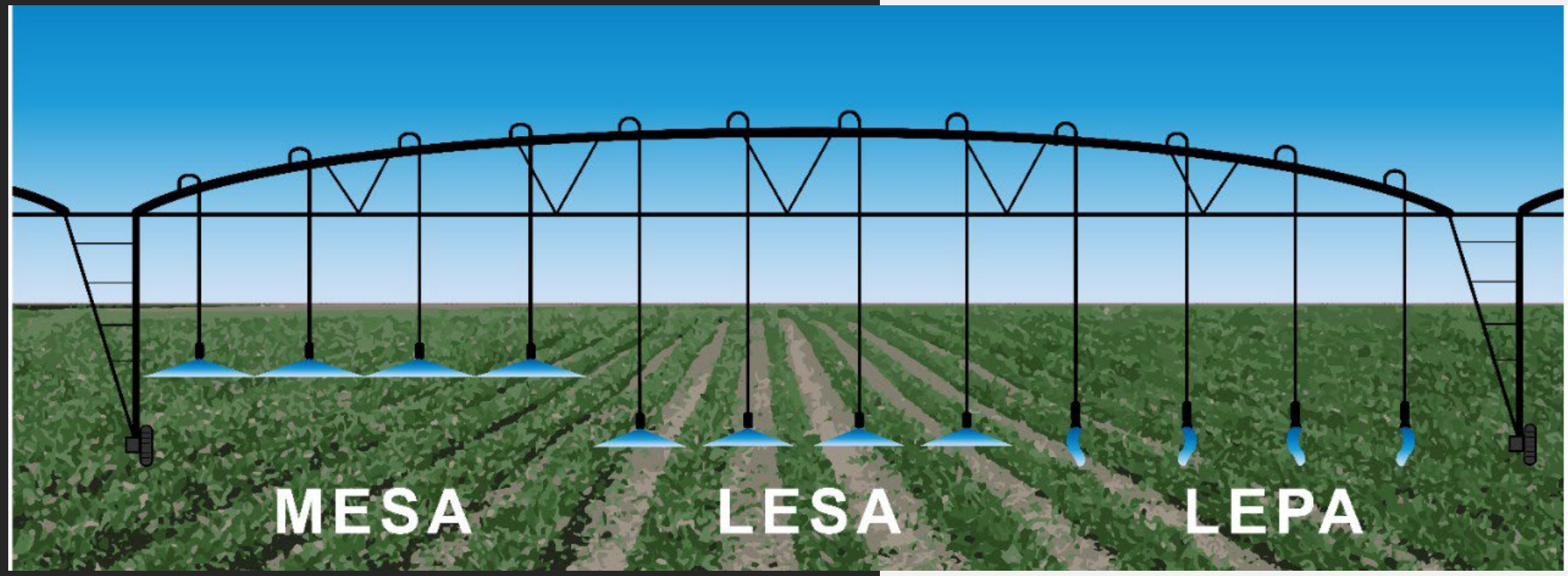
- Obstacles in field

Rock piles, roads, variable soils – VRI?

Limiting Factors: Cost

Is a Pivot more than an expensive sprinkler holder?

- Cost is a limiting factor, but beware of cost being the only limiting factor
- Ideal to have as many sprinklers as possible, accounting for plugged nozzles and overwatering



Limiting Factors: Cost

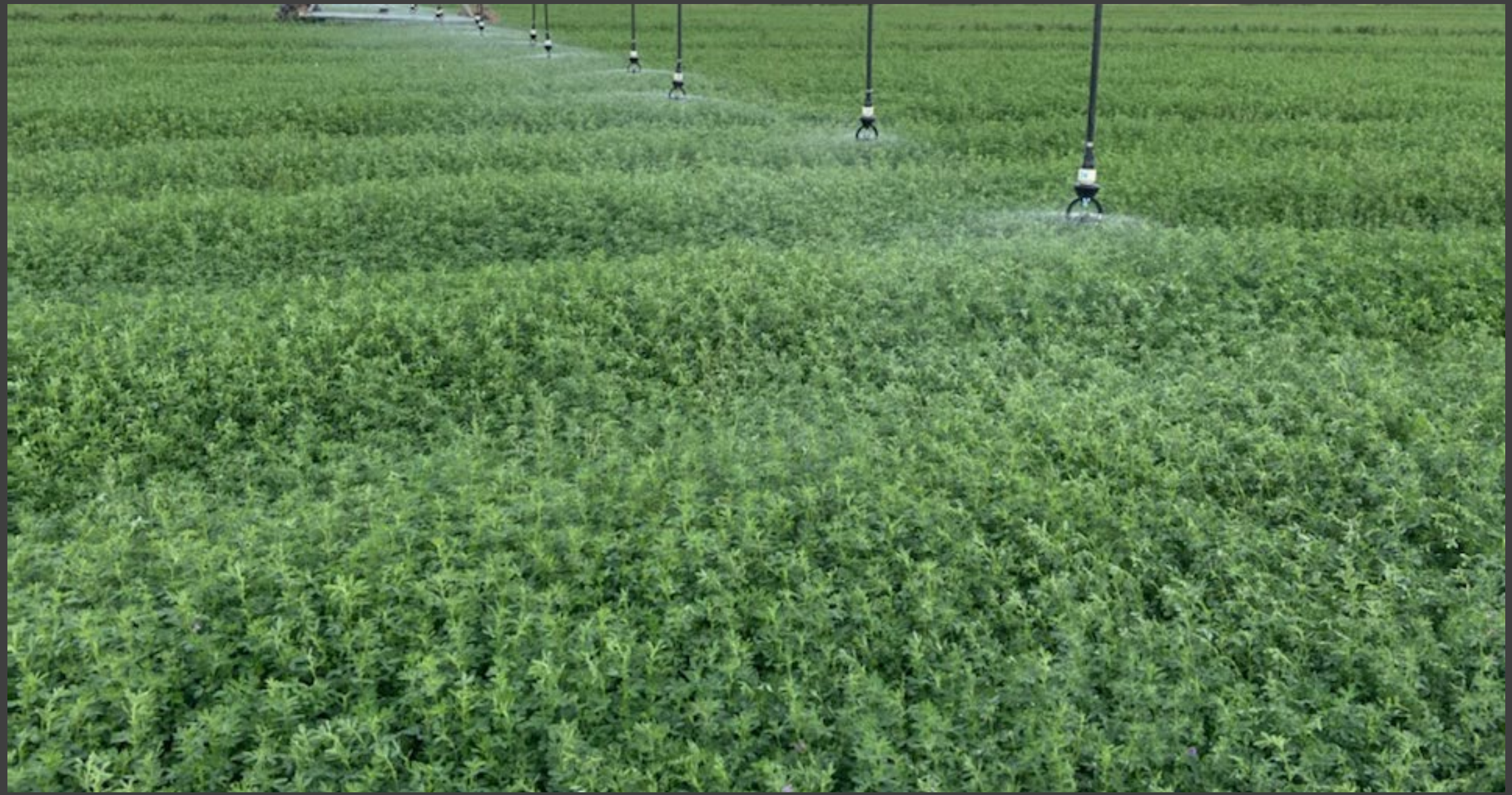
Estimated costs for different systems

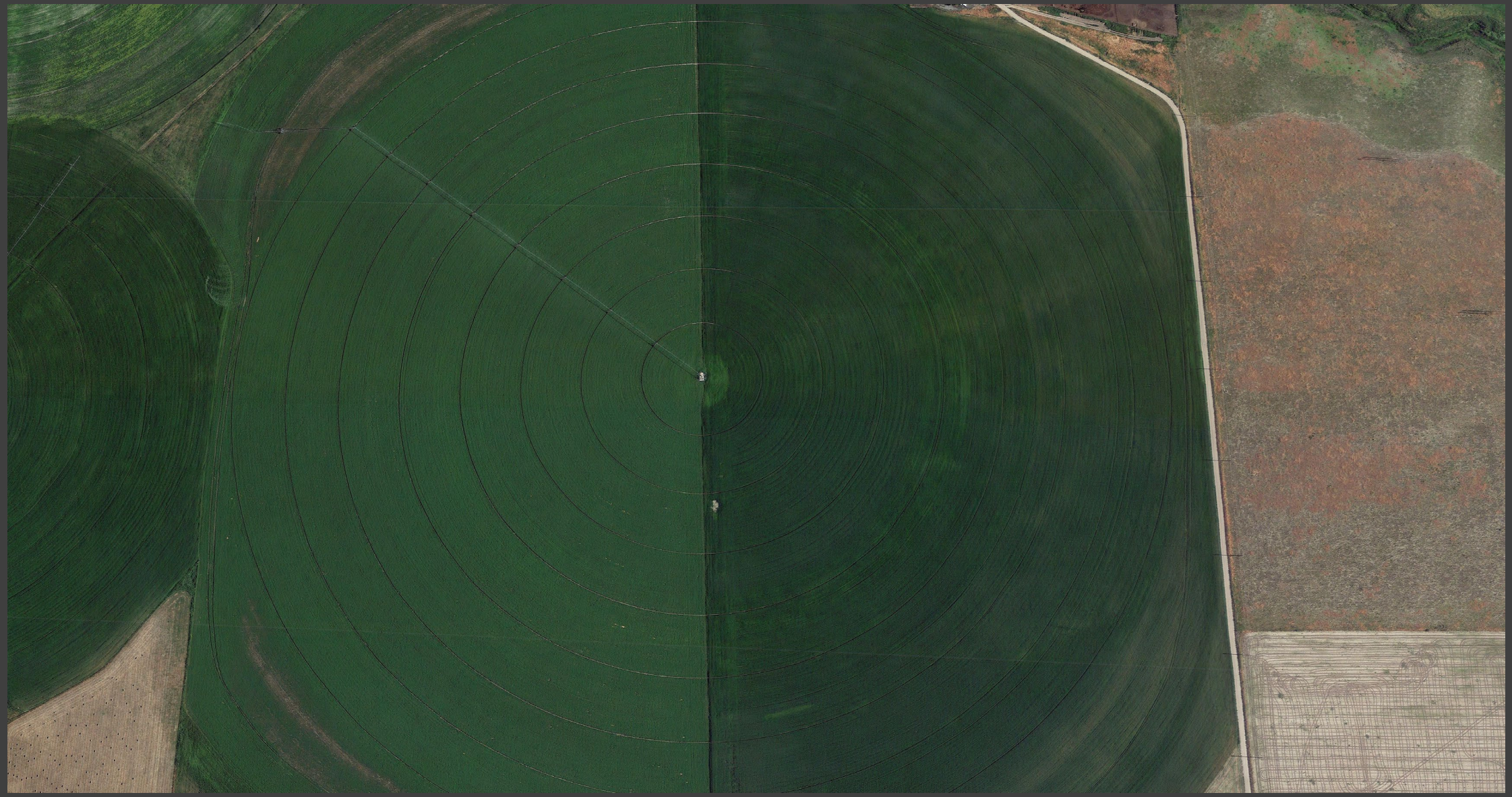
- MESA – SPRAYS - $5000
- MESA – Moving Plates $6,500 (30 % higher)
- LESA - $11,000 (220% higher)
- LEPA – $15,200 (305% higher)

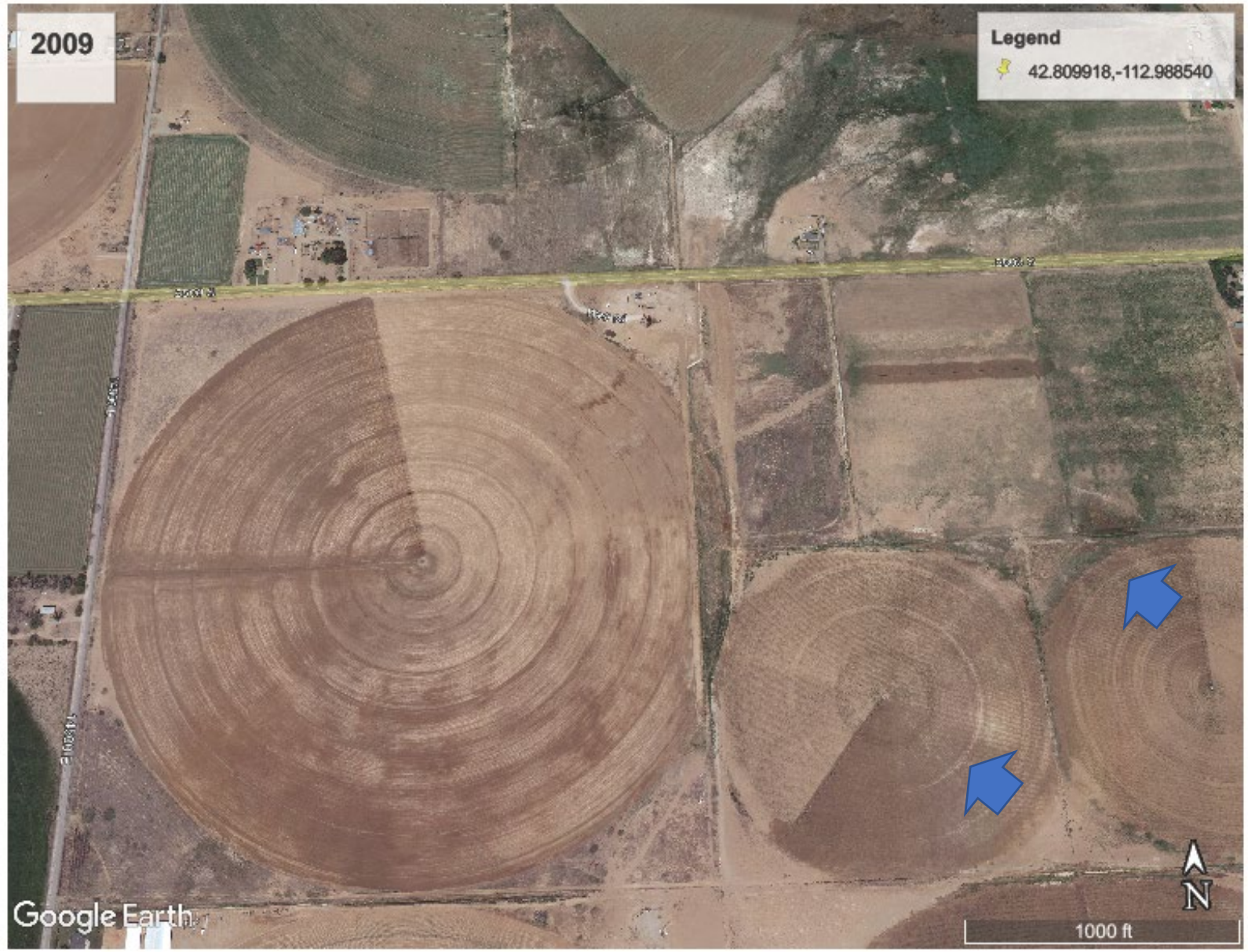
Limiting Factors: Crop

- Irrigate to the current crops needs
- Crop obstruction
- Chemigation and fertigation a consideration
- In canopy vs above canopy

Common issues



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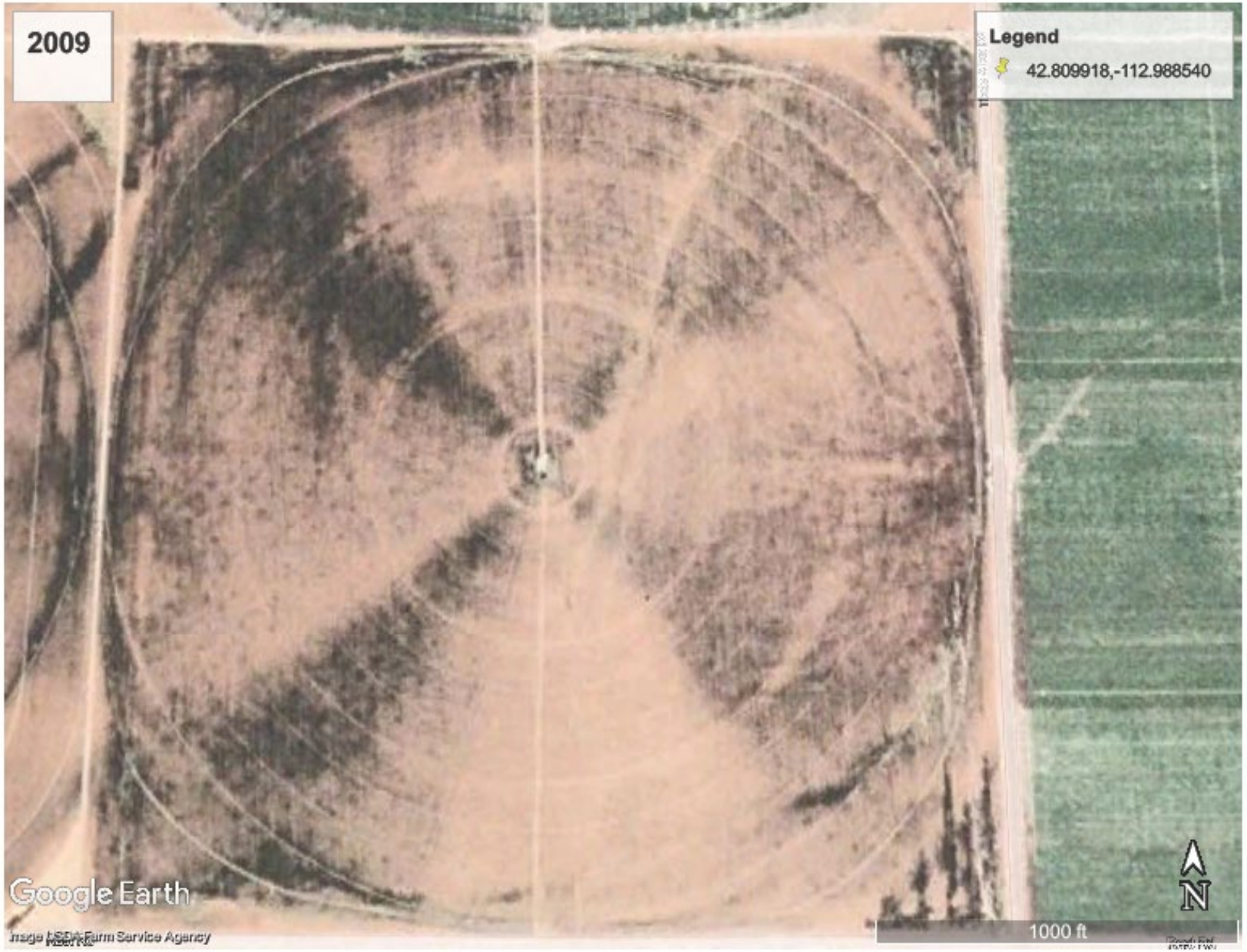
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