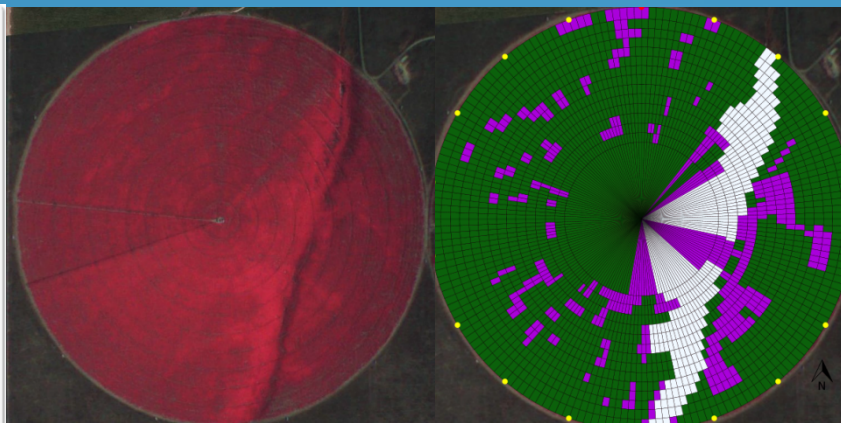
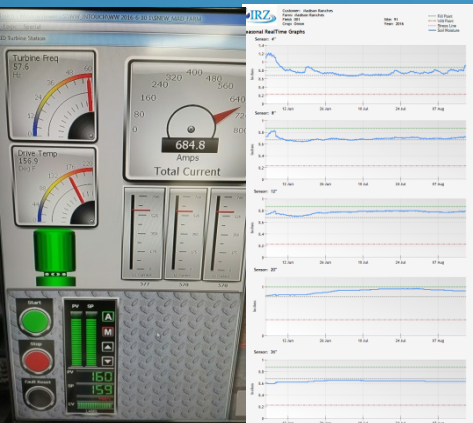


Modern Irrigation

New Methods and New Sources



What has driven farmers to be more efficient/innovative Irrigators?

- Ground water right curtailment.
- No additional withdrawals from the Columbia River.
- Conserved water rights allowed for new development.
- Operational cost/Economics.
- Expanded crop rotations.
- Consumer demand.

Low pressure drop tube sprinklers

- Center pivot is the most common irrigation method in the basin. Has gone from 11.2 gpm pre acre overhead impact sprinklers requiring over 70 psi to low hanging nozzles requiring only 20 psi at the end of the pivot.
- Newer sprinklers also fight the wind better and hit the ground softer and sooner. Allowing for more of the pumped water to get into the ground.



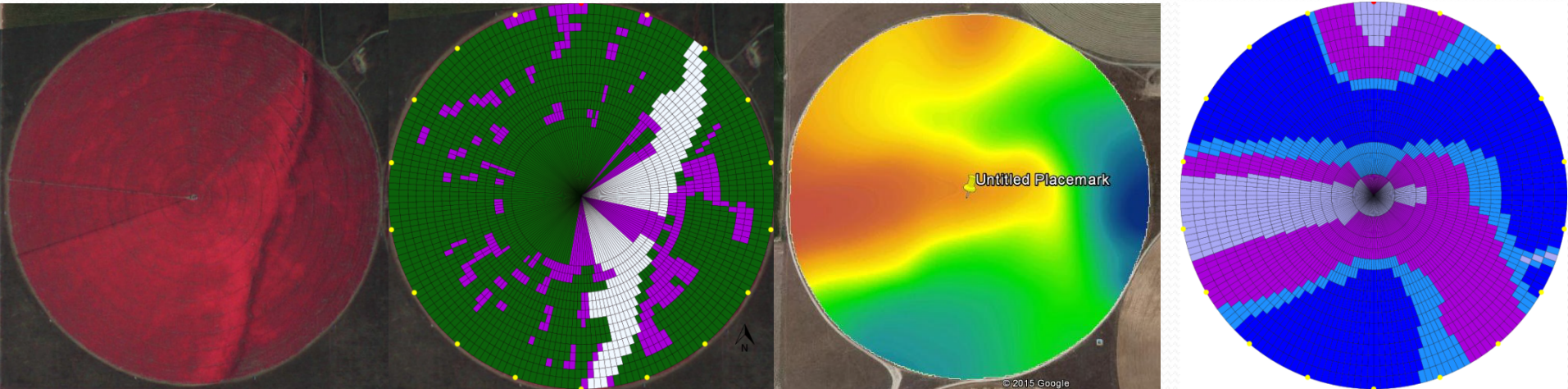
Center Pivot Drag hoses

- Center pivots can be retrofitted to push water through small drag hoses. These hoses drag over the top of the crop or on the ground
- This eliminates much of the loss from wind or evaporation.
- Not a good choice for every crop. In onions for example, the drag hoses would spread diseases from one plant to another.



Variable Rate Irrigation

- Allows producers to write prescriptions for very small zones within a field.
- Helps to ensure that every acre of production is maximized by helping to control over watering or under watering.



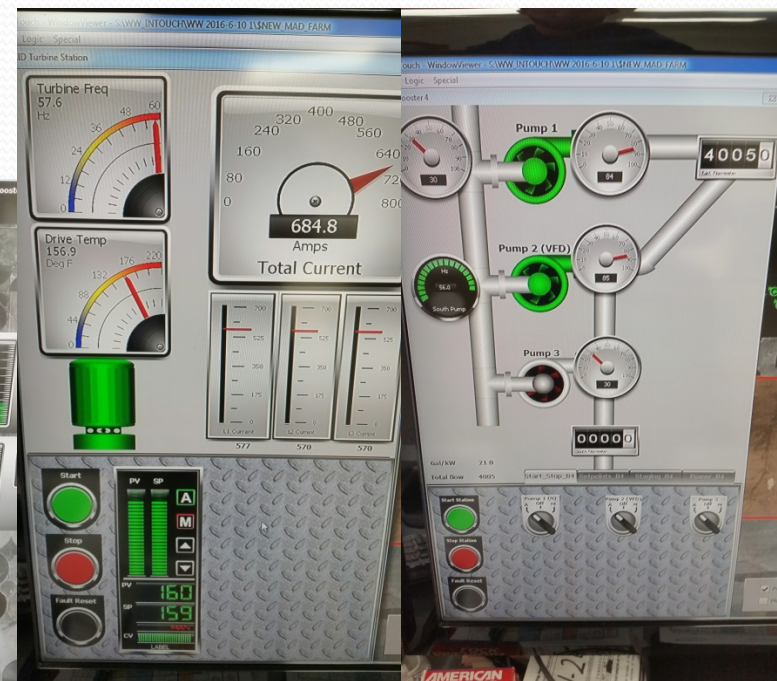
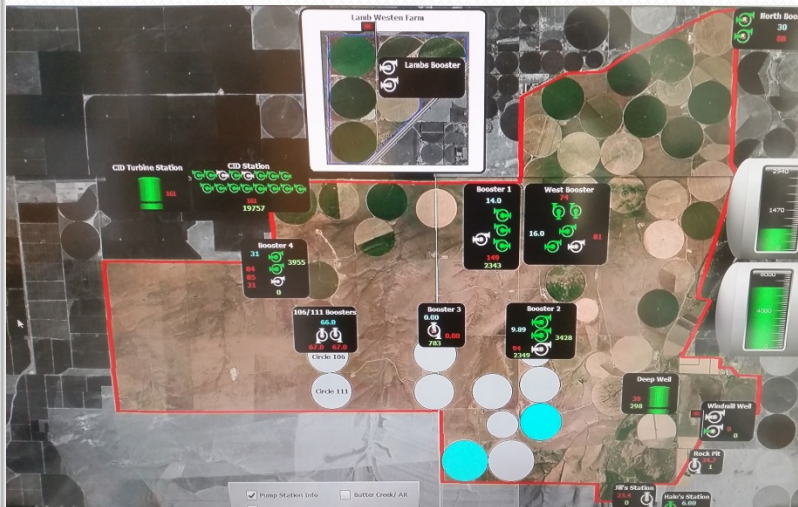
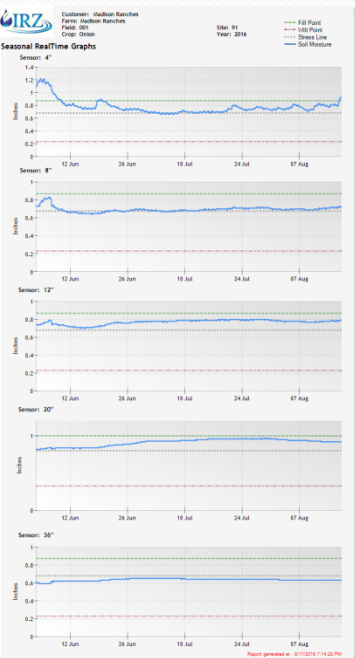
Sub Surface Drip Irrigation

- Uses same volume of water as an overhead irrigated crop, but produces up to 30% more onions.
- Slow adoption due to significant start up cost (\$1,200/acre) along with the struggle to find hand labor, and system maintenance.

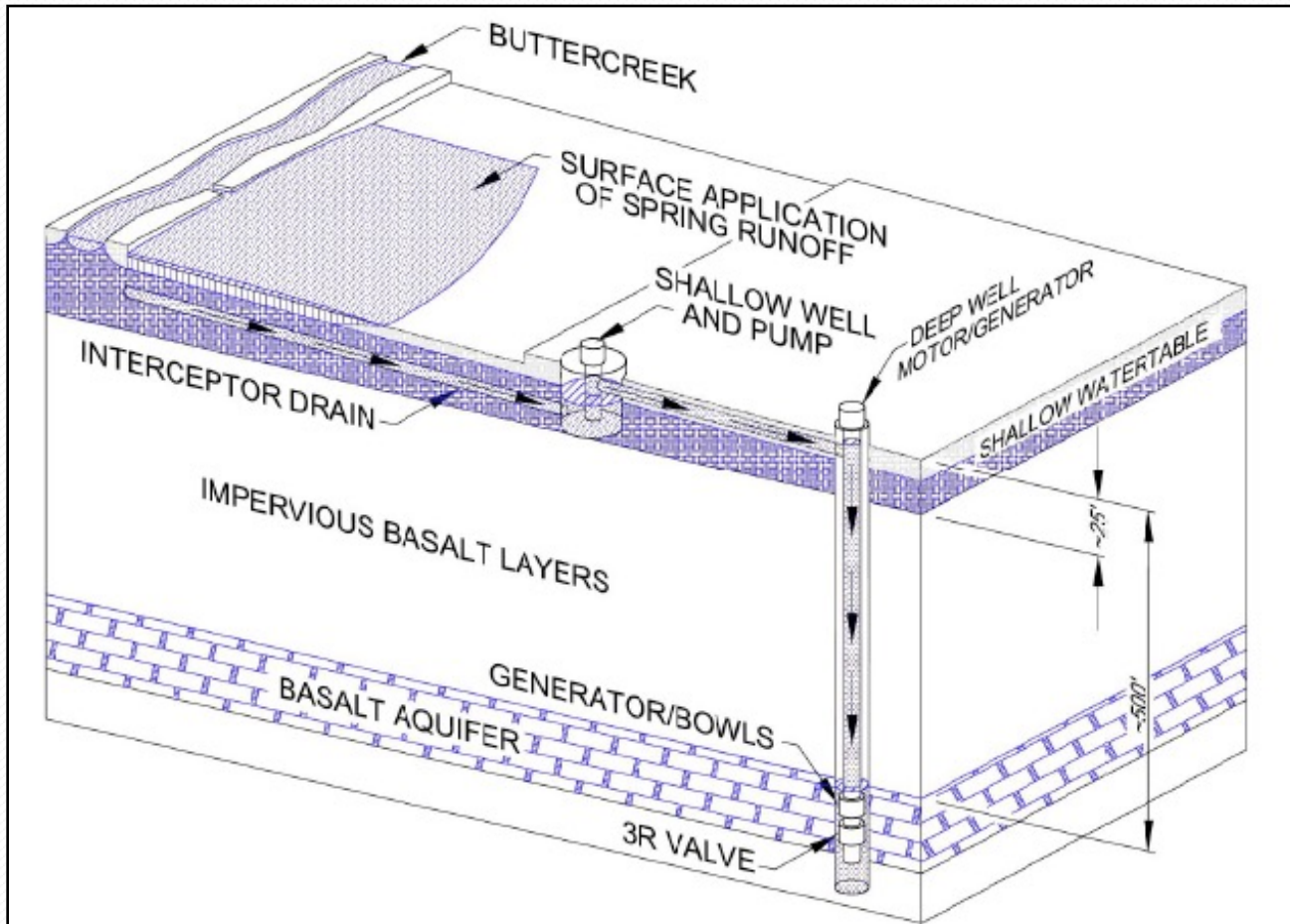


Better Science and Tec

- Weather stations, real time probes, neutron probes, and drone imaging for prescription irrigation.
- Soil samples and tissue samples for prescribed fertility.
- Real time info = real time decisions.



AR/ASR



Industrial Reuse Water For Ag

- Water from rivers or well used for industry.
- Data Centers, Power Plants, Ethanol plants.
- Food processors; cheese, potato, peas, beans, carrots, sweet corn, Organics.
- All produce a water byproduct that has value to the ag industry.

Benefits of land application of reuse water.

Ag Perspective

- Reliable water source. Year round, constant flow.
- Nutrient rich water resulting in reduced need for commercial fert.
- Allows for pre irrigating during the off season. Helping to preserve fresh river/well water.

Industry Perspective

- Least cost/carbon option compared to chemical treatment to discharge.
- Customer “green/sustainability” points.
- Can help put additional acres into production, increasing available acres for local process crops.

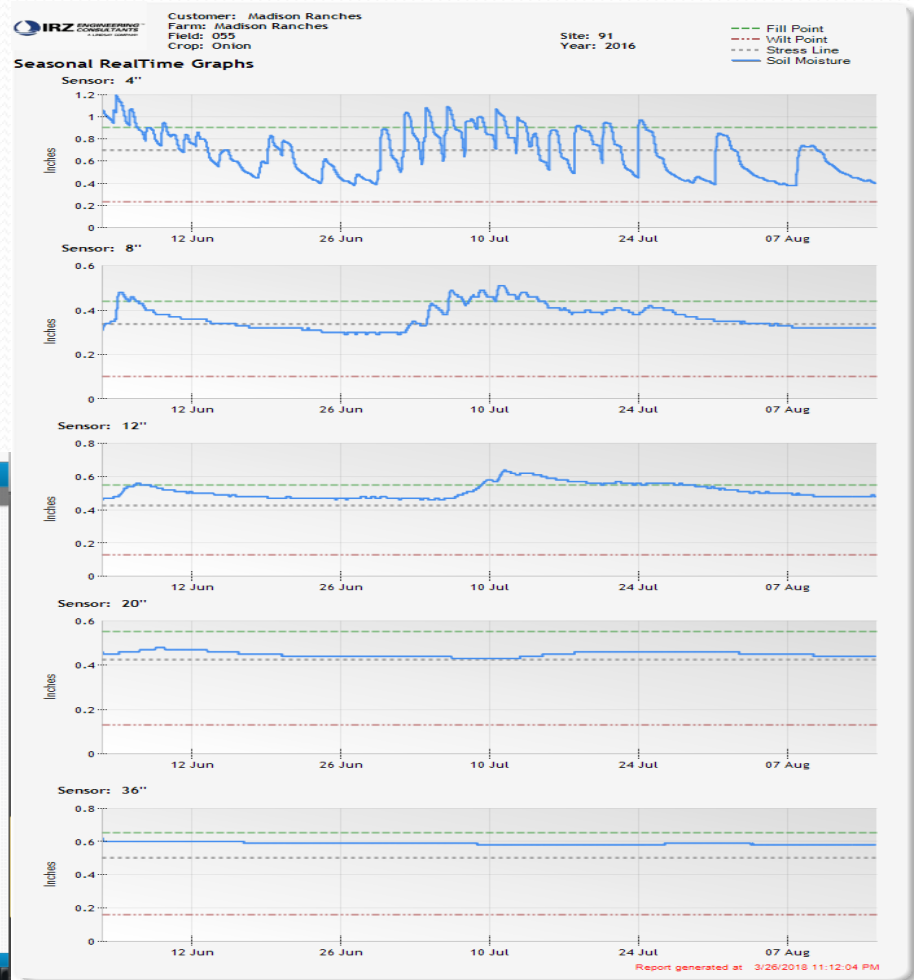
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> Real time information allows for quicker, more accurate decision making.

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Questions

Thank you for your time.

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