"I created a wetlands, I'm an expert in residue management, and I'm still having trouble making the dam ends meet!"

Field Drains

OUR UNKNOWN INFRASTRUCTURE

NORTHERN UTAH CONSERVATION DISTRICT

Fred Selman
Syd Fuhriman
Glenn Capener
Spencer Holmgren
Dennis Francom
Bud Theurer (Ret.)

Field Drains

What are they?

Who put them in?

Why we need them?

Were are they?

Reasons to map them.

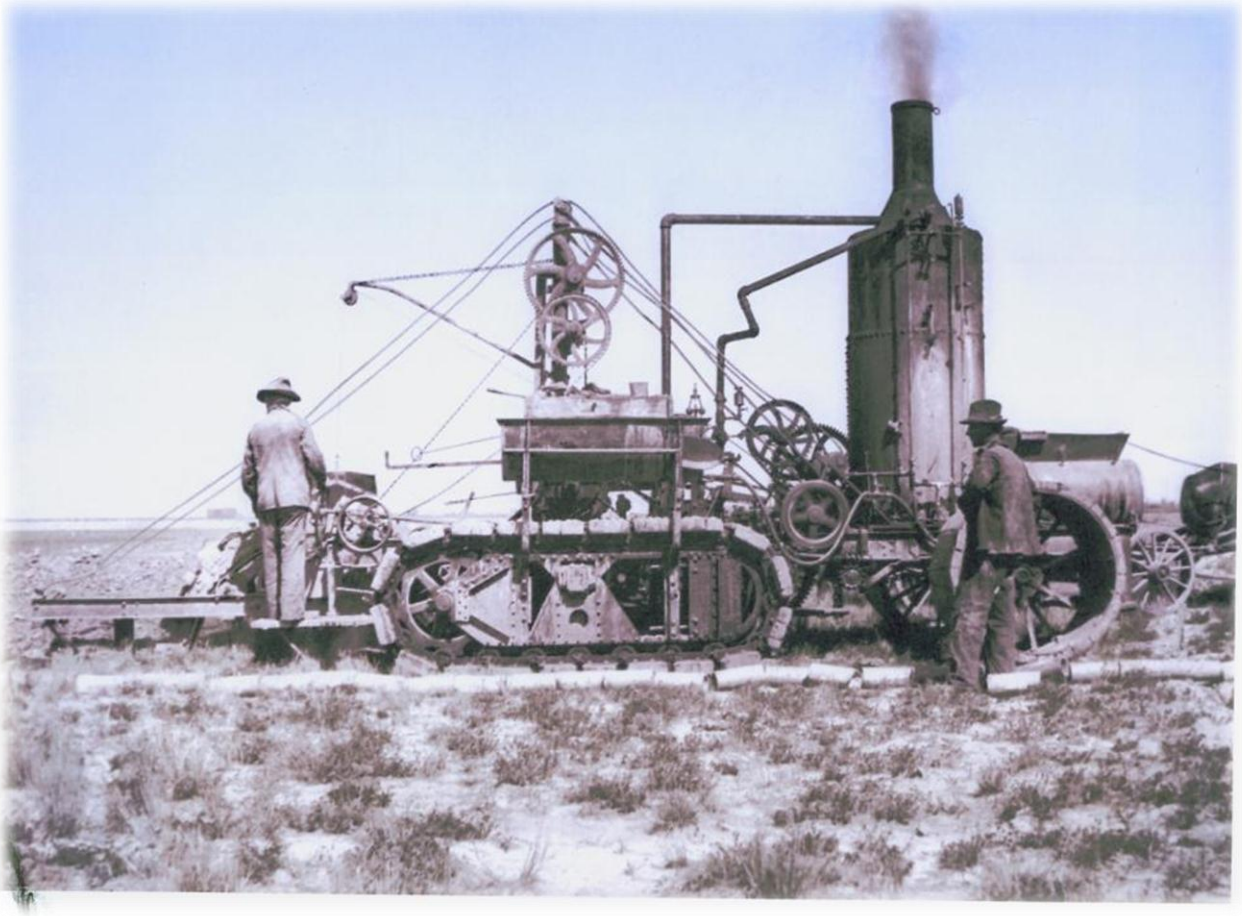


Photo courtesy of Adolph Reeder

Why Map Field Drains?

In the beginning…

- Loss of generational knowledge
- Keep agriculture land functional and productive
- Lack of consideration in development

After the beginning…

- Water quality
- Ruby Pipeline
- Irrigation return flows and BRMBR /'irrigation efficiency'
- Canal management plans
- USU research study
- Private engineering firms
- ???

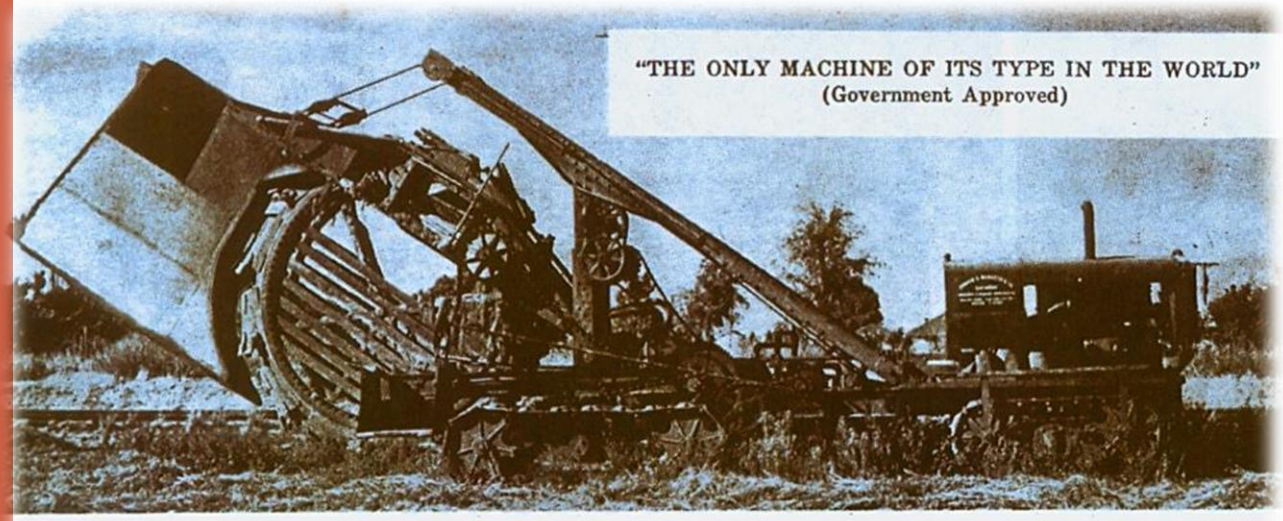
Project Funding

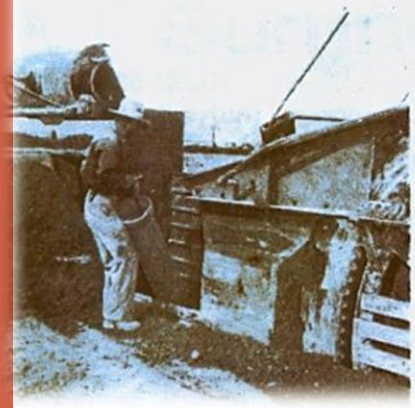
NRCS provided a Conservation Innovation Grant.

Cities/Drainage Districts contributed match money

People provided in-kind match

State of Utah Technical Assistance funding

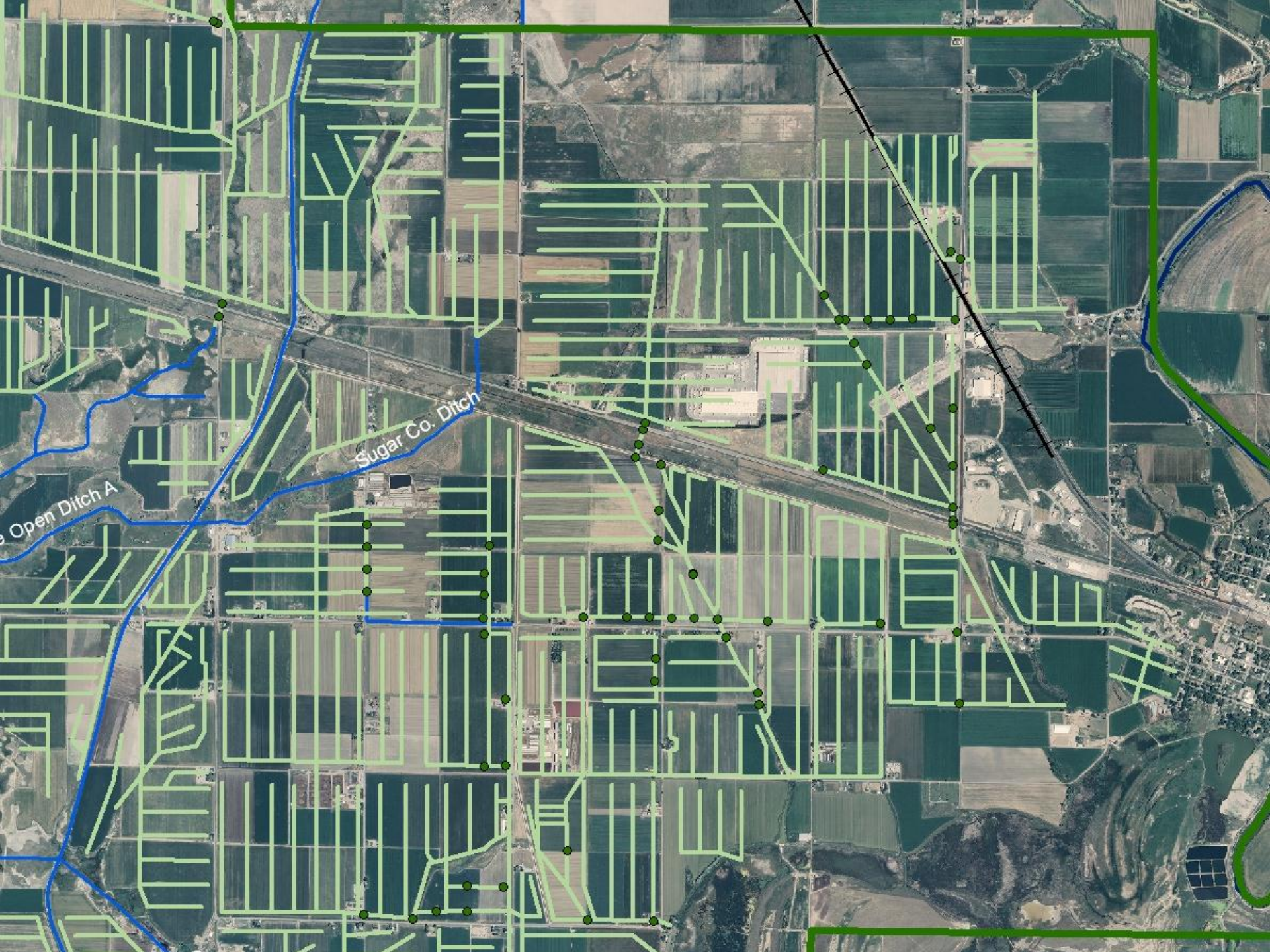




Top—Machine to dig trench, lay pipe and apply gravel filter in one operation is invention of the late Sumner G. Margetts. Device is manufactured at Layton shop.

At left—Arnold Anderson lowers length of clay pipe to Jack Stephens working in crib at bottom of trench. Hydraulic ram will insure precision fit and alignment.

At right—Gravel for filter envelope is dumped into gravity feed chute. Crew installed 8200 feet of pipe to lower water


Sugar Co. Ditch
e Open Ditch A

WE INSTALL DRAINS

Not only can we improve your ground, but we can make you a lot of money.

CALL FOR FREE ESTIMATE: (801) 363-3330 SLC

DRAINAGE—

our only business, to which we bring 60 years of trusted experience

UNDER DRAINAGE FOR (HIGH GROUND WATER AREAS)

Airports • Subdivisions • Golf Courses • Recreation Sites • • Farms • Building Sites for Warehouses, Hospitals, Schools, Churches • Drainage Districts • State & County Roads • Municipalities

Work methods approved by Government Agencies

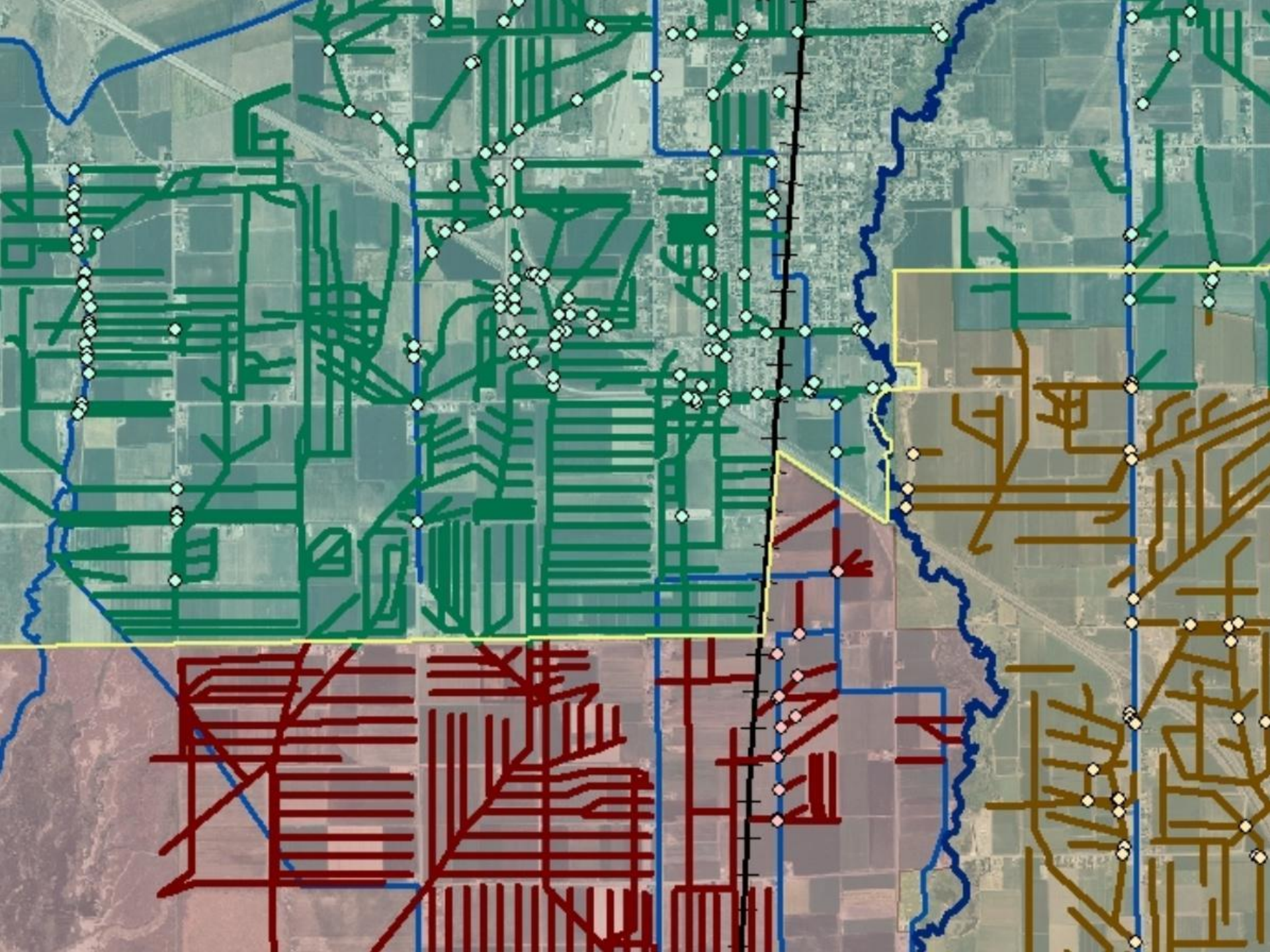
Sumner G. Margetts Company

'DRAIN THE LAND, USE THE WATER'

Local Firm Has Remedy for Areas of High Ground Water.

Subdivision Stabilized by Underdrainage

Dewatering System Developed by Sumner G. Margetts Corporation Gives New Buoyancy To Waterlogged Residential Real Estate



Cinderella

Snow White

The Little Mermaid

Places Involved

Elwood City

Belmont Drainage District

Tremonton/ Garland Drainage District

Tremonton City

Garland City

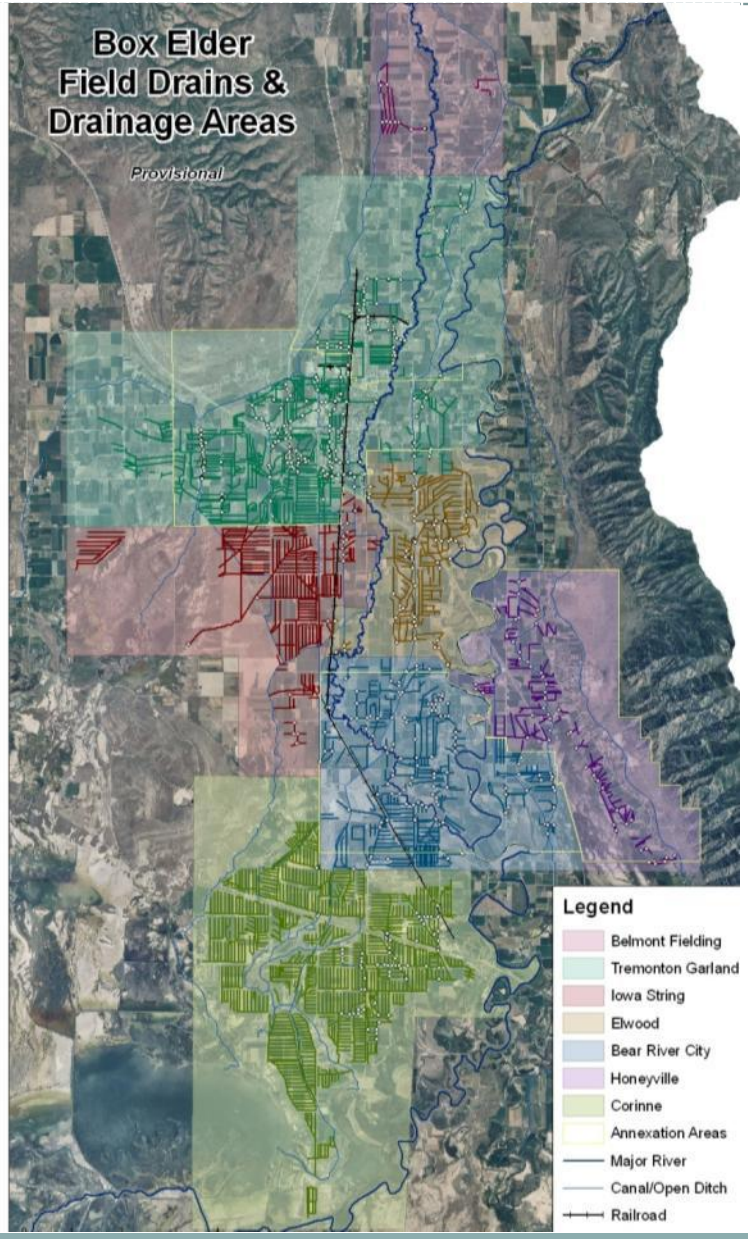
Iowa String Drainage District

Corrine Drainage District

Bear River City

Honeyville City

Lewiston & Nibley (Cache County)

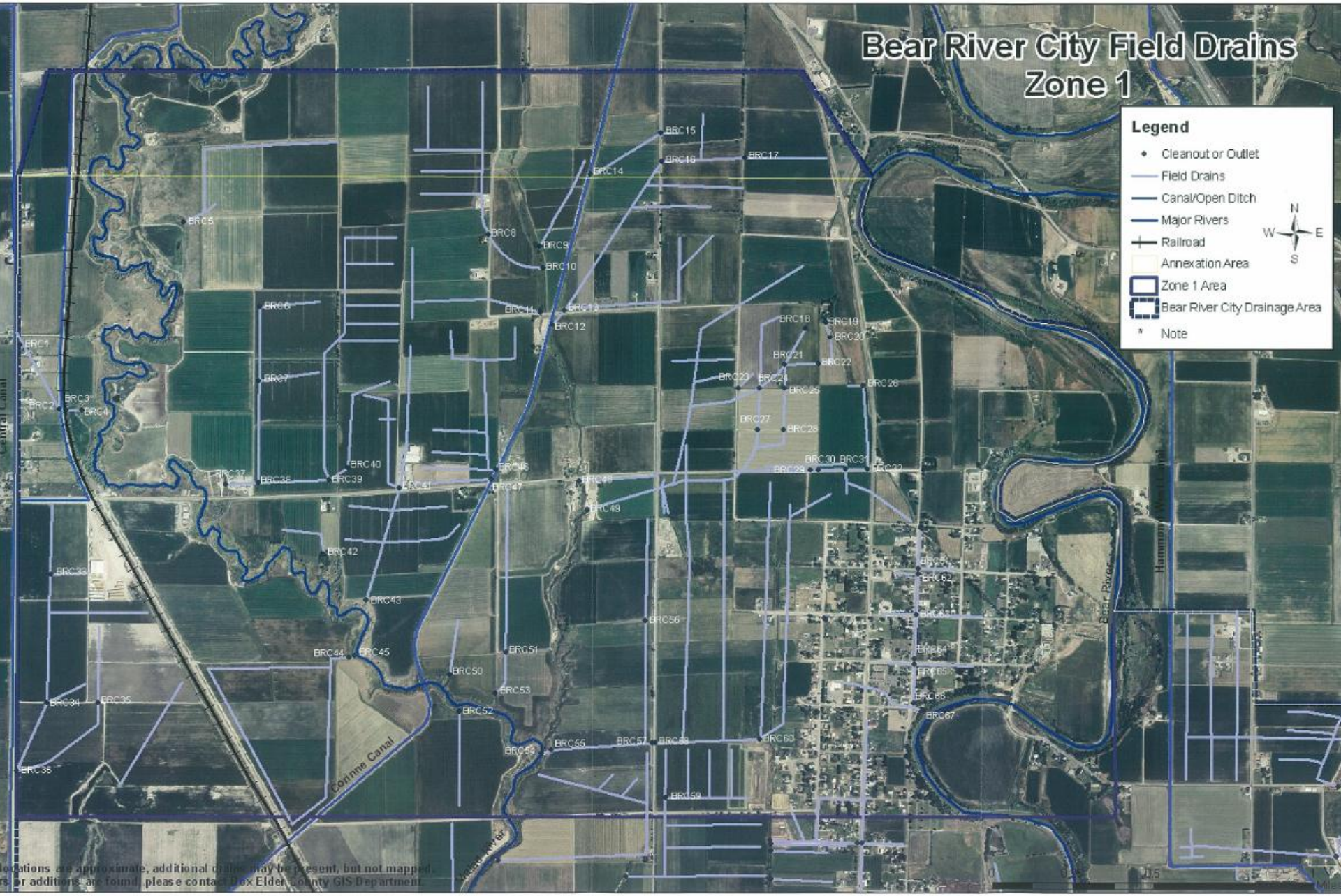


People Involved

Mapping Technicians. (Thayne Mickelson, Danny Mcbride, Taylor Payne, and Clint Hill)

City/Drainage District Officials

In-kind match personnel (Local Landowners/Residents)


Bear River City Field Drains
Zone 1
Legend
Cleanout or Outlet
Field Drains
Canal/Open Ditch
Major Rivers
Railroad
Annexation Area
Zone 1 Area
Bear River City Drainage Area
Note
N
W
E
S
Bear River
Hammond Canal
Conine Canal
BRC1
BRC2
BRC3
BRC4
BRC5
BRC6
BRC7
BRC8
BRC9
BRC10
BRC11
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1.5
Mi
locations are approximate, additional drains may be present, but not mapped.
rs or additions are found, please contact Box Elder County GIS Department.

Bear River City Zone 1

Point #	LAT.	LONG.
BRC-1	41.630287	-112.178323
BRC-2	41.627388	-112.175953
BRC-3	41.627381	-112.175473
BRC-4	41.62739	-112.174539
BRC-5	41.635967	-112.168517
BRC-6	41.632169	-112.163945
BRC-7	41.628801	-112.163887
BRC-8	41.635567	-112.150198
BRC-9	41.635078	-112.147094
BRC-10	41.634107	-112.146851
BRC-11	41.632102	-112.146943
BRC-12	41.631545	-112.146307
BRC-13	41.632172	-112.145518
BRC-14	41.638421	-112.144092
BRC-15	41.640273	-112.139885
BRC-16	41.639005	-112.139847
BRC-17	41.639226	-112.134761
BRC-18	41.631531	-112.13102
BRC-19	41.631734	-112.129811
BRC-20	41.631149	-112.129536
BRC-21	41.629902	-112.132228
BRC-22	41.629968	-112.130212
BRC-23	41.628816	-112.134978
BRC-24	41.628776	-112.133628
BRC-25	41.628833	-112.132216
BRC-26	41.628948	-112.127444
BRC-27	41.626919	-112.133756
BRC-28	41.626931	-112.132209
BRC-29	41.625202	-112.1306
BRC-30	41.625195	-112.130083
BRC-31	41.625218	-112.128414
BRC-32	41.625247	-112.127083
BRC-33	41.619947	-112.176287
BRC-34	41.614146	-112.176359
BRC-35	41.614168	-112.173264
BRC-36	41.611044	-112.17811
BRC-37	41.62414	-112.165759
BRC-38	41.624267	-112.163772
BRC-39	41.6244	-112.159564
BRC-40	41.624982	-112.158413
BRC-41	41.624099	-112.155292

Bear River City Zone 1

BRC-1 *Lat.* 41.630287 *Long.* -112.178323

BRC- 2 *Lat.* 41.627388 *Long.* -112.175953

BRC-3 *Lat.* 41.627381 *Long.* -112.175473

BRC-4 *Lat.* 41.62739 *Long.* -112.174539

BRC-5 *Lat.* 41.635967 *Long.* -112.168517

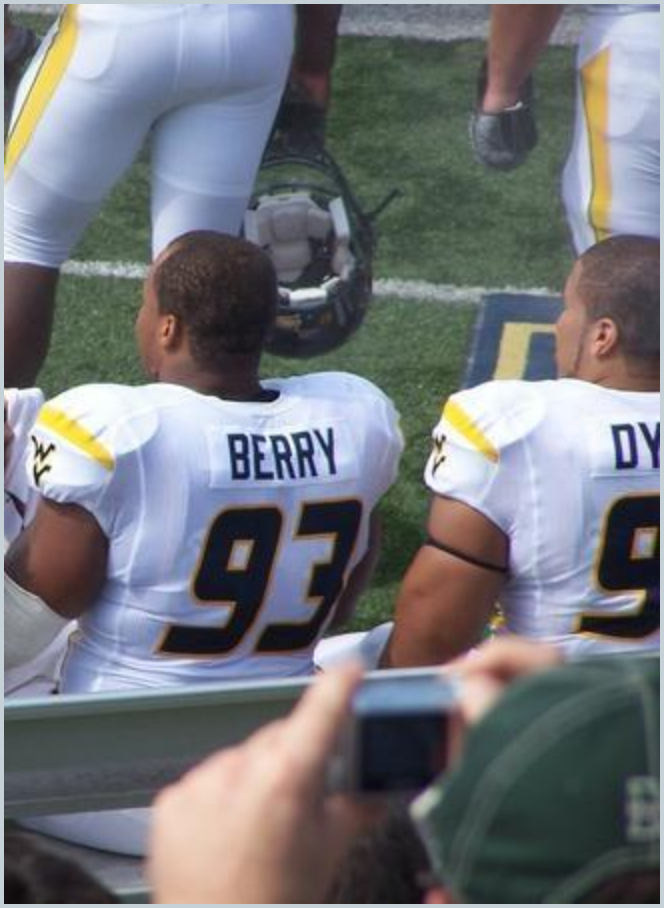
BRC-6 *Lat.* 41.632169 *Long.* -112.163945

Mapping

- Talking to Land owners and everyone else. (personal interviews)
- Taking GPS points on all cleanouts, outlets and other points of interest.
- Looking physical identifiers of drains (plant growth, drying patterns, seepage, and others).
- Looking at aerial photography.

Personal Interviews

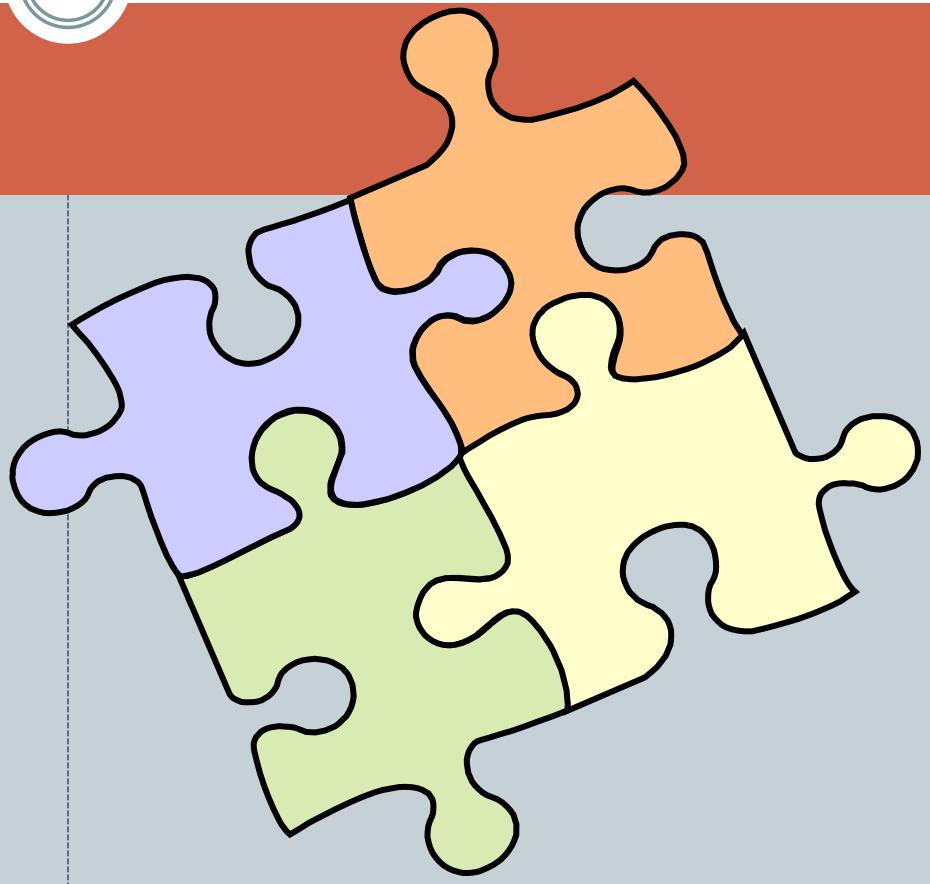
DINGLE
92


BERRY
93

DINGLE
92
BERRY
93

Putting the pieces together

- Personal Interviews
- Physical Identifiers
- Aerial Photography
- Cleanouts
- Outlets
- Other Clues



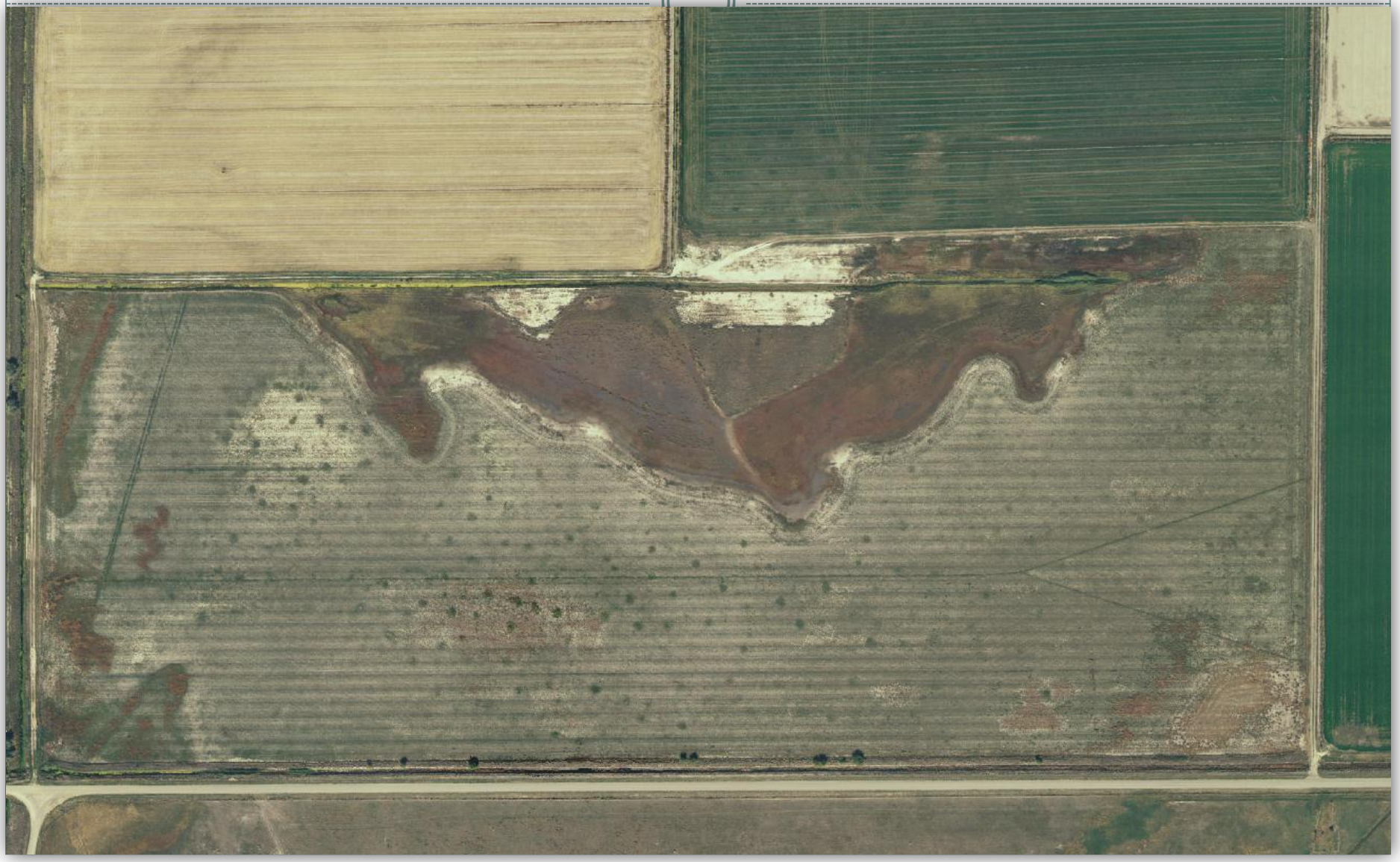
Physical Identifiers

Plant Growth Patterns

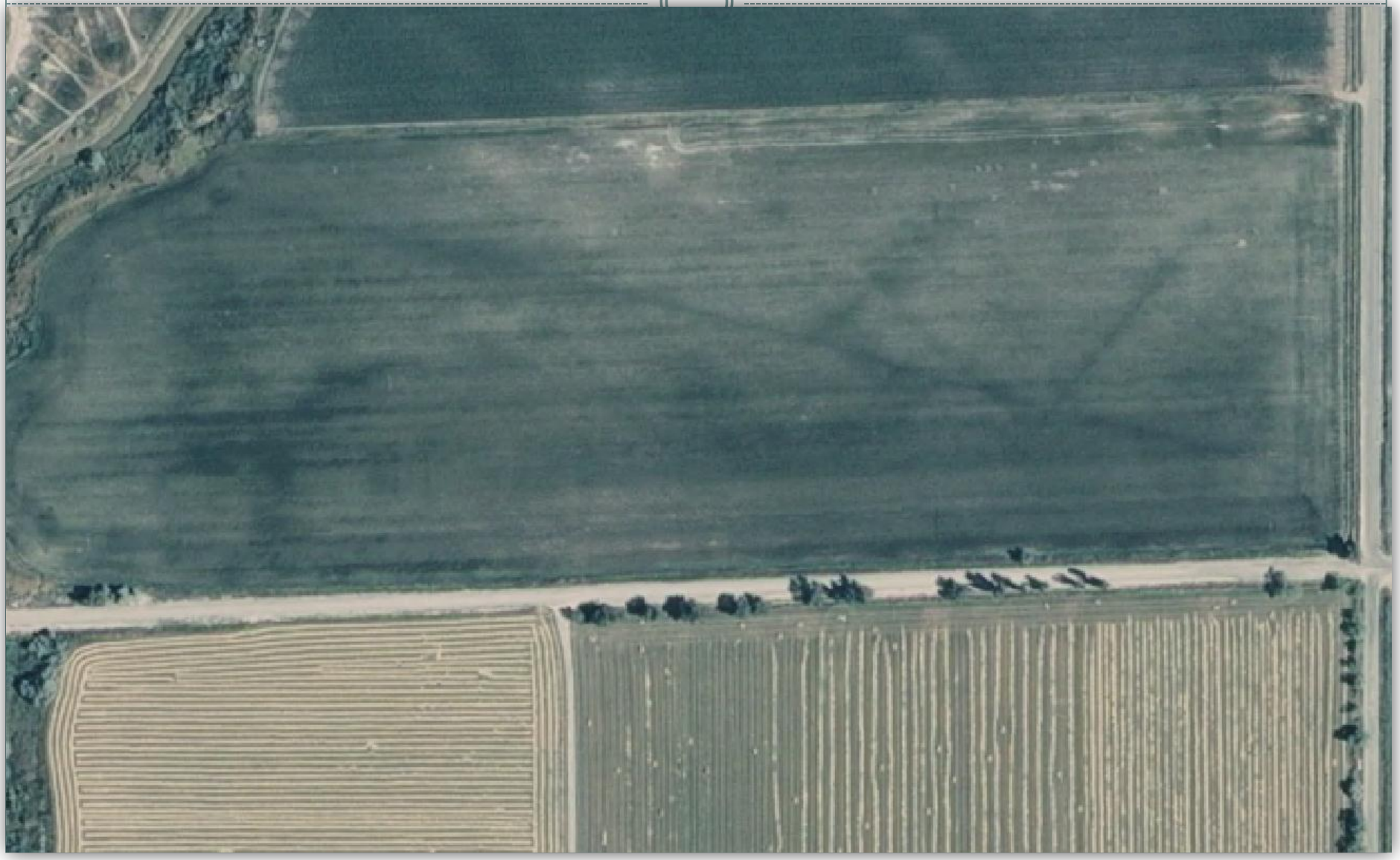
Seepage

...a picture taken at just the right moment

Aerial Photography



Aerial Photography



GPS Points

Cleanouts

Outlets

Cleanouts

Outlets

Tile

Cement

Metal

Plastic

Sink Holes

Water Quality

Ecoli Testing

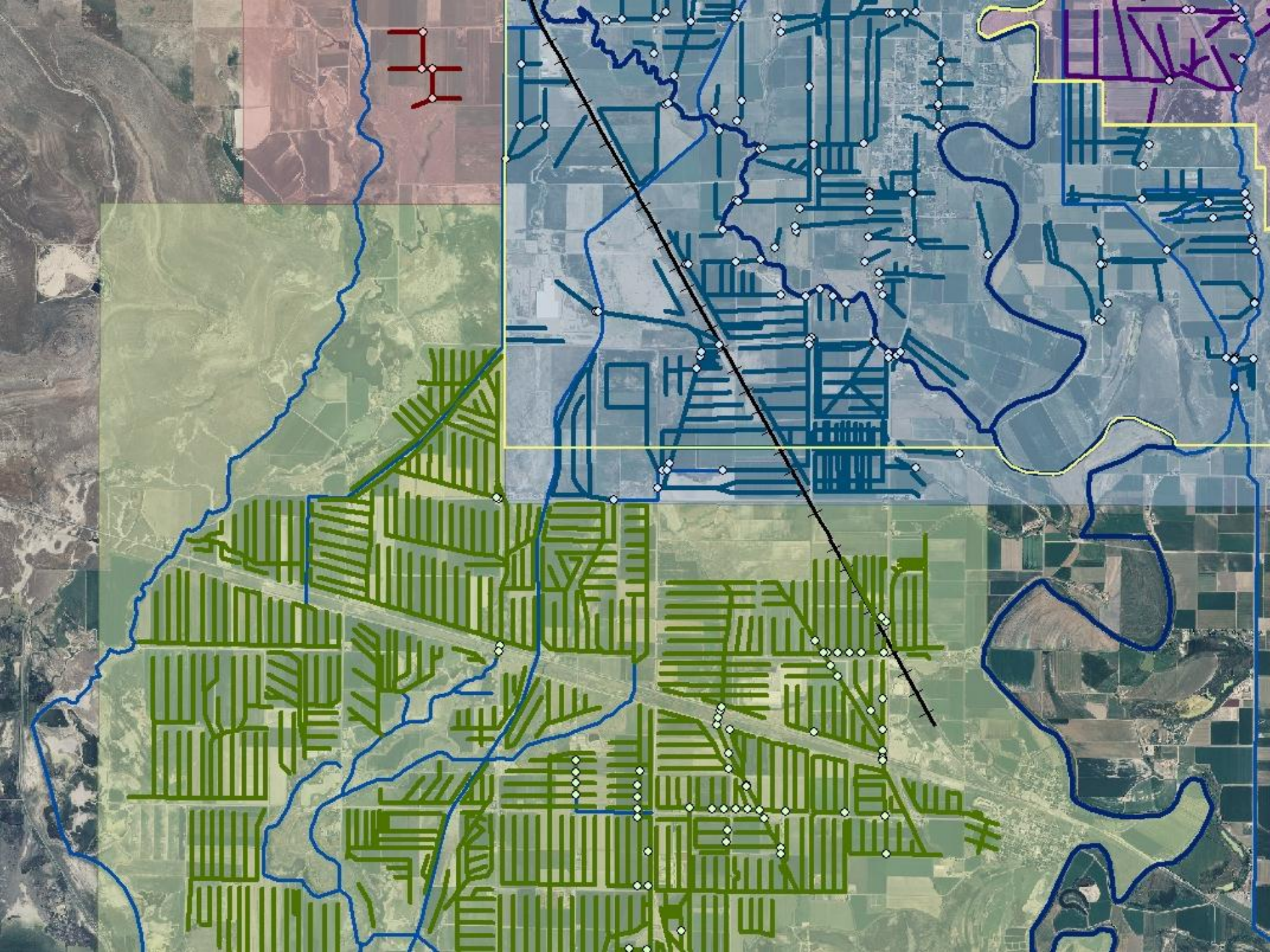
- Out of the 7 samples tested:
  - 5 tested positive for ecoli
  - 2 of the drains were very high in ecoli, one even had too many to count.

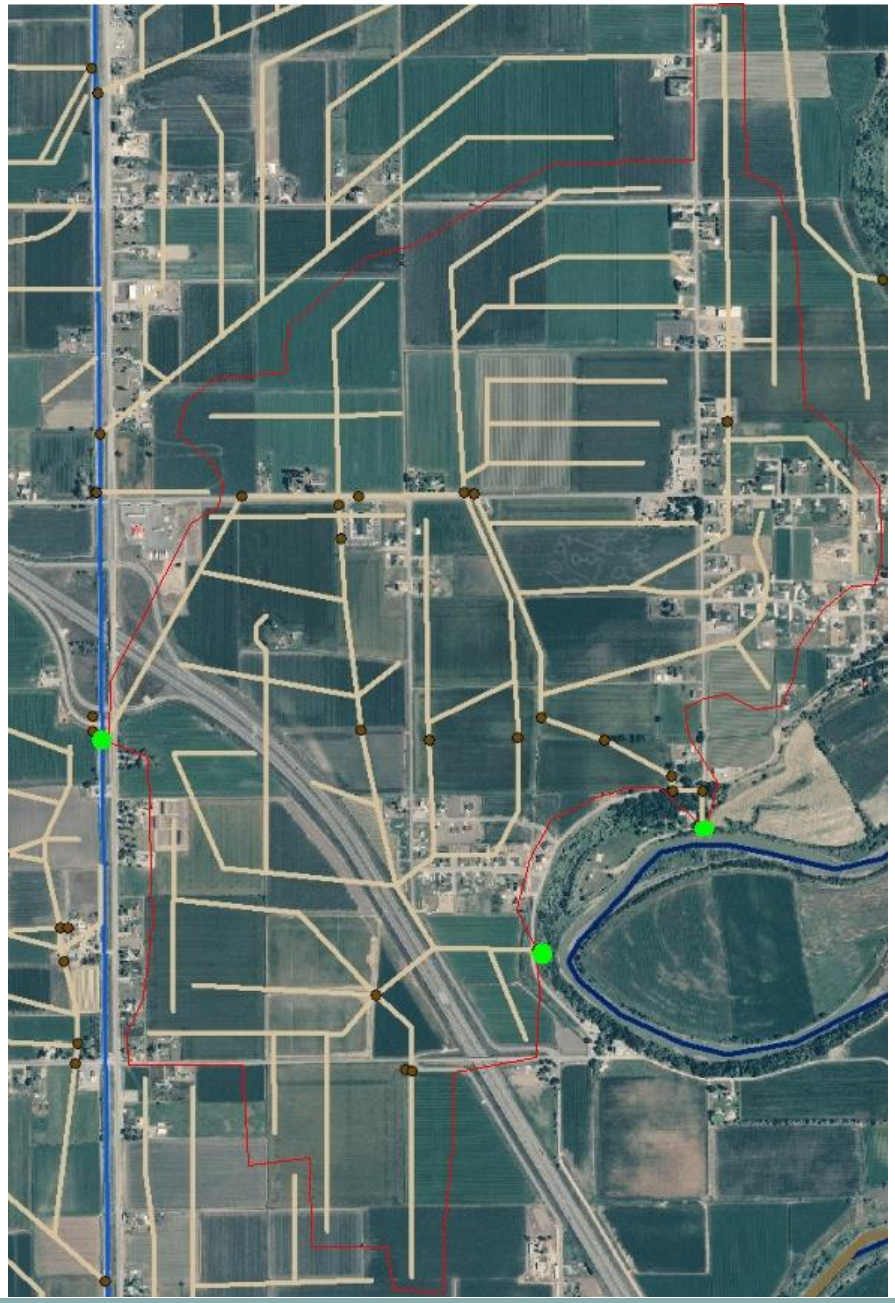
Optical Brighteners

- Optical brighteners present if detergents are present (septic)
  - Out of the five tubes two had slight hits.
  - One lit up like the fourth of July.
  - Two others were non-detects.

Optical Brighteners - The Equipment

Under the Black Light

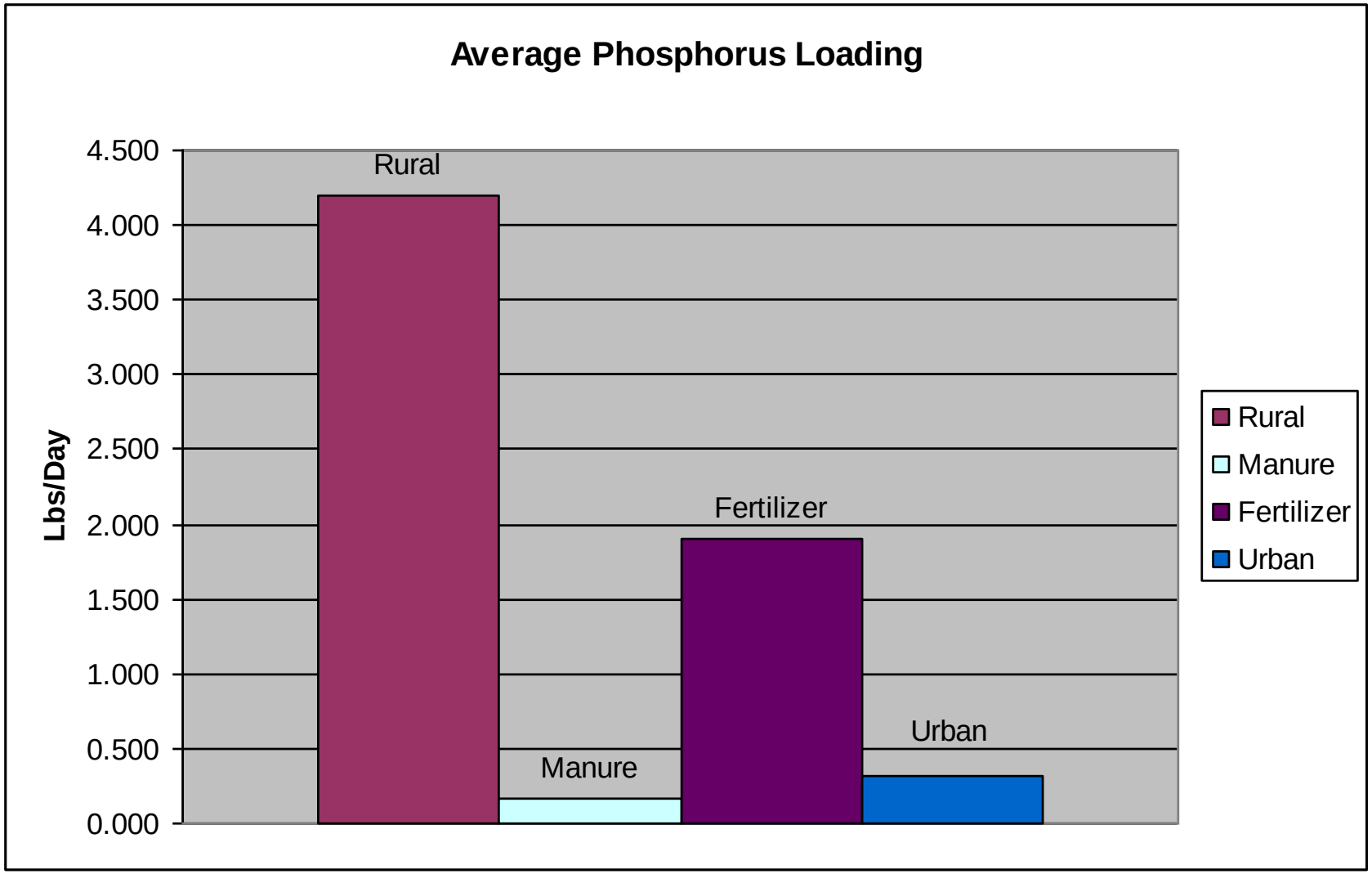




Water Quality and Field Drains

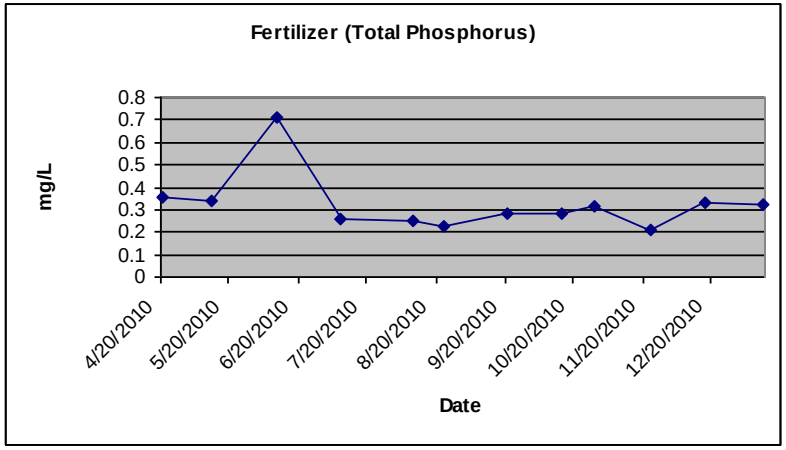
- Recently the State Division of Water Quality has been trying to identify possible sources of Phosphorus loading to the Bear River.
- High phosphorus concentrations have been found in the field drains.
- What is the cause of this loading?

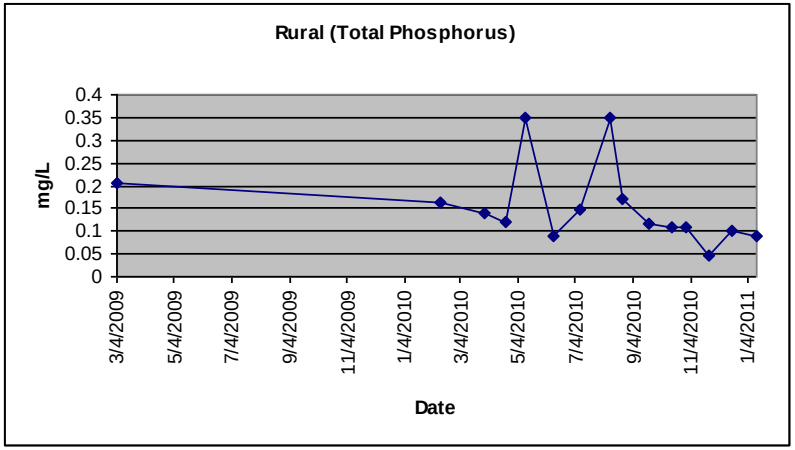
Current Results



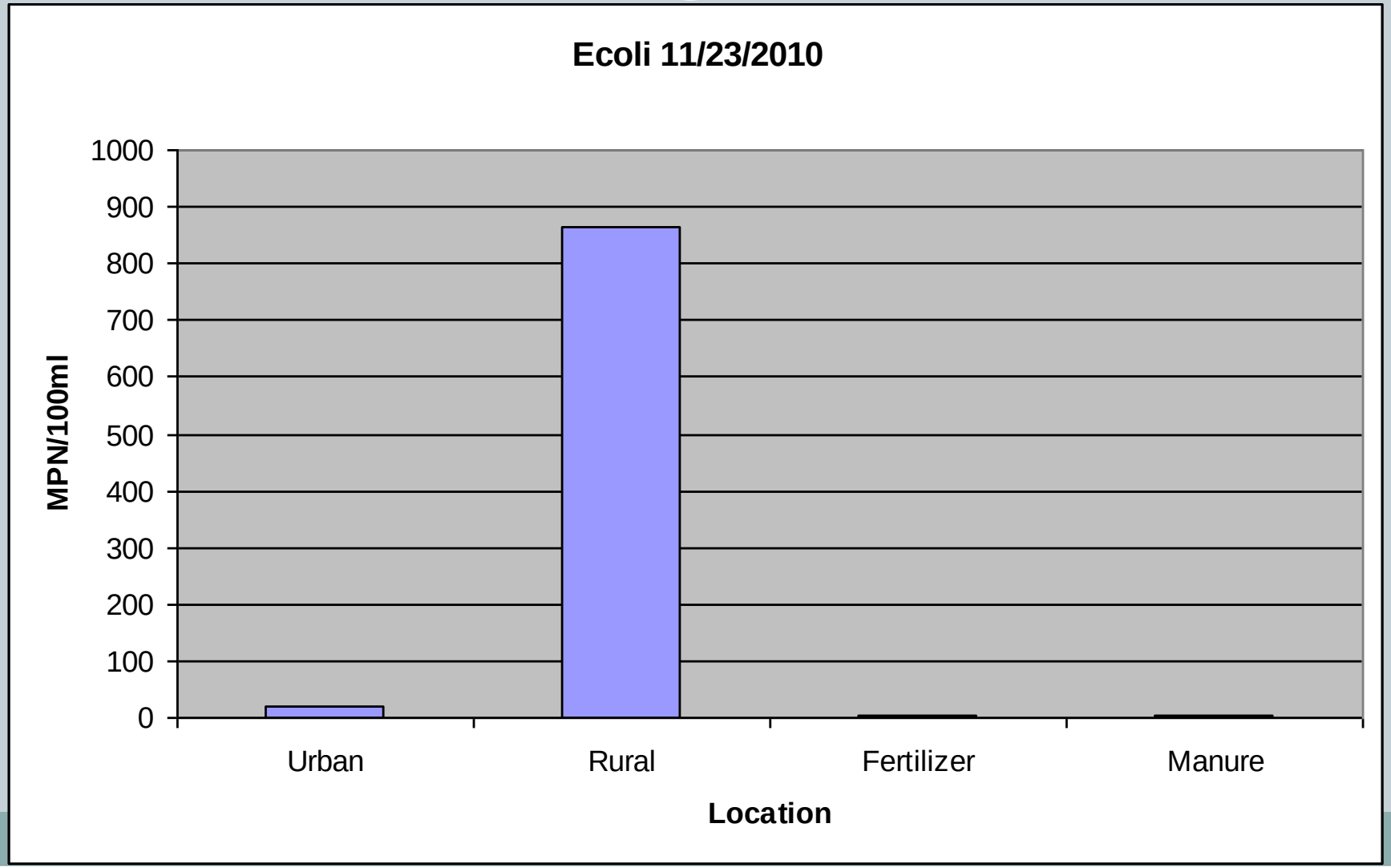
Findings

- Phosphorus loading tends to peak in all drains from the end of August to October.
- In the two years of data a large spike in Phosphorus concentrations has been observed at the beginning of irrigation season, but then concentrations drop. (Nutrient Management?)
- Patterns in the data are not as predictable in the drains with septic influence.

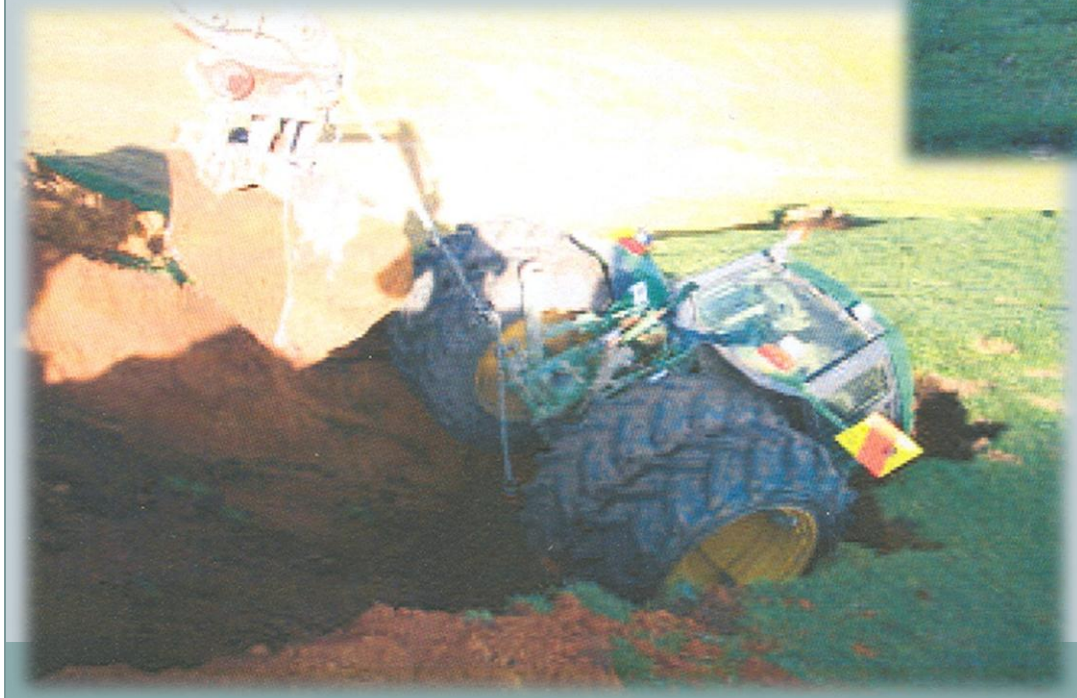




E.coli Results



Conclusions

- Septic systems are obviously impacting the water quality leaving the drains in rural areas. This is supported by optical brightener tests and MST samples.
- However, additional data analysis is required to better understand the sources of the phosphorus concentrations.
- Nutrient management, Improved irrigation, and other conservation practices may also help improve the water leaving the drains.
- USU will continue monitoring drains to help determine the sources of the contaminants. (soil testing, additional MST testing, ect.)

Questions?