

# Establishment of Groundwater Well Site at Ira and Reatha T. Post Sanctuary Site (Vishnu Springs)

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# Vishnu History

- Documented back to 1880 when a doctor promoted as medical spring
- Hotel built 1889
  - post office
  - restaurant
- Windmill pumped water to hotel and surrounding houses
- Goldfish pond feed by spring

Source: Marla Vizdal, WIU Alumni Assoc. webpage







(Photo by L. Dean, October, 2007)





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# Ira and Reatha T. Post Sanctuary Site

- Well #1  
West of Hotel
- Well #2  
Near Vishnu Spring
- Well #3  
Uplands Prairie





# Drilling Wells with Giddings





# Drilling Wells with Giddings





# Well Establishment

- Construction
  - 5 foot screen at bottom
  - Silica sand used as filter media
  - Capped with bentonite clay
- Develop wells





# Well #1 (west of hotel)

- Total Depth  
8.01 ft.
- Hit sandstone bedrock
- Bore sample taken





# Bore Sample

- Textures
  - Mostly sandy clay loam with small amount of silty clay and loamy sand at bottom
- Colors determined using Munsell color chart
  - Varied from dark brown (3/2 7.5YR) to very dark grayish brown (3/2 10YR)





# Well #2 (near Vishnu Spring)

- Total Depth  
7.61 ft.
- Created  
Artesian Well





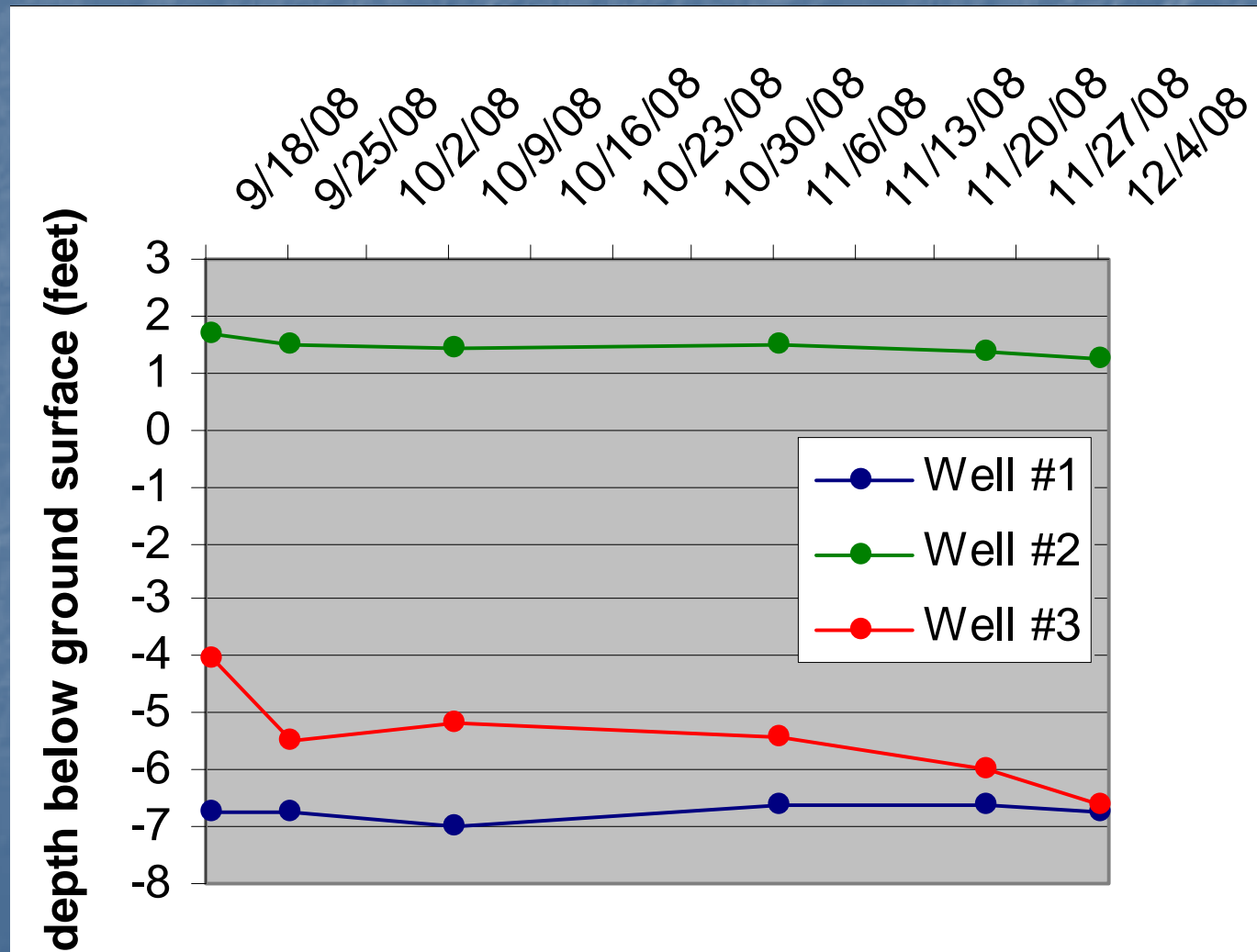
# Well #3 (upland prairie)

- Total Depth  
16.27 ft.
- Deepest Well Drilled





# Water Levels Below Surface





# Slug Tests

- Performed slug-in and slug-out tests
- Use laptop computer and pressure transducer
- Slug volume  $430 \text{ cm}^3$
- 3 minute tests:
  - first 10 sec. measure every 0.1 sec.
  - next 30 sec. measure every 1 sec.
  - next 60 sec. measure every 2 sec.
  - last 80 sec. measure every 4 sec.

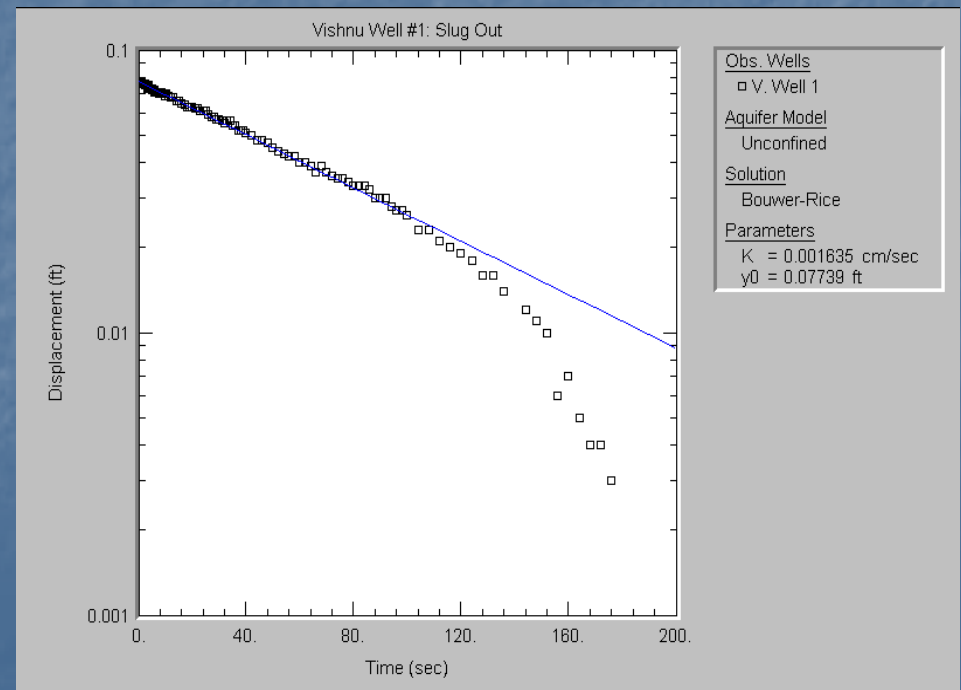
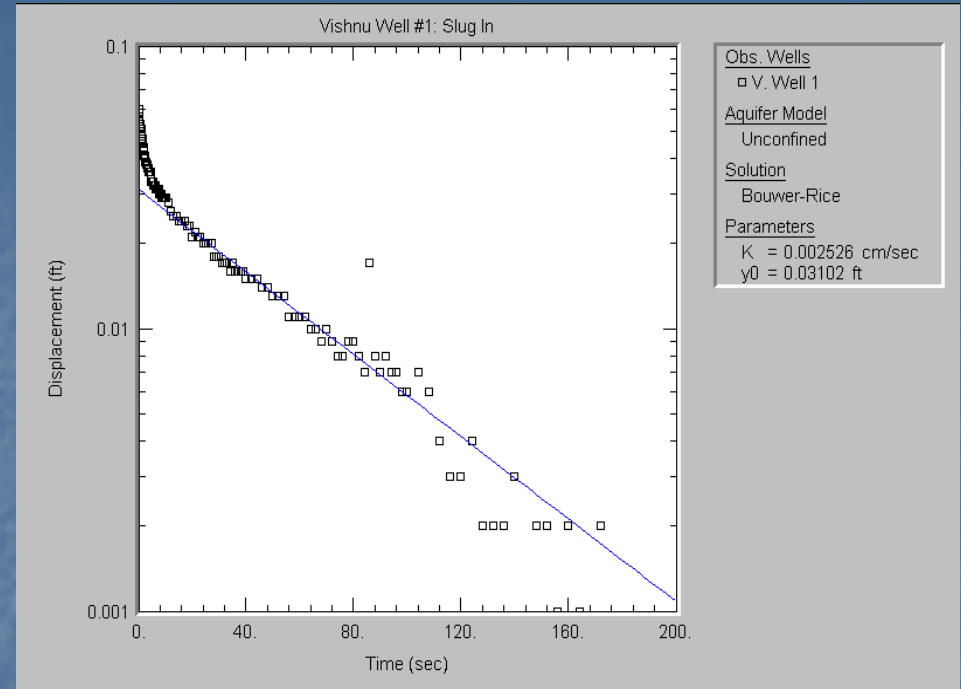


pressure transducer



# Slug Test Well #1

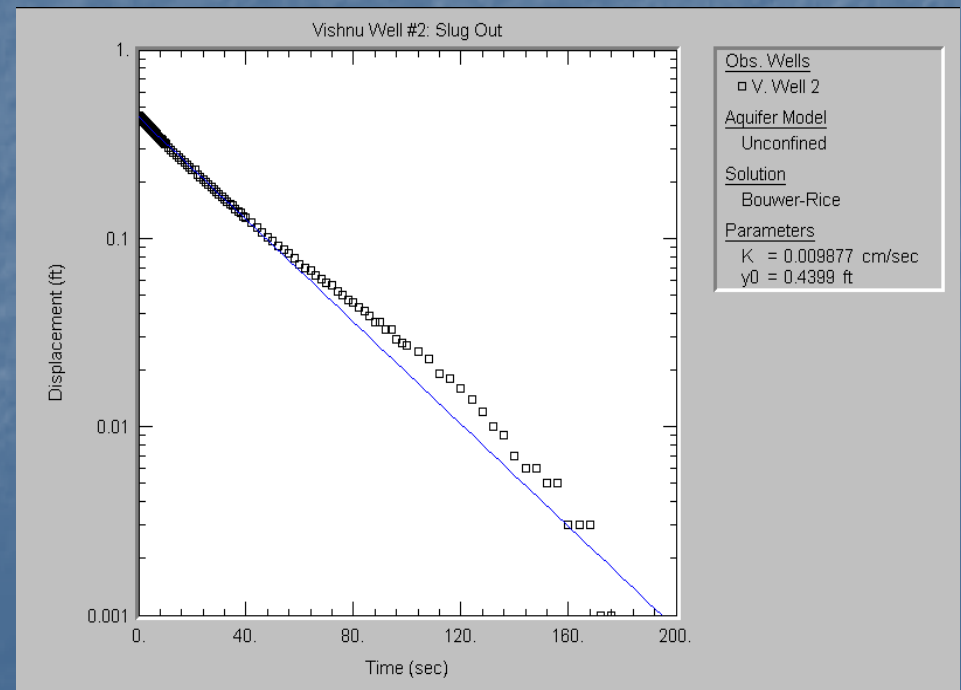
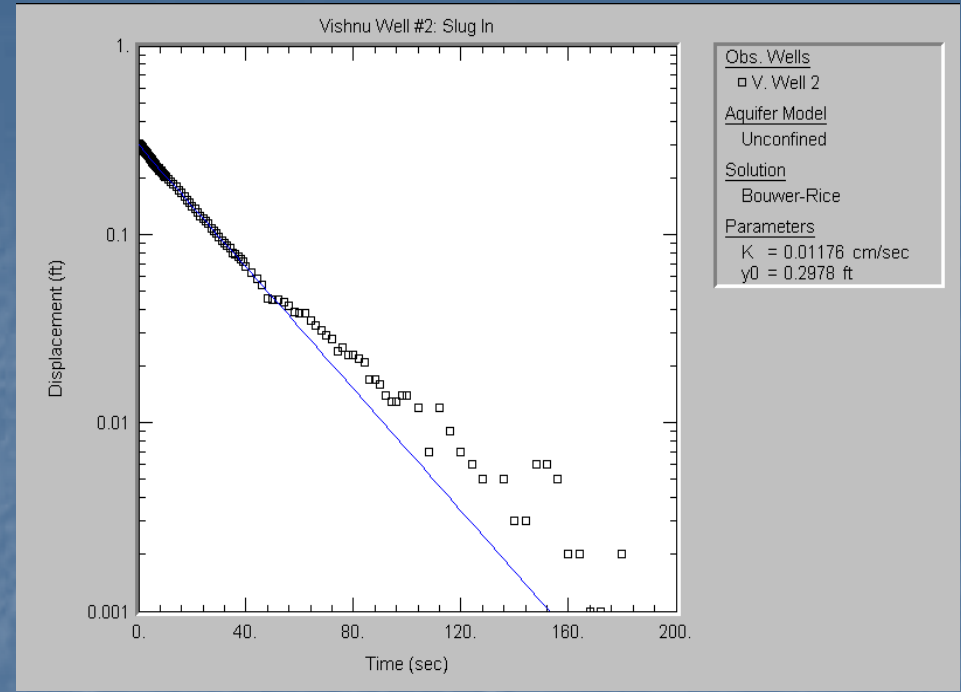
- All slug tests analyzed with Bouwer-Rice Method using AQTESOLV program
- Average hydraulic conductivity (K) .0021 cm/sec





# Slug Test Well #2

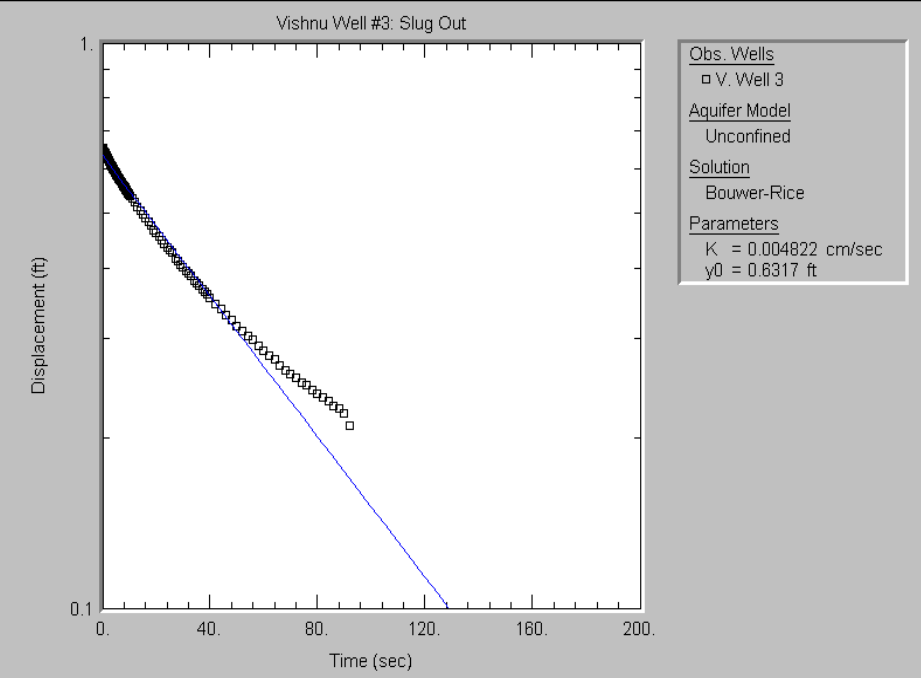
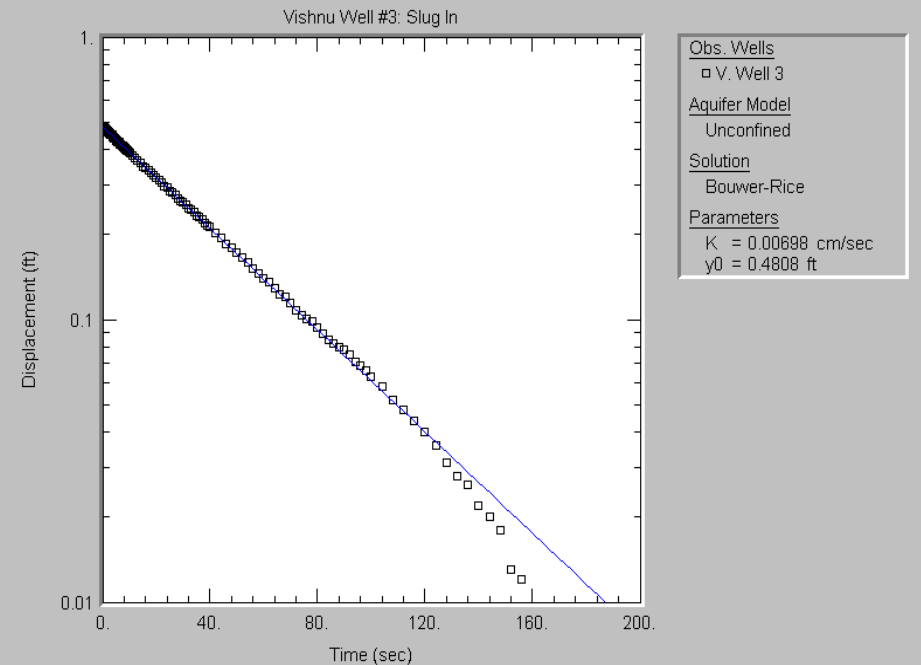
- Avg. (K)  
.011 cm/sec





# Slug Test Well #3

- Avg. (K)  
.0059 cm/sec



# Hydraulic Conductivity Summary

	Slug-in	Slug-out	Average
Well #1	0.002526	0.001635	0.0021
Well #2	0.01176	0.009877	0.011
Well #3	0.00698	0.004822	0.0059

Units measured in cm/sec.



# Water Chemistry: Field Measurements

	Temperature (C)	pH	Conductivity ( $\mu\text{S}/\text{cm}$ )	TDS (mg/L)	DO	
					%	(mg/L)
Well #1	15.7	6.74	602	358	55	5.05
Well #2	13.1	7.1	530	331	19.7	2.04
Well #3	17.3	6.6	444	254	40.2	3.7
Pond	12.1	7.09	530	331	15.1	1.7
Stream	13	7.72	530	331	90	9

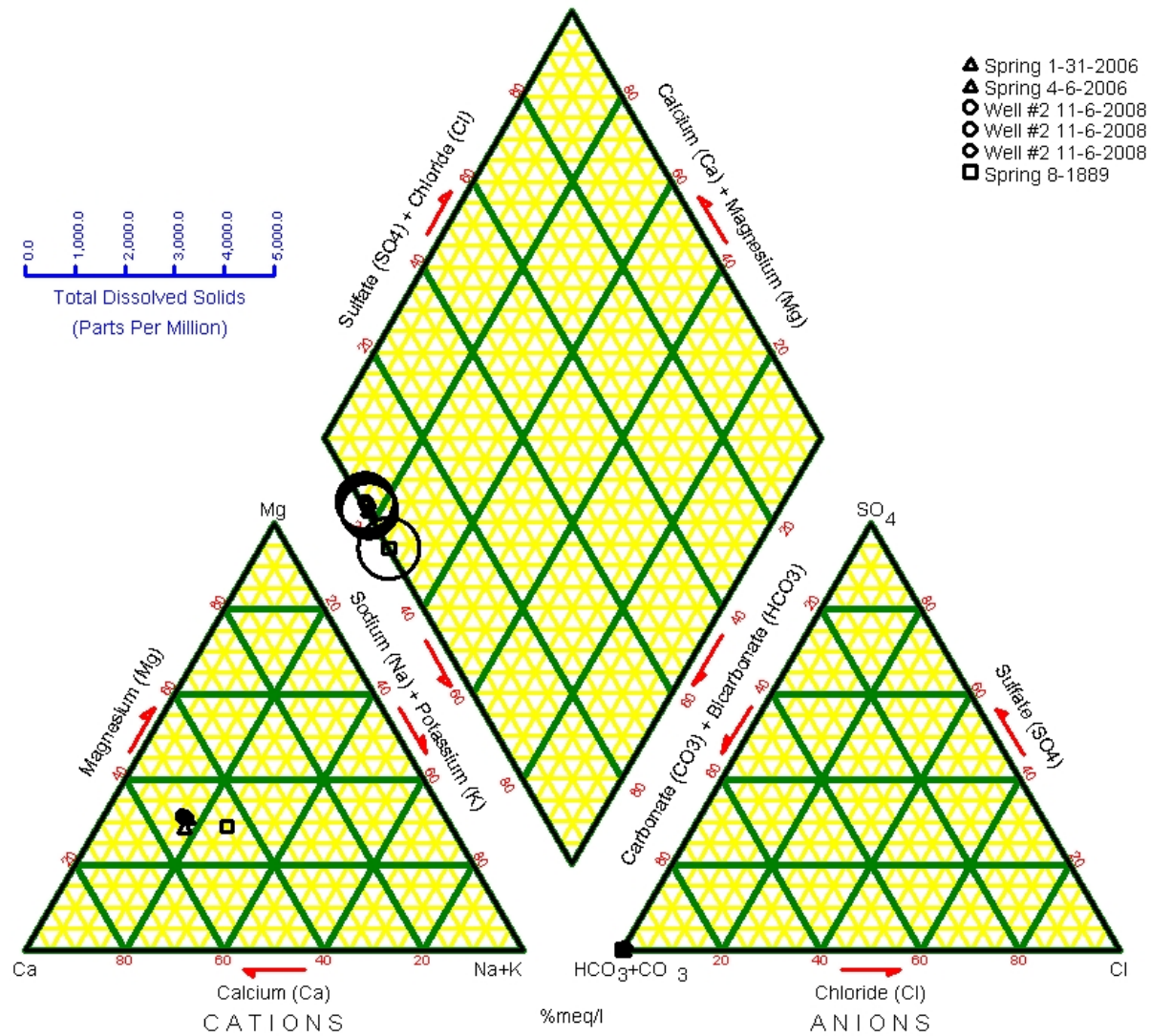
# Water Chemistry: Lab Analyses

Location	Date	Na	K	Ca	Mg	HCO <sub>3</sub>	CO <sub>3</sub>	Cl	SO <sub>4</sub>
Vishnu Spring	1/31/2006	30	1.2	80	29	410	<2	<1	<1
Vishnu Spring	4/6/2006	31	0.64	83	27	420	<2	<1	1.3
Vishnu Well #2	11/6/2008	30	3.9	94	34	410	<2	1.3	<1
Vishnu Well #2	11/6/2008	30	3.7	86	31	410	<2	1.3	<1
Vishnu Well #2	11/6/2008	31	2.9	91	33	410	<2	1.3	<1
Vishnu Spring	8/1889	46	0	69	27	473	----	0.28	0

Concentrations in mg/L



# Vishnu Water Analyses



# Future Research

- Well locations using Total Station and GPS
- Locate second spring
- Ongoing measurements
  - water levels
  - water chemistry



# Acknowledgements

- Dr. Roger Viadero, Director of the Institute for Environmental Studies for use of field equipment and purchasing chemistry analyses
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- Morris Wells for mowing path to well #3, maintaining road, and unlocking gates
- Biology Dept. for use of Suburban to pull Giddings Drilling Machine