Southern Willamette Valley 2013 Groundwater Monitoring Results Part 1

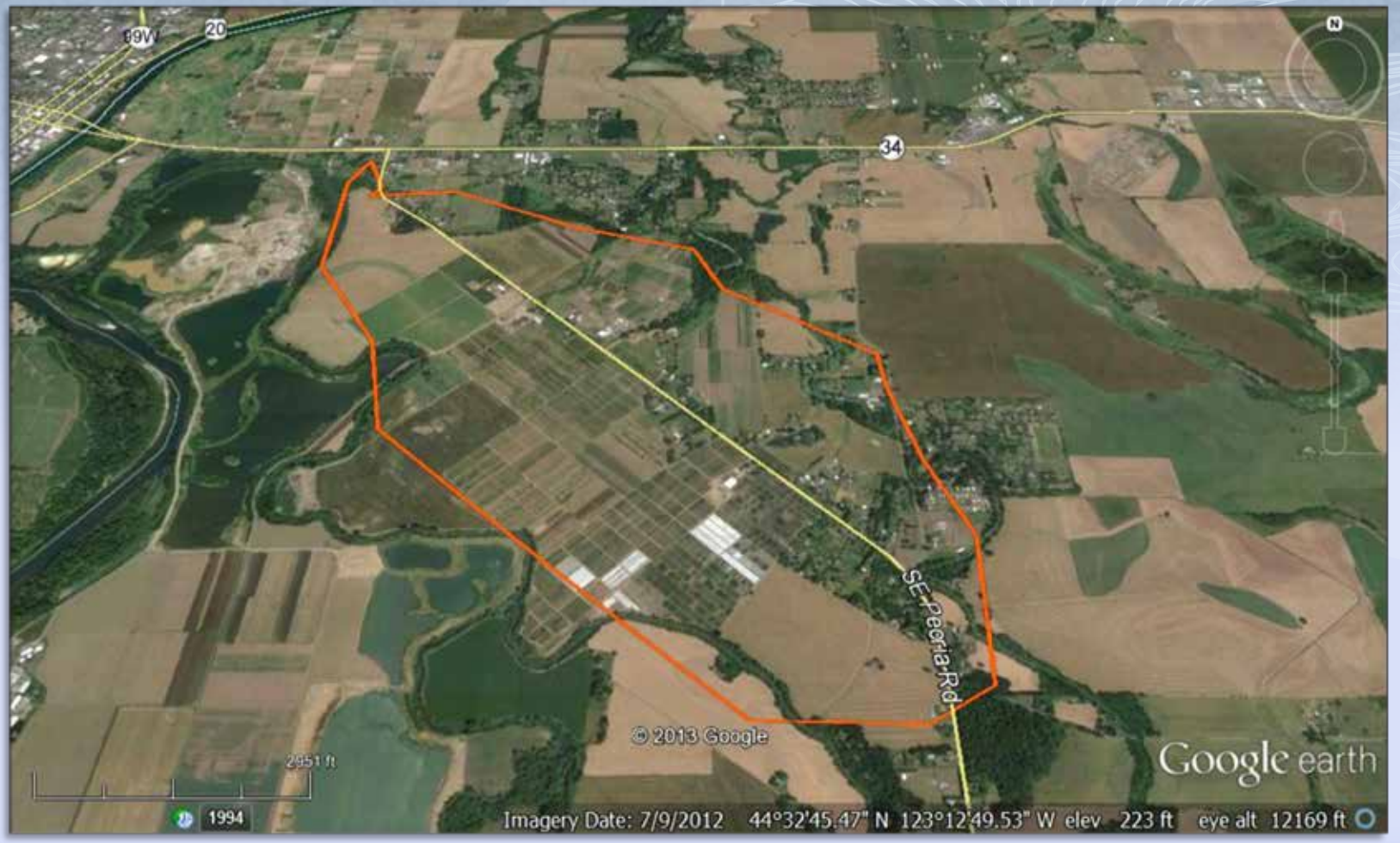
And today we can talk about ….

- Pesticide Testing
- School Participation
- Surface Water Data
- EPA Isotope Assessment
- Long-term Monitoring

Why the Pesticide Testing?

In the spring of 2012, 22 small public water supply systems participated in the USDA analysis of their drinking water. All of the participating public water suppliers (PWS) use groundwater wells as their source of drinking water and all are located in agricultural and rural areas.

Half of these 22 small PWS did not find any pesticide present in their drinking water; another 5 PWS only found 1 pesticide present. Four wells had between 5 and 12 pesticides detected in the drinking water. Two of these PWS are located in the recent pesticide study areas.

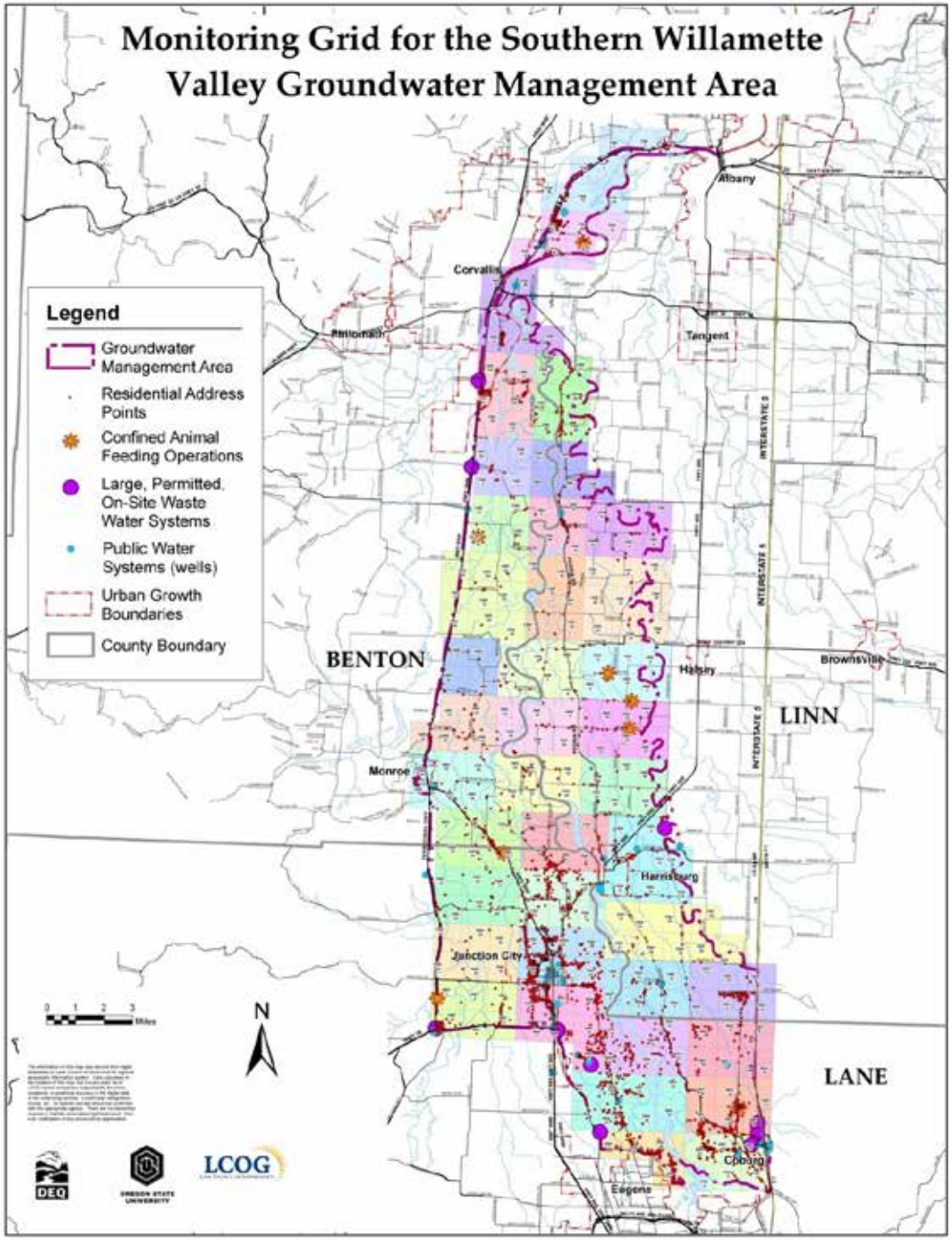


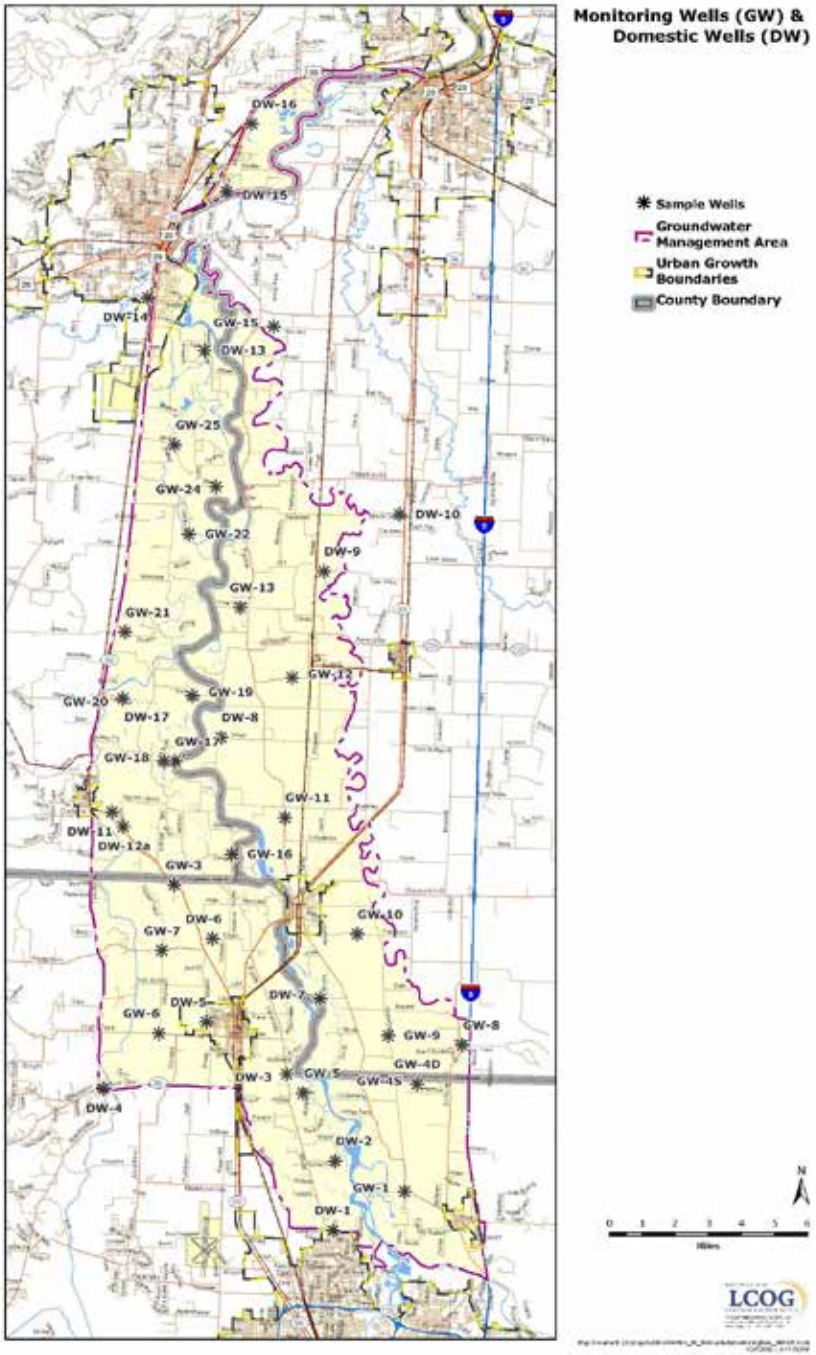
Linn County – Peoria Road Area
9 Wells Scheduled – but then DC happened

Northern Benton County near Route 20
24 Wells Sampled

Long Term
Measuring Overall Groundwater Quality

- Process of Selection


Monitoring Grid for the Southern Willamette Valley Groundwater Management Area
Legend
Groundwater Management Area
Residential Address Points
Confined Animal Feeding Operations
Large, Permitted, On-Site Waste Water Systems
Public Water Systems (wells)
Urban Growth Boundaries
County Boundary
BENTON
LINN
LANE
Albany
Corvallis
Philomath
Tangent
Halsey
Brownsville
Monroe
Harrisburg
Junction City
Coburg
Eugene
INTERSTATE 5
N
0 1 2 3 Miles
DEQ
OREGON STATE UNIVERSITY
LCOG


Monitoring Wells (GW) &
Domestic Wells (DW)
Sample Wells
Groundwater Management Area
Urban Growth Boundaries
County Boundary
DW-16
DW-15
DW-14
GW-15
DW-13
GW-25
GW-24
GW-22
DW-10
DW-9
GW-13
GW-21
GW-12
GW-20
GW-19
DW-17
DW-8
GW-18
GW-11
DW-11
DW-12a
GW-16
GW-3
GW-10
DW-6
GW-7
DW-5
DW-7
GW-6
GW-8
GW-9
GW-4D
DW-3
GW-5
GW-4S
DW-4
DW-2
GW-1
DW-1
N
0 1 2 3 4 5 6
Miles
LCOG

Long Term
Measuring Overall Groundwater Quality

- DW = Domestic Wells, generally deeper, used on a regular basis

- GW = Groundwater Monitoring Wells, generally shallower, purged only when sampled

Long Term
Measuring Overall Groundwater Quality

- Originally established a network of 17 domestic and 26 monitoring wells
- 2 DW wells no longer sampled
- 1 GW ‘dug out’, 2 are usually no shows

Long Term
Measuring Overall Groundwater Quality

What is being measured

- pH
- Temperature
- Dissolved Oxygen
- Nitrate
- Sulfate (every other time)
- Specific Conductance
- Chloride

Long Term

Measuring Overall Groundwater Quality

Current Sampling Program occurs every 3 months (quarterly)

DW Wells take about 2 days

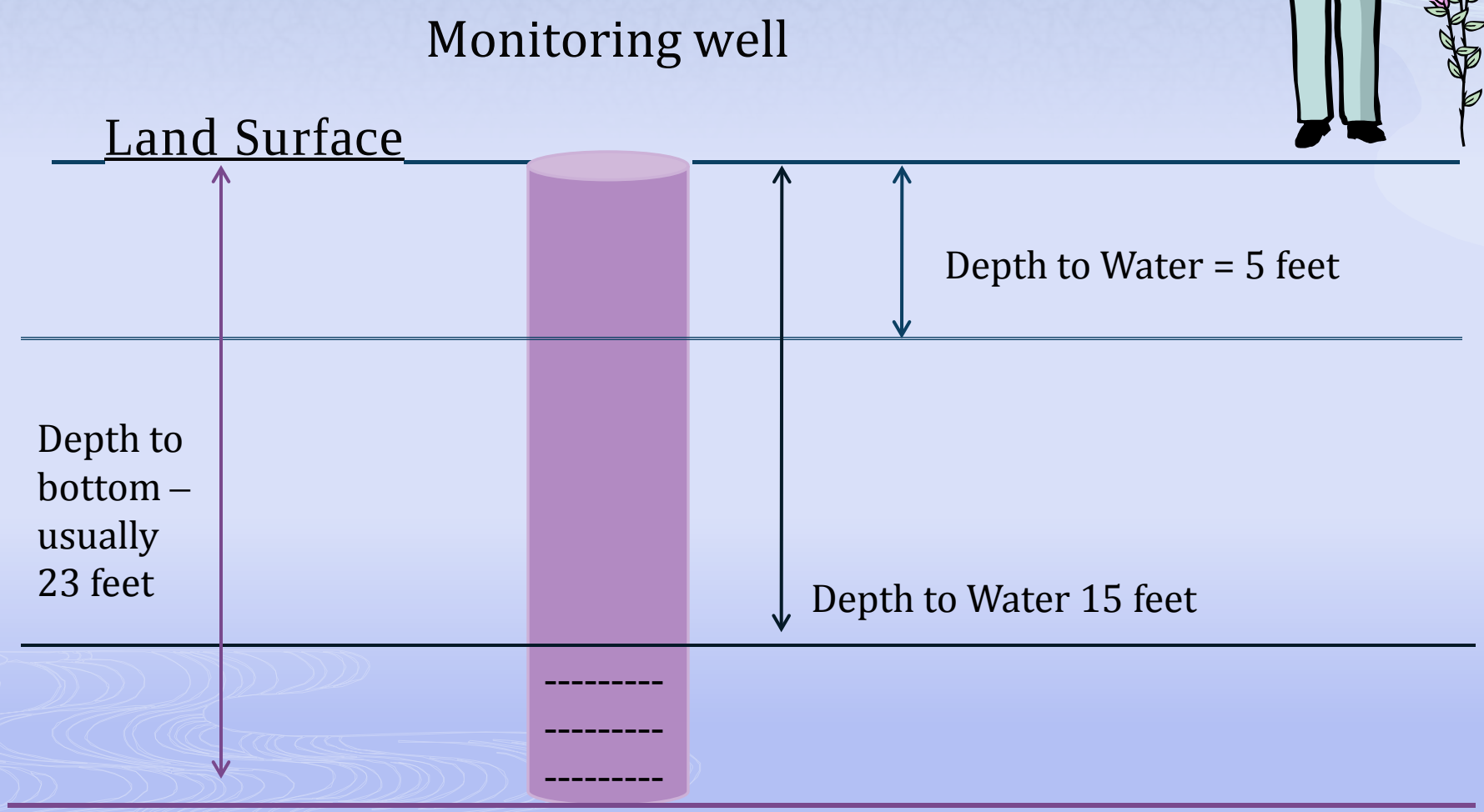
GW Wells take about 4 days

28 Quarterly events completed, next one is due in Nov. 2013

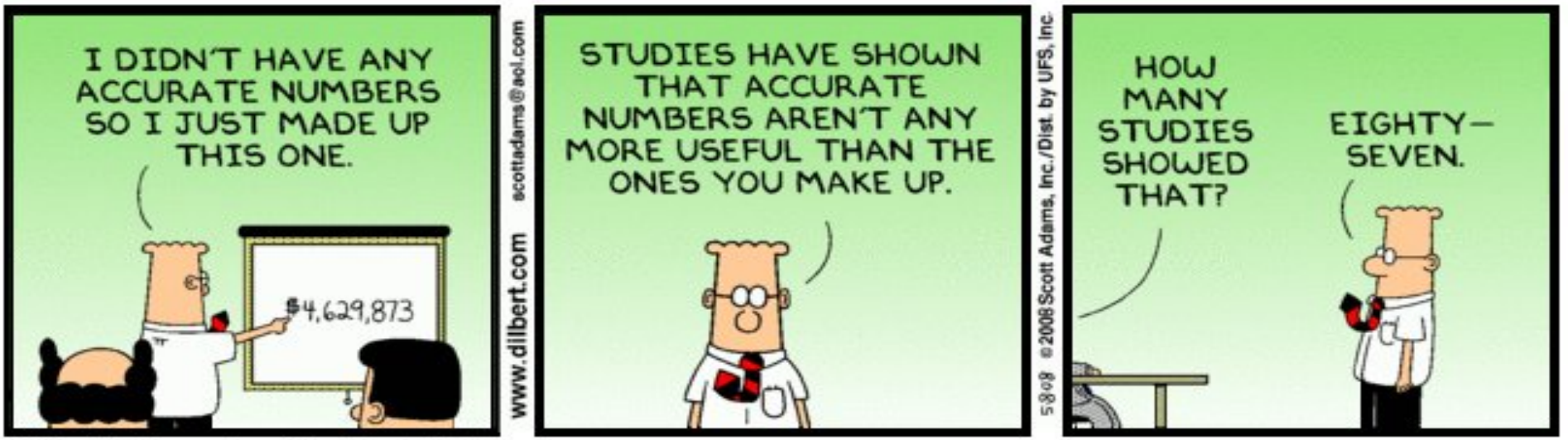
Long Term
Measuring Overall Groundwater Quality

- We had an opportunity to include surface water monitoring , and are doing 6 locations each quarter
- Two wells on 1 property have been added to the long-term monitoring (1524 and 1525) but are not currently included in the statistical assessment
- EPA has performed stable isotope analyses, to help delineate the source of the water

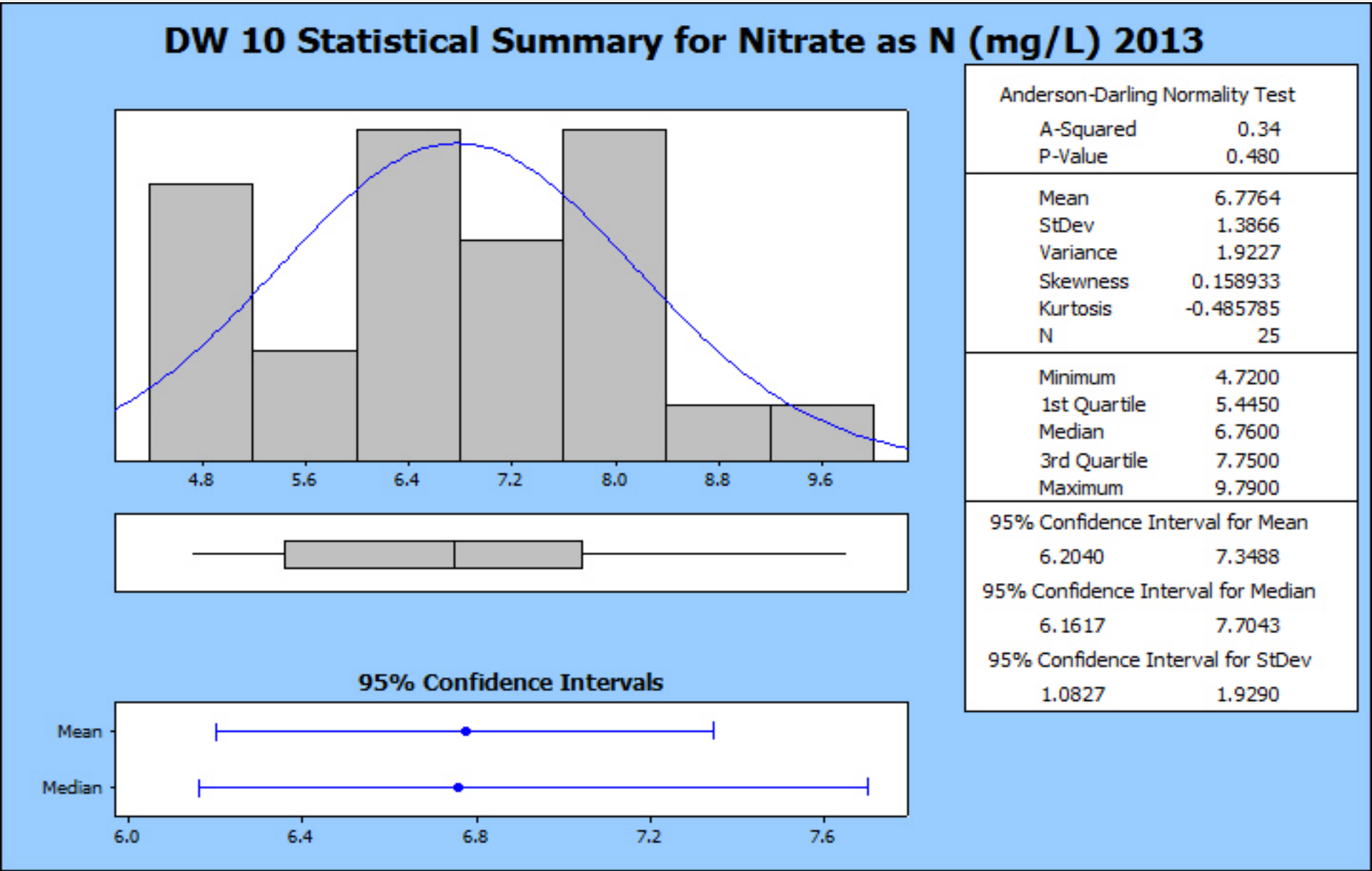
Monitoring Wells & Depth to Water



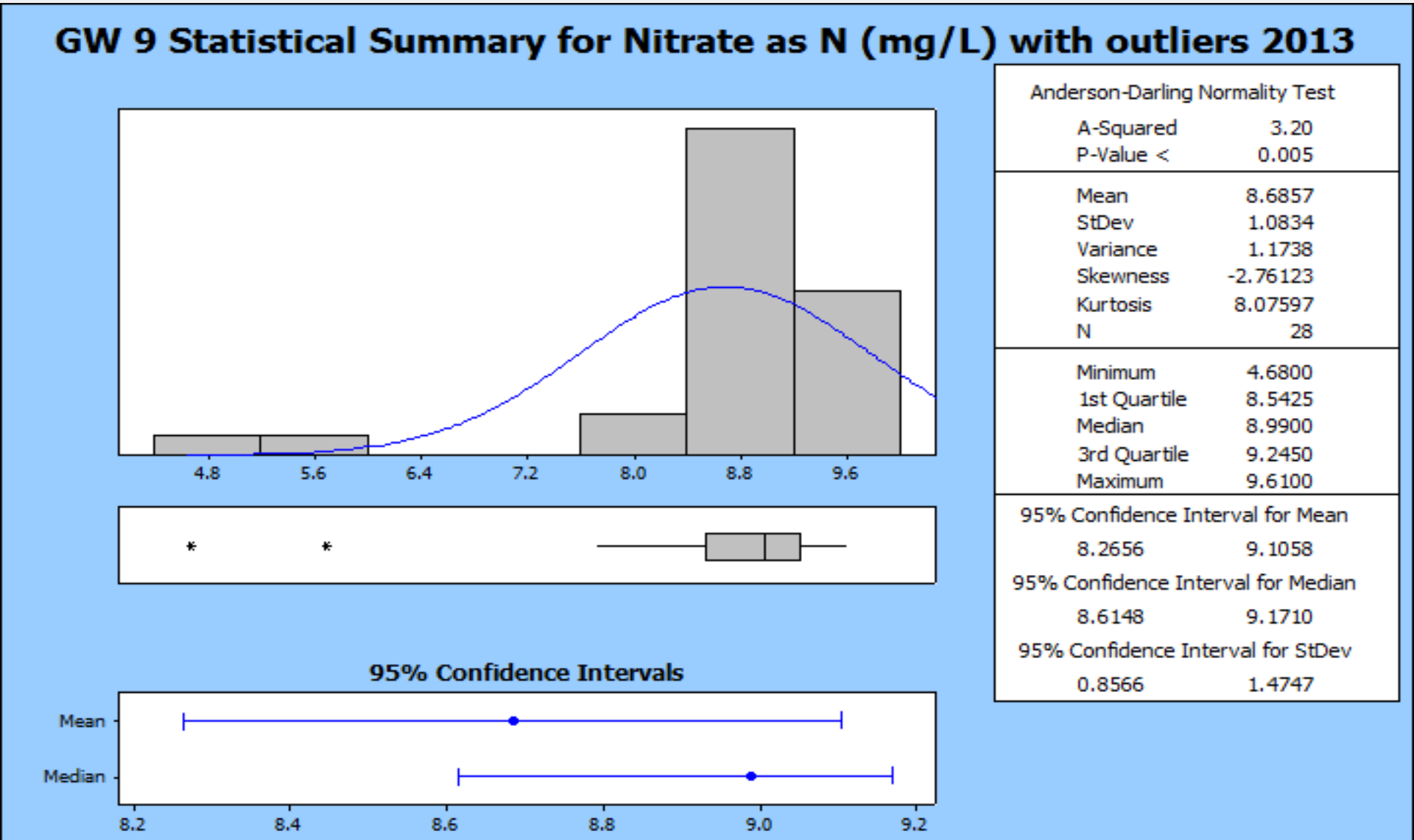
A bit about data management and statistics



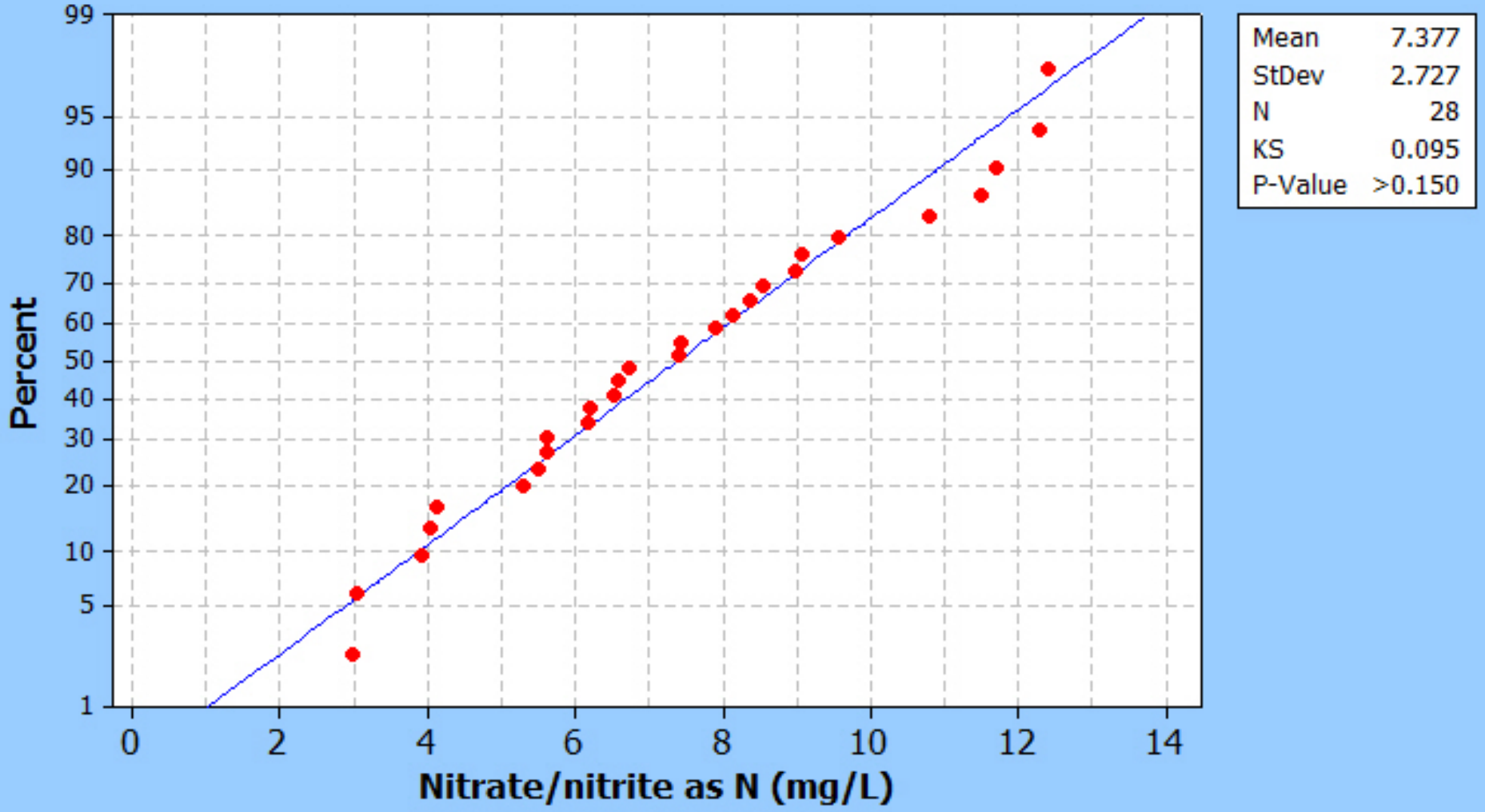
What we like to see



What we really don't like to see



Statistics can tell us what we know about the data we don't have



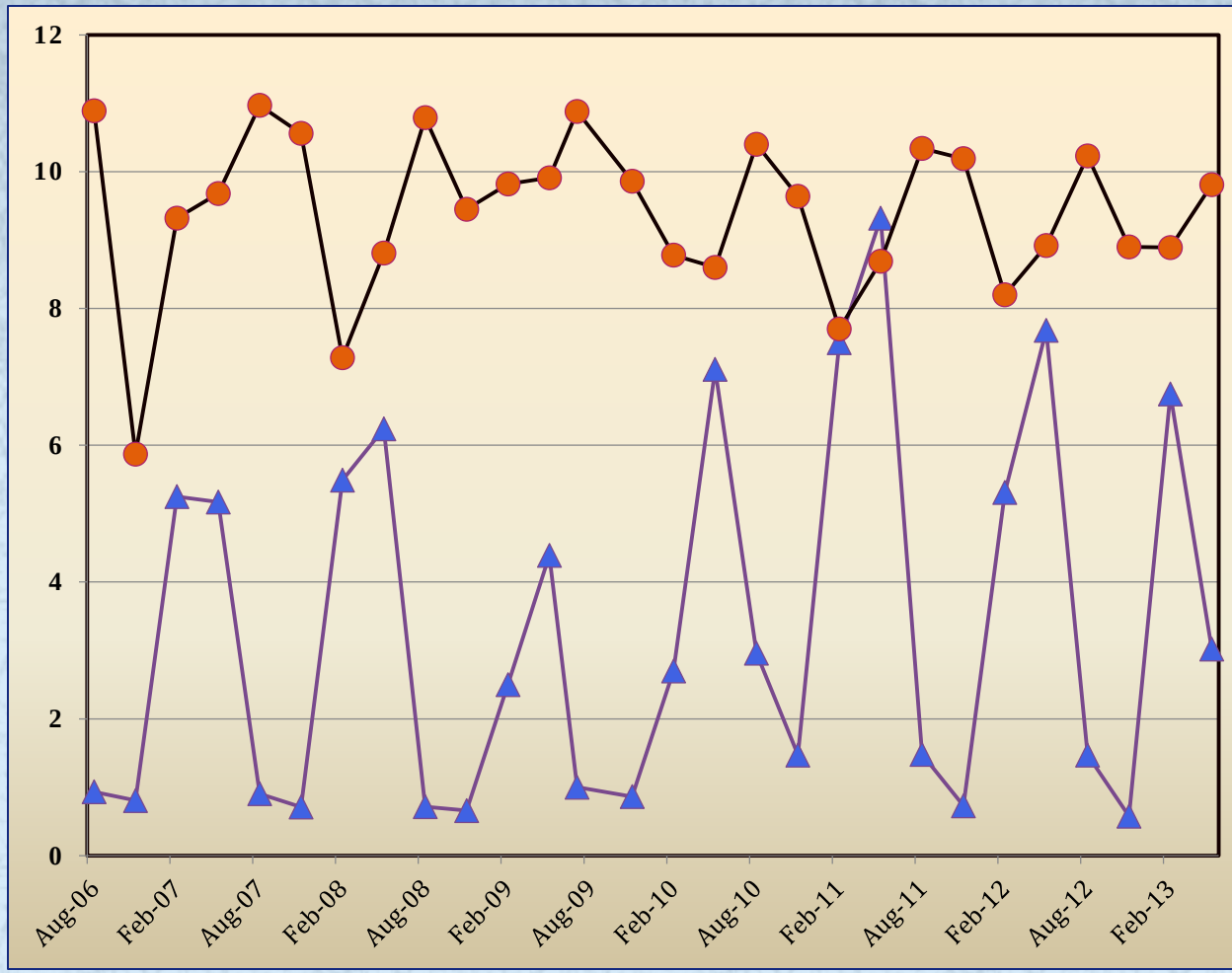
Groundwater or *Surface Water*?

- Over the years, there seems to be some water results from select wells that indicate we are seeing more surface-water influence than groundwater influence.

- Wells DW-7, GW-16, GW17 and sometimes GW-5 are good examples


GW 5
Larson Ln
1172 ft
© 2011 Google
©2010 Google
Imagery Date: 8/18/2011
44°11'39.08" N 123°09'29.22" W elev 338 ft
Eye alt 5410 ft

GW-5 Hayes and Zumwalt Nitrate and Depth to Water



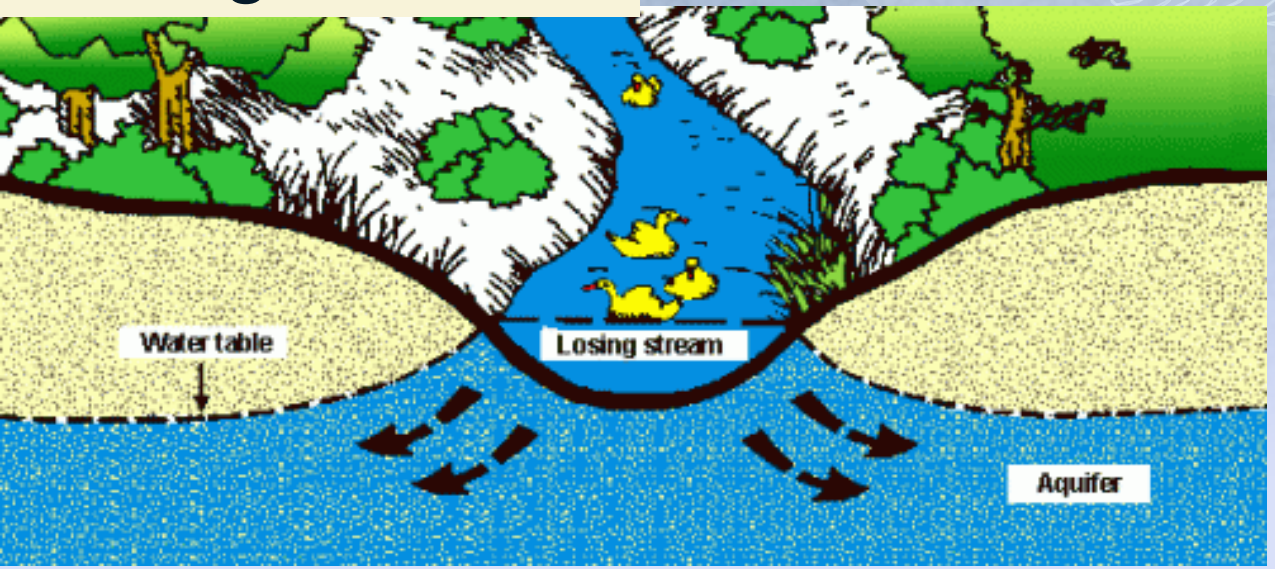
GW-5 Nitrate and Depth to Water

Highest Nitrate levels are in Feb and May - lowest water tables generally in August and November

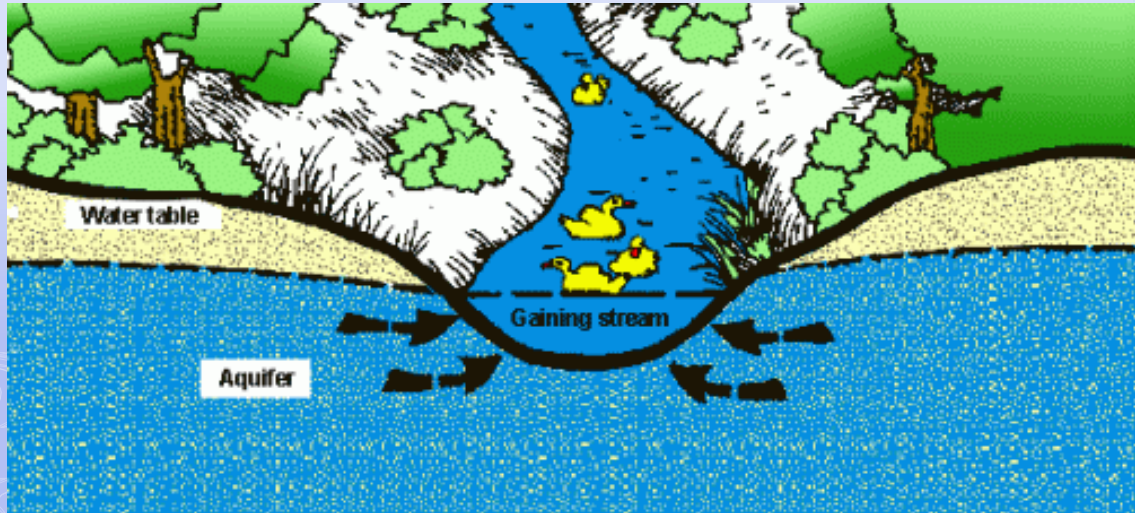
Nitrate/nitrite as N (mg/L)

Depth to Water (ft)

Losing Stream



Gaining Stream

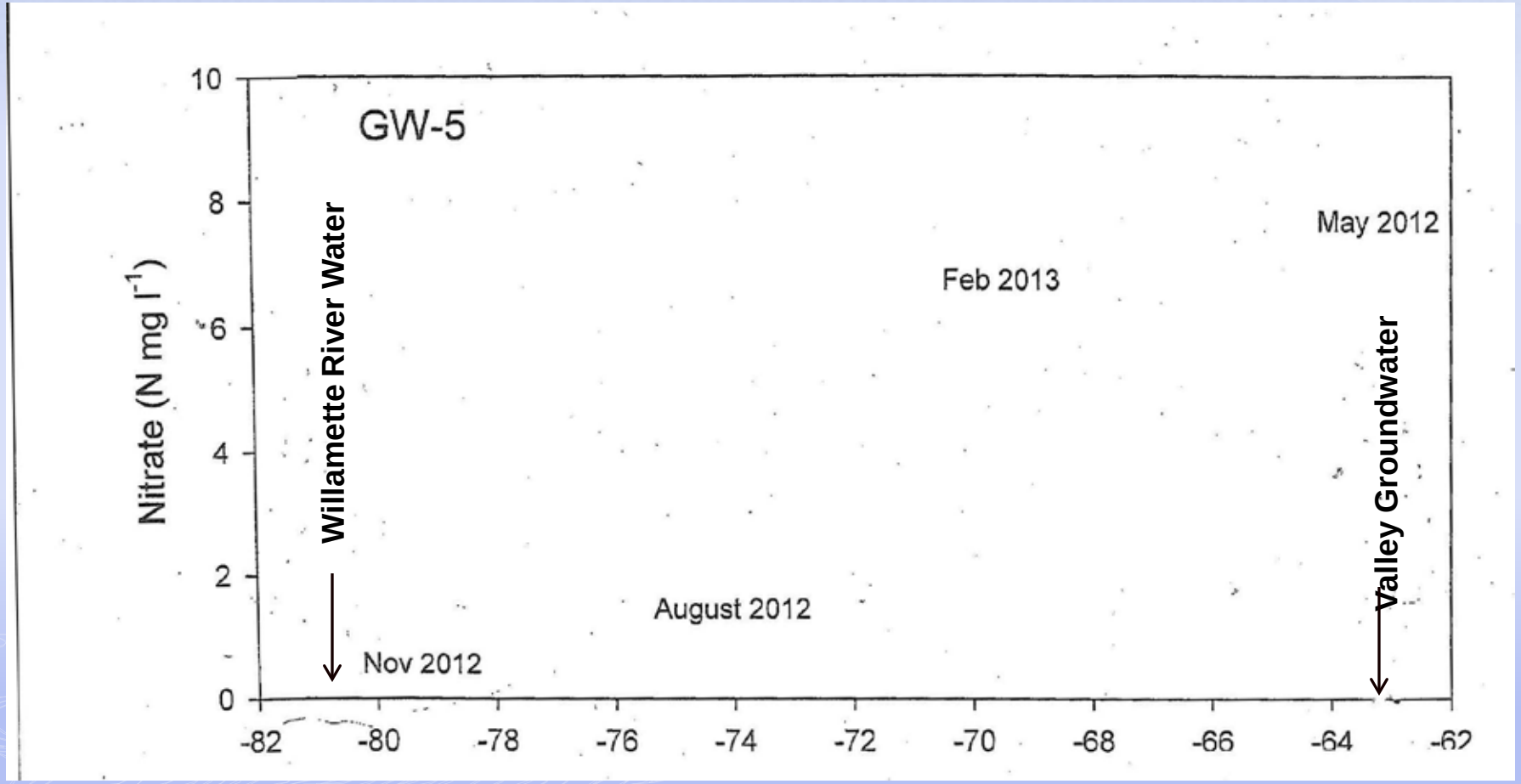


GW-5
Groundwater or *Surface Water*?

- All high nitrate-N values in Feb or May
- Lowest Spec. Cond. in Aug and Nov
- Groundwater table lowest in Aug and Nov

If this was mostly river water influenced – one might think the nitrate would be lowest when the river is the highest (Feb) and the groundwater table was the highest (Feb and May)

GW 5 – Staple d^2 H Isotopes



What does this all Mean??

- Willamette River nitrate levels are significantly below 1 mg/L as N
- Willamette River influence on groundwater at GW-5 greatest in November and August when the water table is the lowest
- Nitrate levels are greatest when the water table is the highest in February and May (Valley Groundwater)
- Irrigation may be pulling river water towards the well during the dryer seasons
- Old river channel?


DW-3
GW-5 Hayes and Zumwalt
Zumwalt Ln
Larson Ln
Unnamed Slough of Will. River at HAyes Lane
Morgan Ln
Hayes
717 ft
© 2013 Google
Google

Surface Water Data from Nearby Slough

Date	LOCATION	Nitrate-N mg/L	total Phosphorus
5/22/2012	Unnamed Slough of the Willamette River at Hayes Lane	1.51	
5/22/2012	Unnamed Slough of the Willamette River at Hayes Lane	1.51	
8/7/2012	Unnamed Slough of the Willamette River at Hayes Lane	1.83	0.03
11/6/2012	Unnamed Slough of the Willamette River at Hayes Lane	0.83	0.05
2/11/2013	Unnamed Slough of the Willamette River at Hayes Lane	0.77	0.02
5/13/2013	Unnamed Slough of the Willamette River at Hayes Lane	1.34	0.03

Willamette River Historic Channels, North of Corvallis, Oregon

L I D A R

Revealing Oregon's Dynamic Landscape

The Willamette River and its former channels near Corvallis, Oregon. For thousands of years, the Willamette River has meandered across the valley floor. This 3D enhanced image was created using a combination of lidar-derived elevation data and aerial orthophotography.

2010 Oregon Department of Geology and Mineral Industries Lidar imagery and graphic design by Daniel Coe