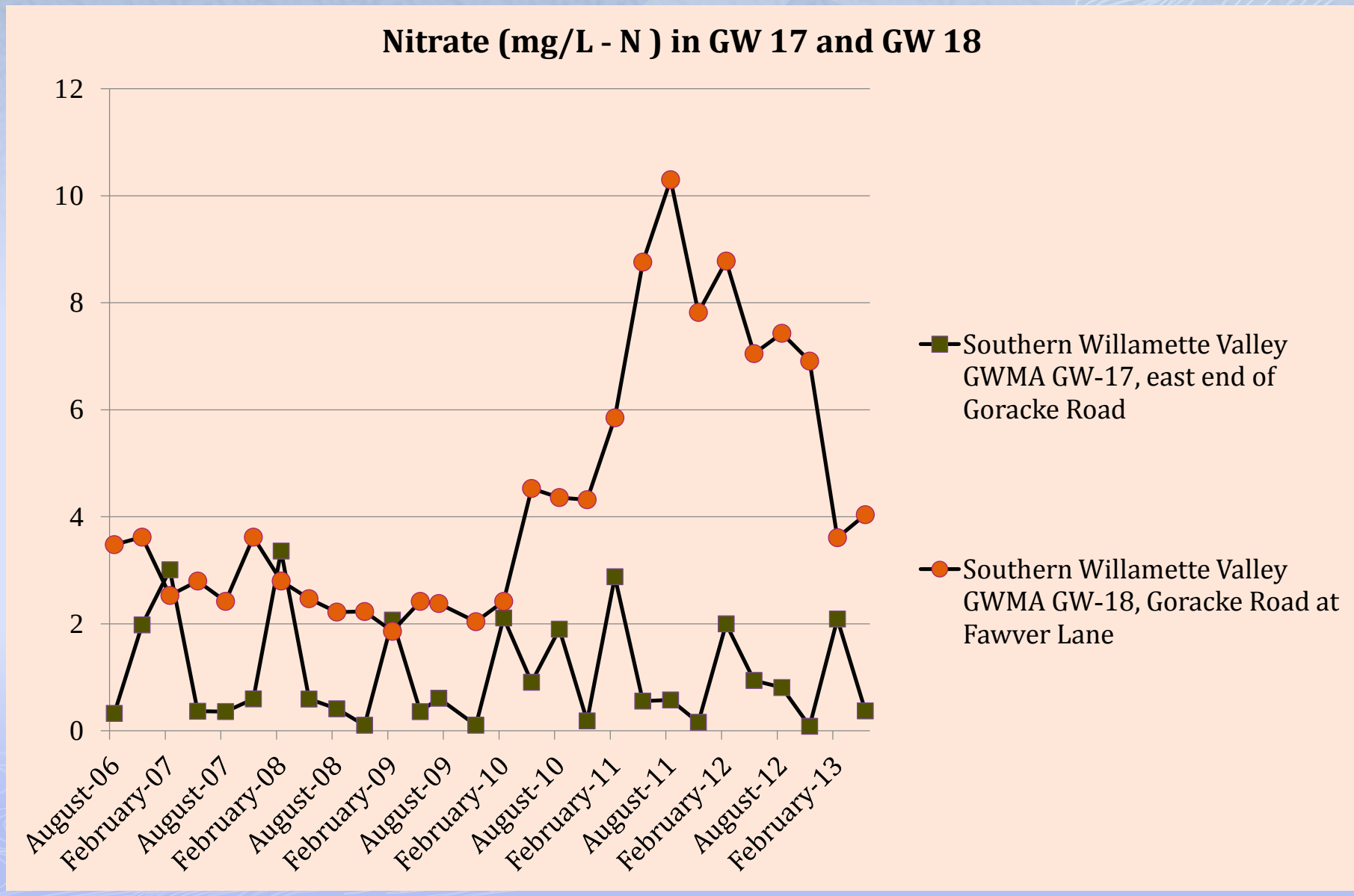
Southern Willamette Valley 2013 Groundwater Monitoring Results Part II

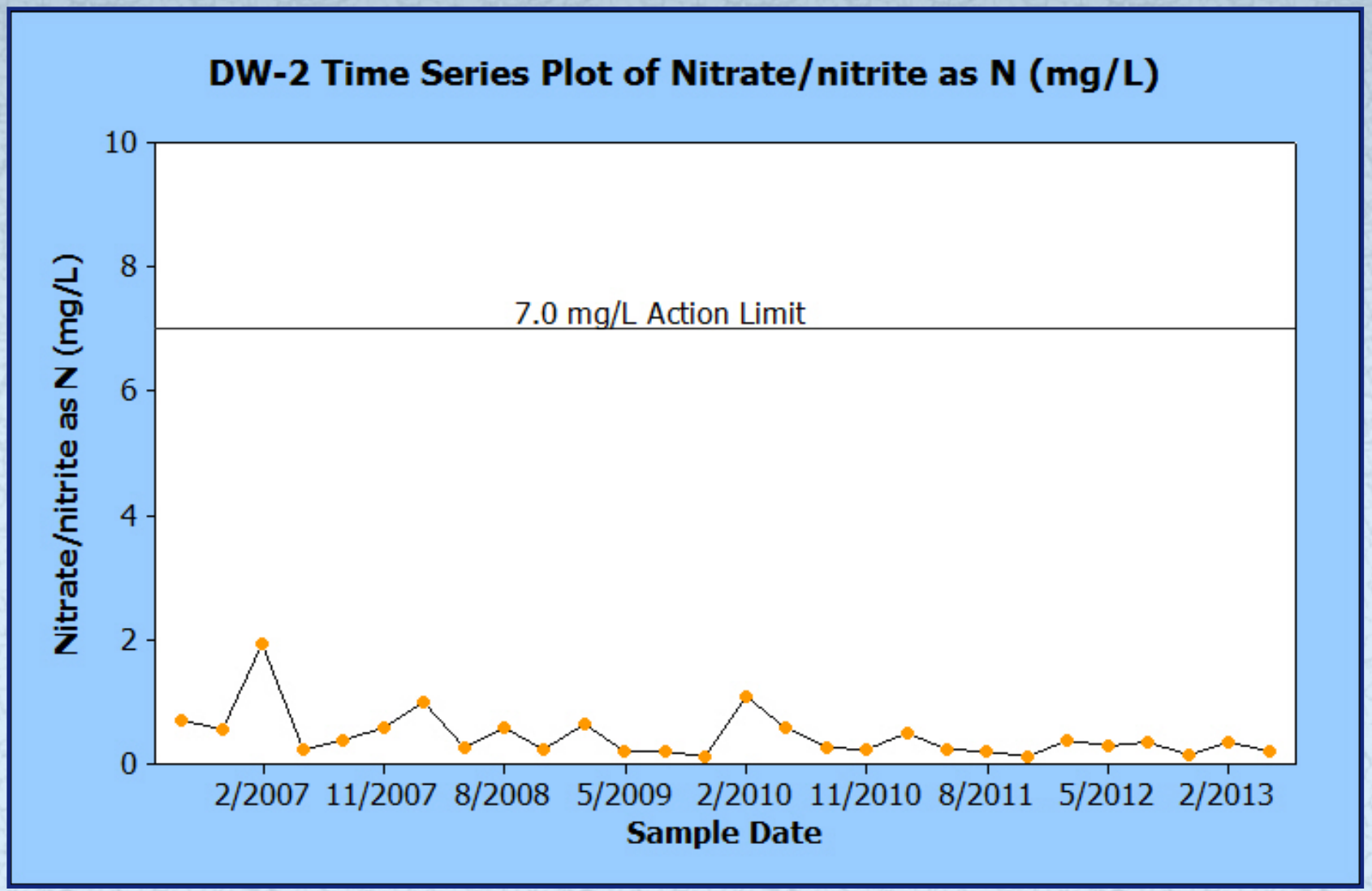
GW-17 and GW-18

GW-17 and GW-18

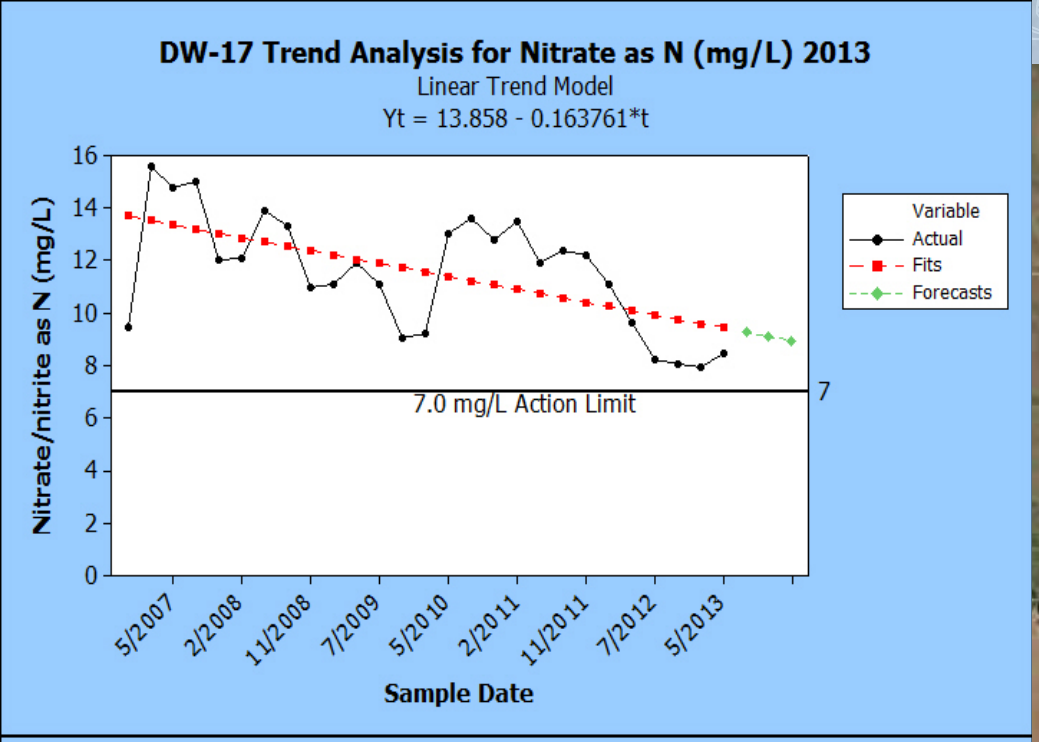


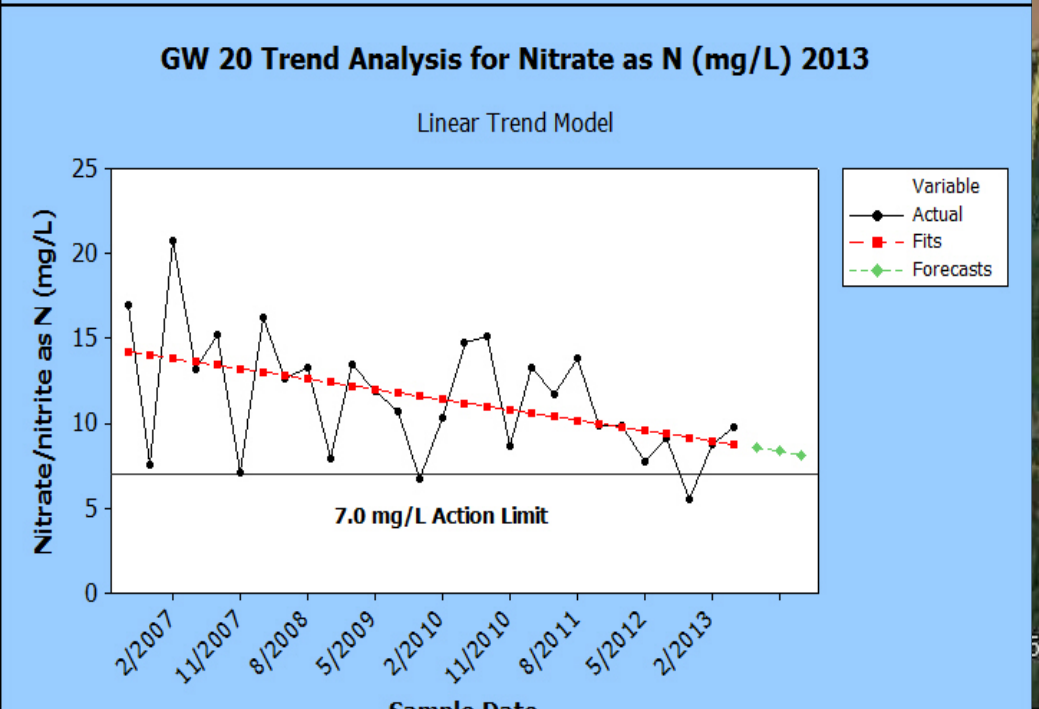

Lone Pine Dr
DW-2
©2011 Google
©2010 Google
Imagery Date: 8/18/2011
199
44°09'51.44" N 123°08'03.53" W elev 345 ft
Eye alt 6316 ft

DW-2 Times Series of Nitrate



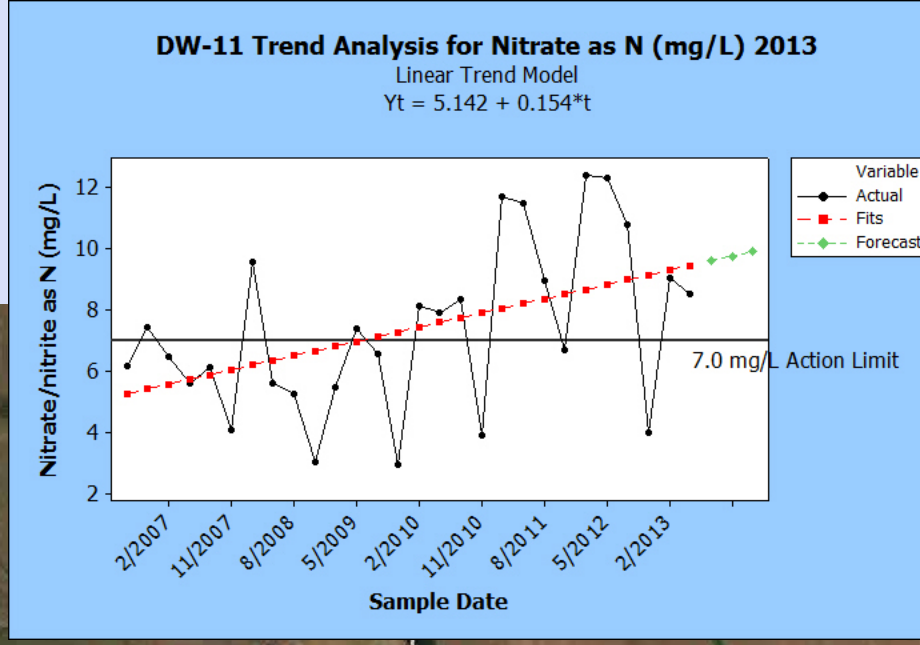

GW-20
DW-17
Hubbard Rd
© 2011 Google
©2010 Google
1391 ft


DW-17 Trend Analysis for Nitrate as N (mg/L) 2013
Linear Trend Model
Yt = 13.858 - 0.163761*t
Nitrate/nitrite as N (mg/L)
Variable
Actual
Fits
Forecasts
7.0 mg/L Action Limit
7
5/2007
2/2008
11/2008
7/2009
5/2010
2/2011
11/2011
7/2012
5/2013
Sample Date


GW 20 Trend Analysis for Nitrate as N (mg/L) 2013
Linear Trend Model
Nitrate/nitrite as N (mg/L)
Variable
Actual
Fits
Forecasts
7.0 mg/L Action Limit
2/2007
11/2007
8/2008
5/2009
2/2010
11/2010
8/2011
5/2012
2/2013


99W
GW-20
DW-17
© 2013 Google
527 ft

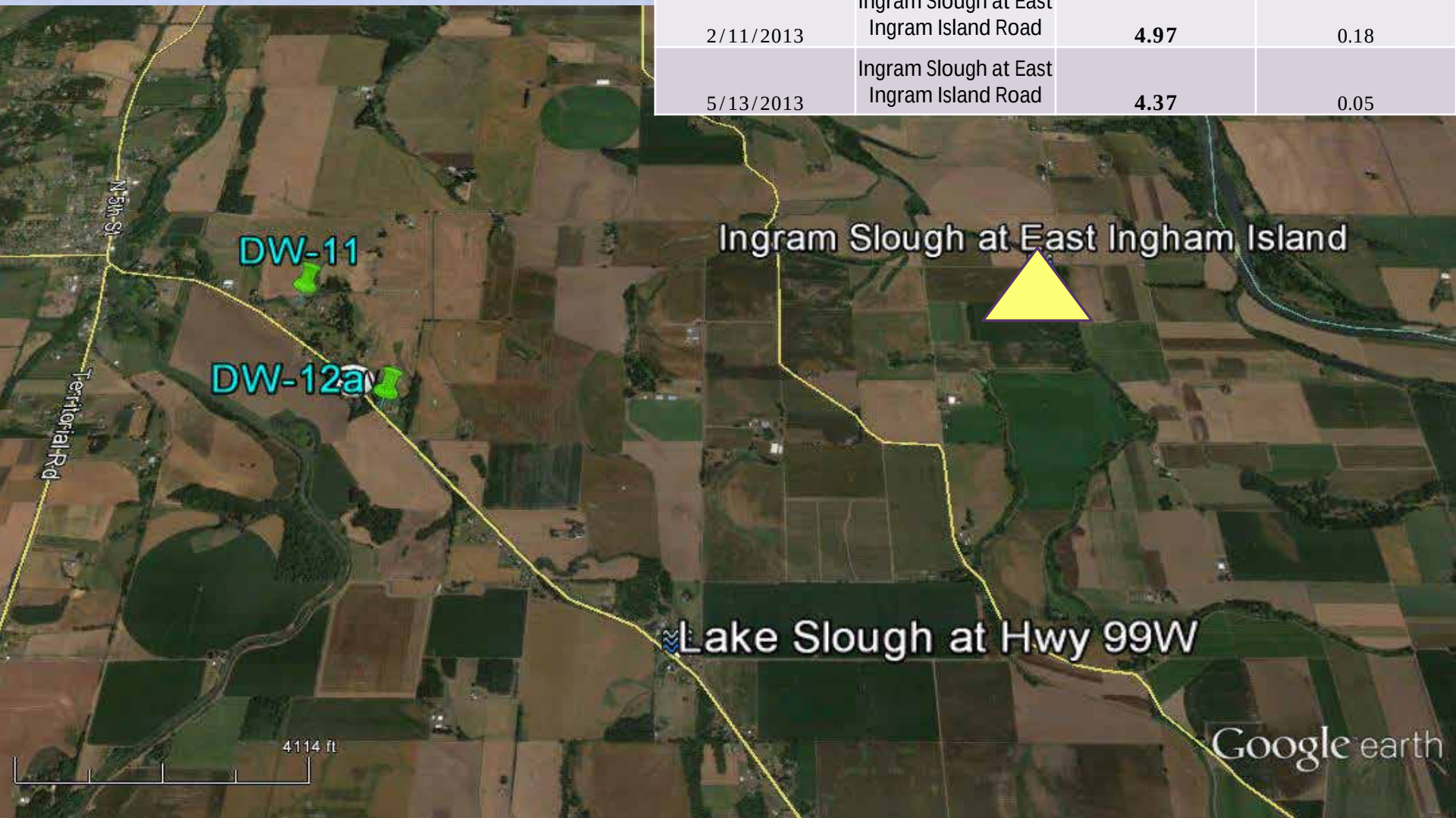
DW 11


DW-11 Trend Analysis for Nitrate as N (mg/L) 2013
Linear Trend Model
Yt = 5.142 + 0.154*t
Nitrate/nitrite as N (mg/L)
12
10
8
6
4
2
7.0 mg/L Action Limit
Variable
Actual
Fits
Forecast
2/2007
11/2007
8/2008
5/2009
2/2010
11/2010
8/2011
5/2012
2/2013
Sample Date

DW-11
W-Ingram-Island-Rd
99W
L-osen-Rd
987 ft
Google earth

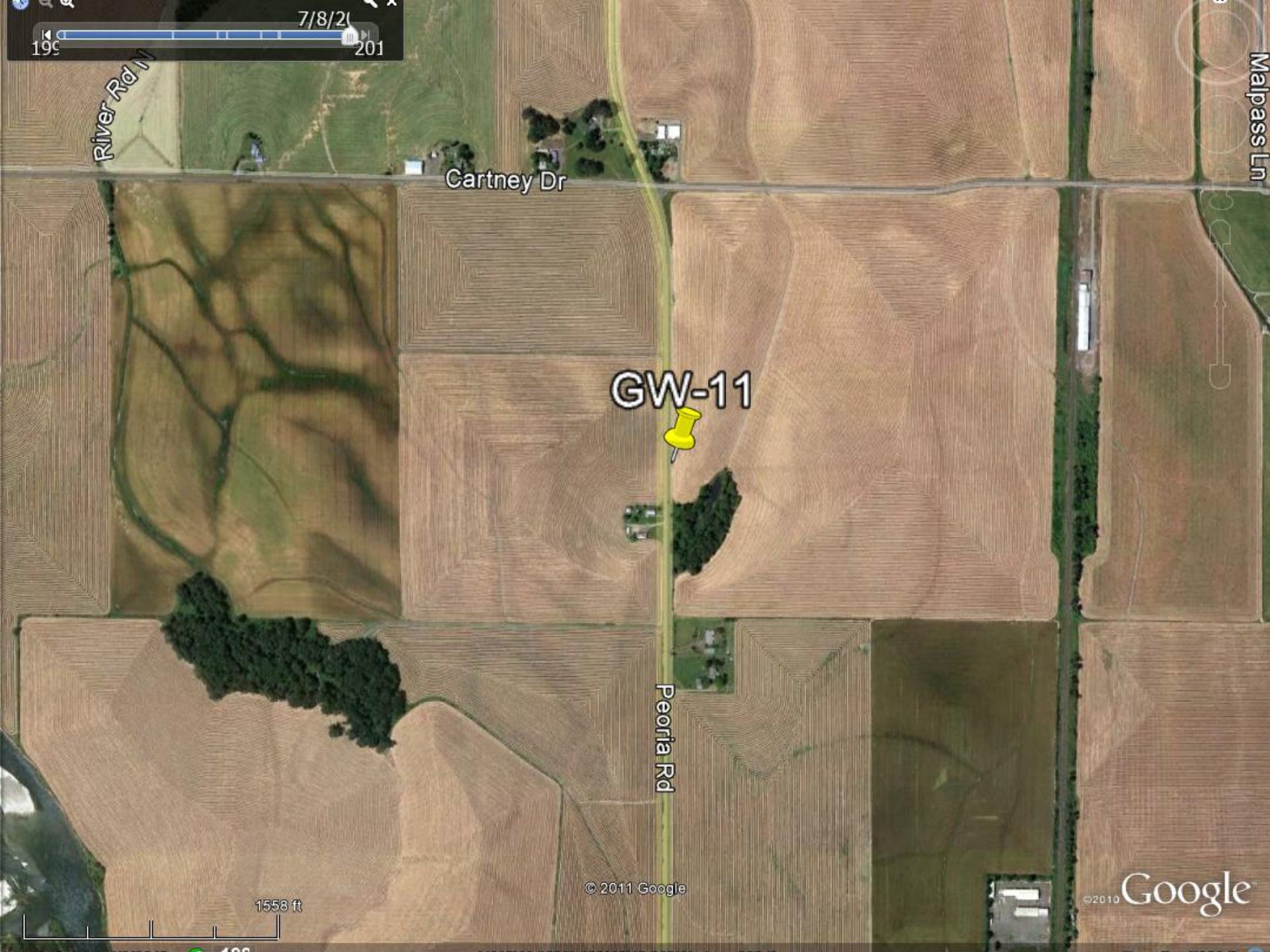
Nitrate Levels in Surface Water

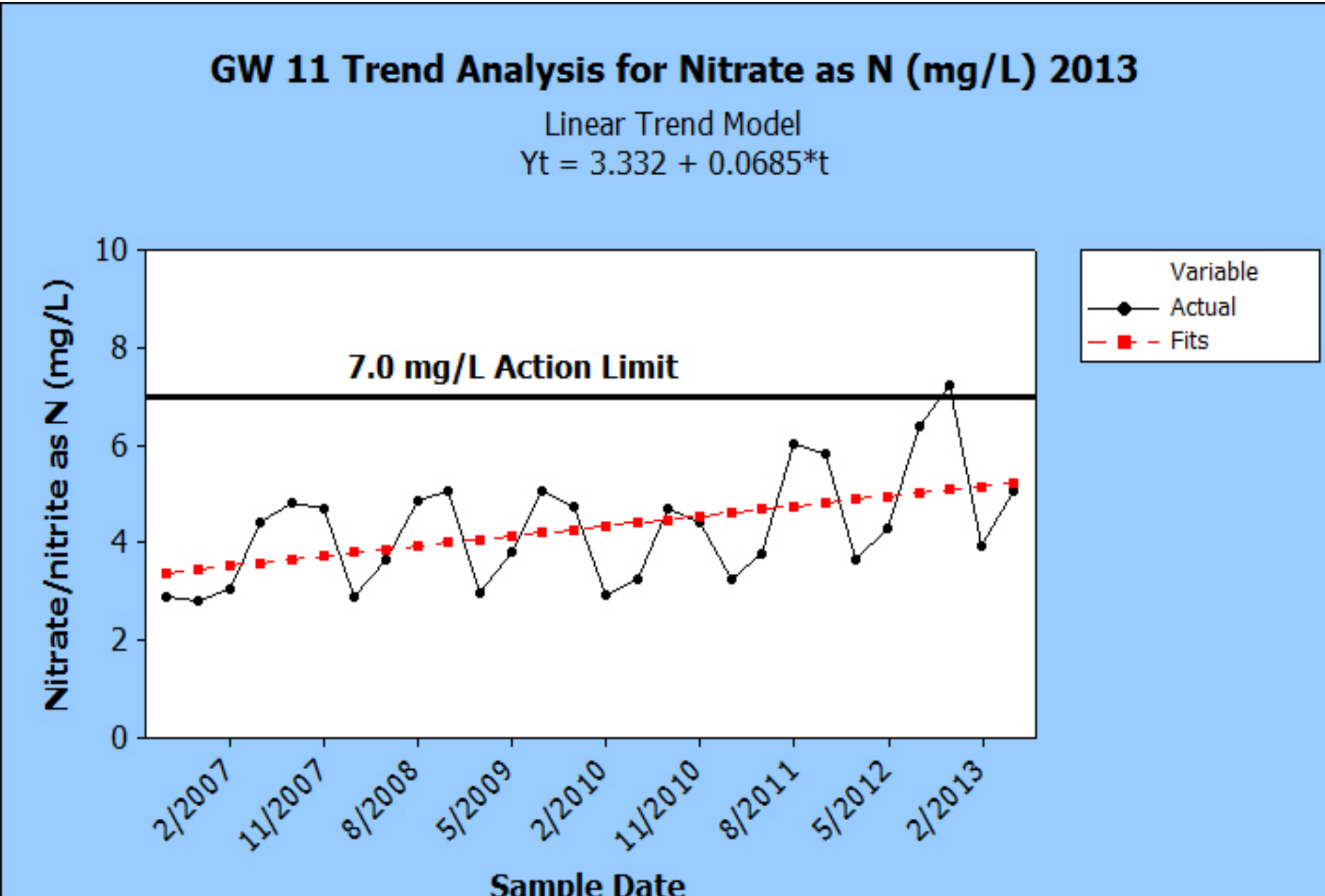
Date	LOCATION	Nitrate-N mg/L	total Phosphorus
5/22/2012	Ingram Slough at East Ingram Island Road	**4.83**	
8/7/2012	Ingram Slough at East Ingram Island Road	**3.75**	0.05
11/6/2012	Ingram Slough at East Ingram Island Road	**4.44**	0.14
2/11/2013	Ingram Slough at East Ingram Island Road	**4.97**	0.18
5/13/2013	Ingram Slough at East Ingram Island Road	**4.37**	0.05

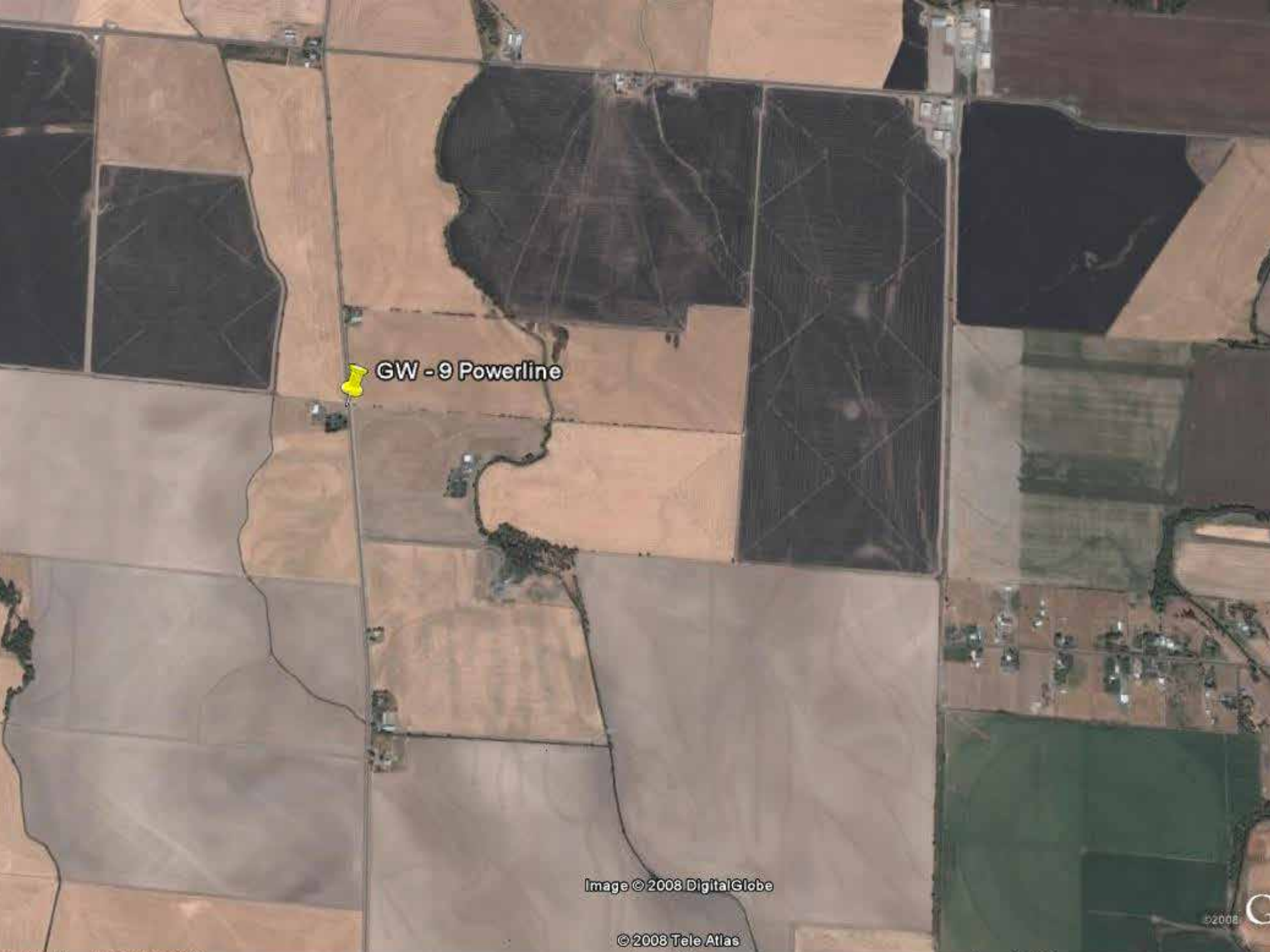



MAY 2012

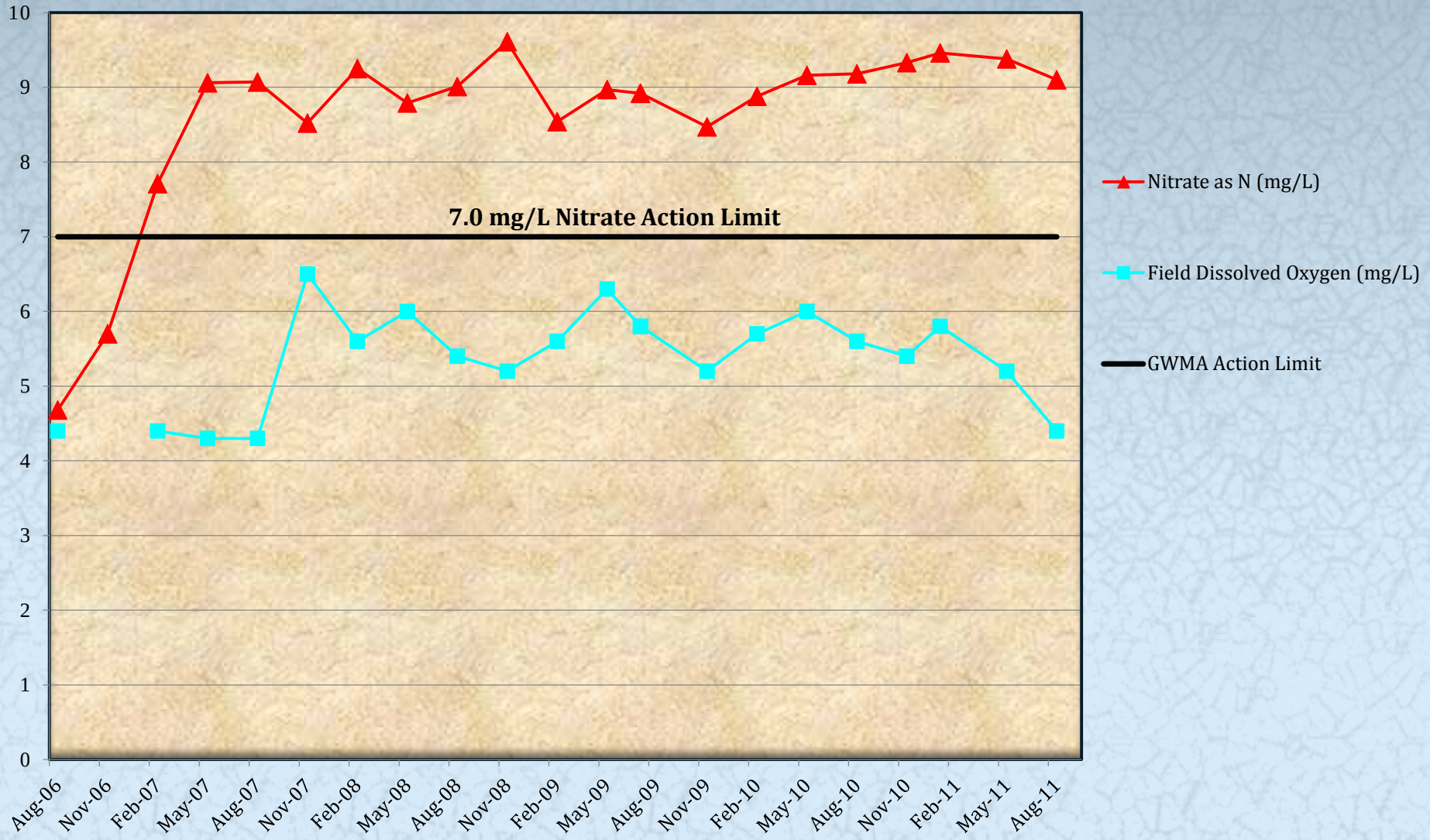

MAY 2012


River Rd N
Cartney Dr
Malpass Ln
GW-11
Peoria Rd
© 2011 Google
1558 ft
©2010 Google

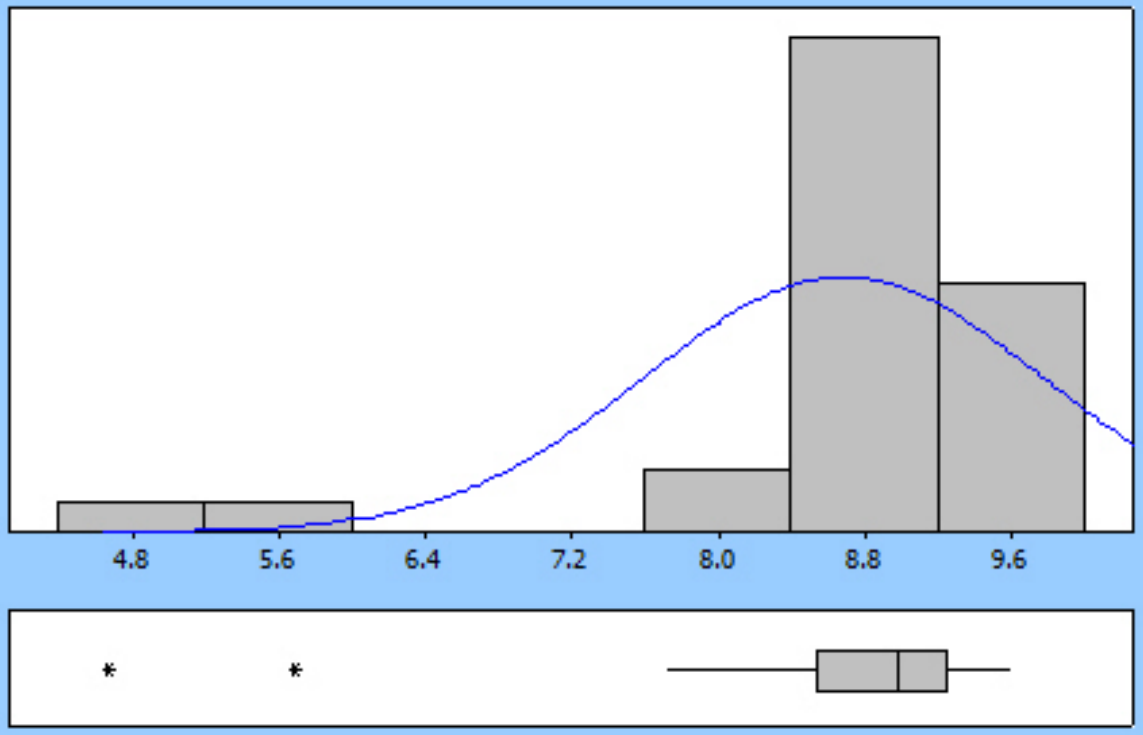

GW 11 Trend Analysis for Nitrate as N (mg/L) 2013
Linear Trend Model
Yt = 3.332 + 0.0685*t
7.0 mg/L Action Limit
Nitrate/nitrite as N (mg/L)
Sample Date
Variable
Actual
Fits
0
2
4
6
8
10
2/2007
11/2007
8/2008
5/2009
2/2010
11/2010
8/2011
5/2012
2/2013

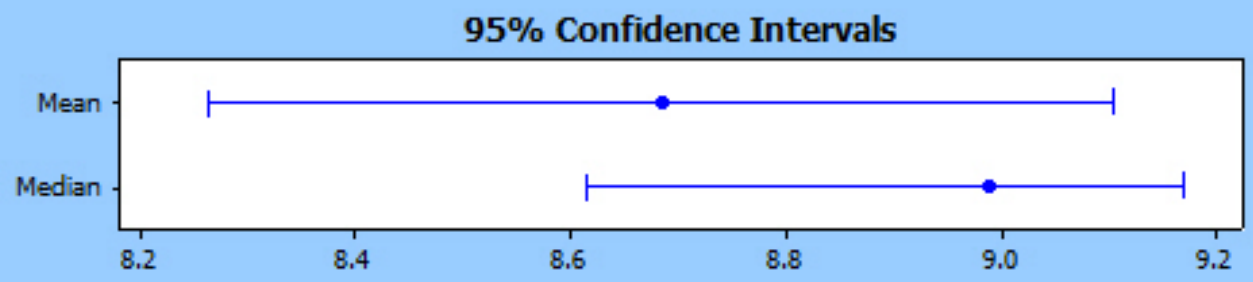

GW - 9 Powerline
Image © 2008 DigitalGlobe
© 2008 Tele Atlas

GW-9 Powerline Road



GW 9 Statistical Summary for Nitrate as N (mg/L) with outliers 2013





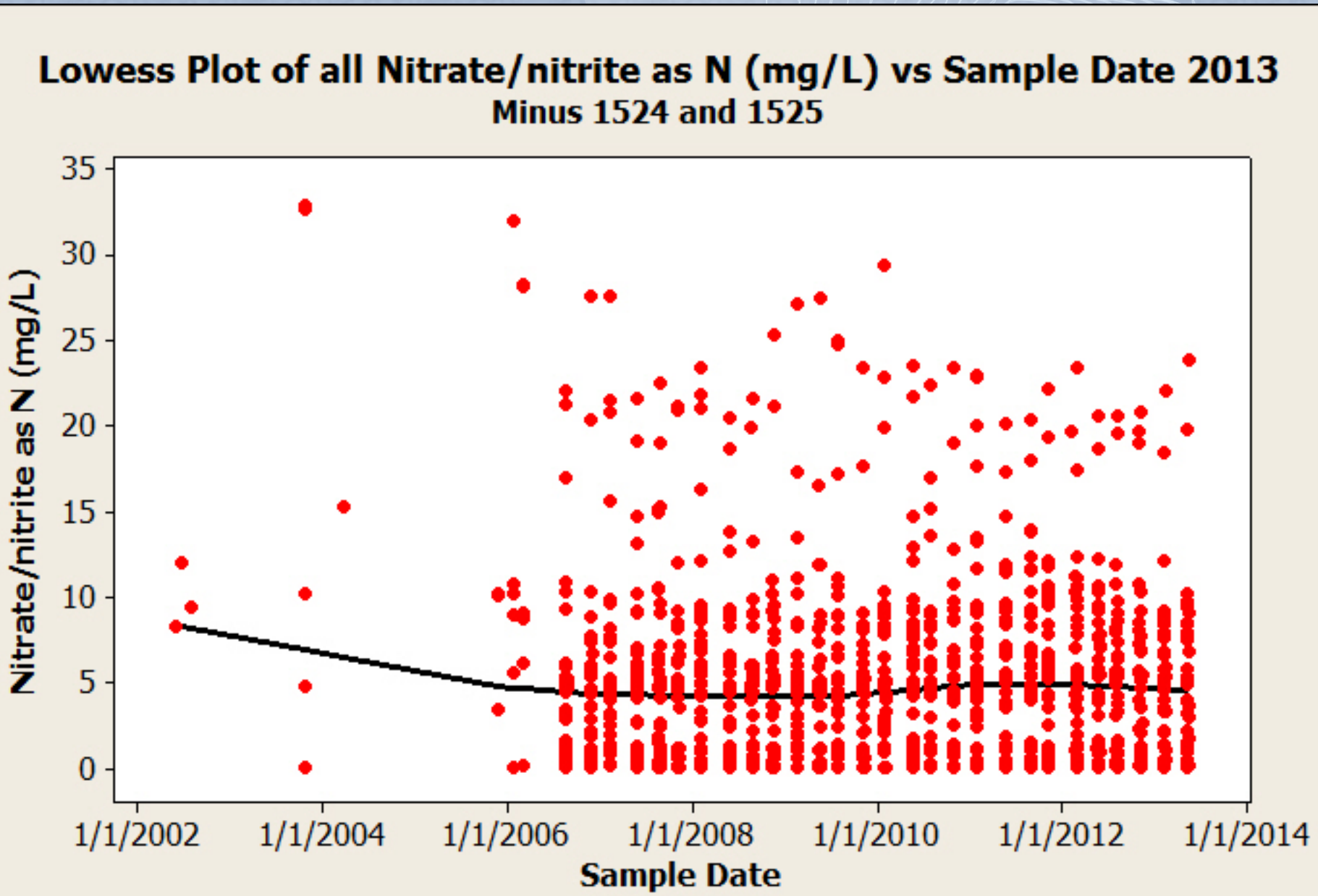
Anderson-Darling Normality Test	
A-Squared	3.20
P-Value <	0.005
Mean	8.6857
StDev	1.0834
Variance	1.1738
Skewness	-2.76123
Kurtosis	8.07597
N	28
Minimum	4.6800
1st Quartile	8.5425
Median	8.9900
3rd Quartile	9.2450
Maximum	9.6100
95% Confidence Interval for Mean	
8.2656	9.1058
95% Confidence Interval for Median	
8.6148	9.1710
95% Confidence Interval for StDev	
0.8566	1.4747

Overall Trend Comparisons

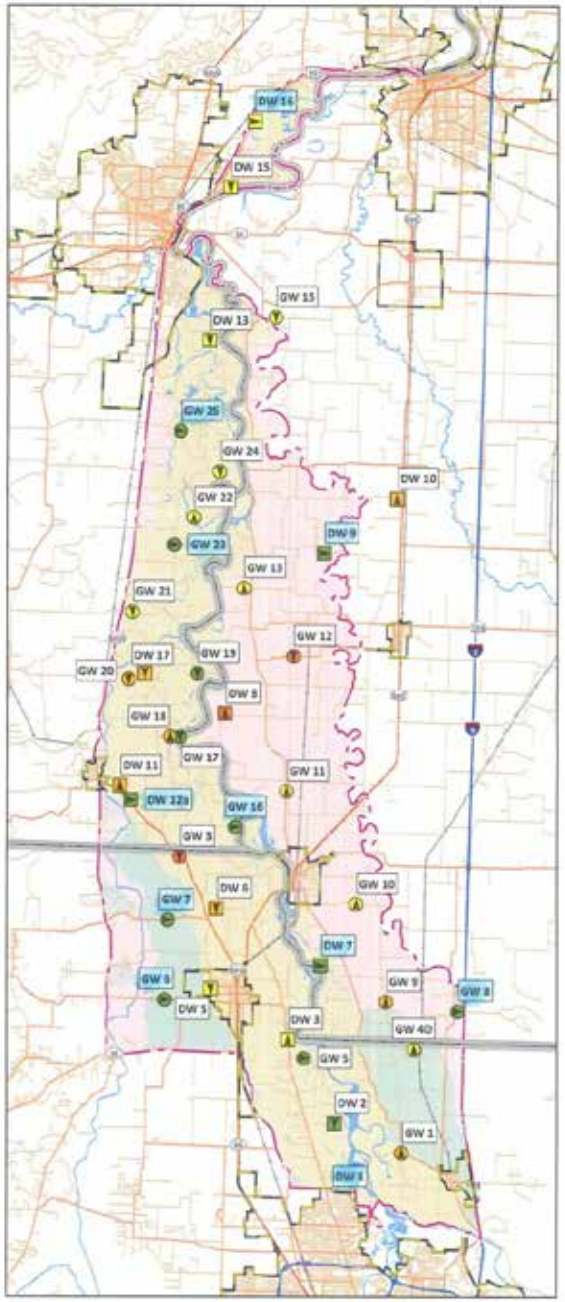
Well	Nitrate-N Increase 2011 vs Increase 2010	Nitrate-N Decrease 2011 vs Decrease 2010	Nitrate-N Steady 2011/ Steady 2010
DW	4 (2013) 4 (2011) 1-2 (2010)	6 (2013) 2 (2011) 7 (2010)	5 (2013) 8 (2011) 5-6(2010)

DW Wells – the average nitrate value of the last 8 sampling events minus the background average was down 3.43 mg/L (14 wells)

GW Wells – the average nitrate value of the last 8 sampling events minus the background average was down 2.05 mg/L (23 wells)


Lowess Plot of all Nitrate/nitrite as N (mg/L) vs Sample Date 2013
Minus 1524 and 1525
Nitrate/nitrite as N (mg/L)
35
30
25
20
15
10
5
0
1/1/2002
1/1/2004
1/1/2006
1/1/2008
1/1/2010
1/1/2012
1/1/2014
Sample Date

Southern Willamette Valley Groundwater Management Area



Nitrate Values in the Long-Term Monitoring Sites

Through May 2013

Legend

- Groundwater Management Area
- Urban Growth Boundaries
- County Boundary

Ground Water Wells

Aug. 2011 May 2013 Mean

- 0.0 - 3.0
- 3.1 - 7.0
- 7.1 - 10.0
- 10.1 - 22.0

Drinking Water Wells

Aug. 2011 to May 2013 Mean

- 0.1 - 3.0
- 3.1 - 7.0
- 7.1 - 10.0
- 10.1 - 20.0

Well Nitrate Trends

Change in nitrate levels

- Increasing
- Steady
- Decreasing

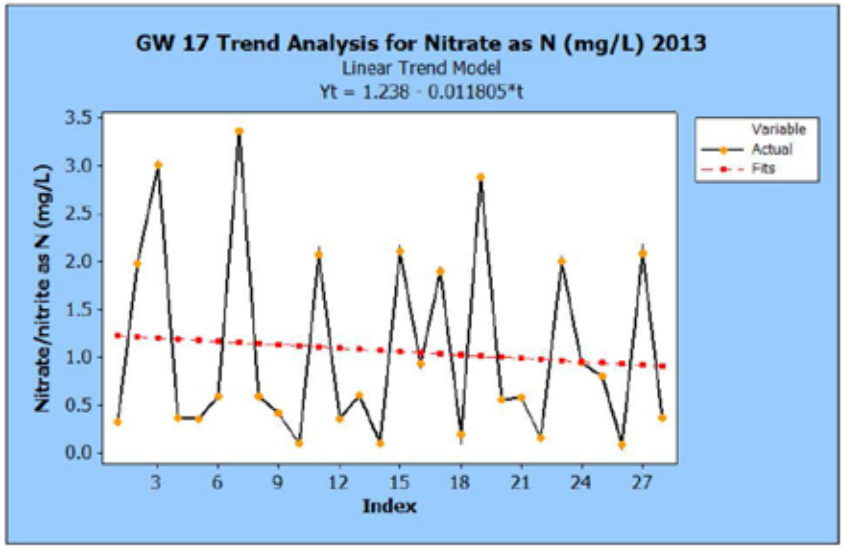
N

0 1 2 3 4 5

Miles

LCOG

Monitoring Well GW-17



first 9 events = background		
August-06	0.33	
November-06	1.98	
February-07	3.01	
May-07	0.37	
August-07	0.36	
November-07	0.60	
February-08	3.36	
May-08	0.59	**Std Deviation = 1.23**
August-08	0.41	**Background Mean = 1.22**
Rest of data		
November-08	*0.11*	
February-09	2.07	
May-09	0.36	
July-09	0.61	
November-09	0.11	
February-10	2.11	
May-10	*0.91*	
August-10	1.90	
November-10	0.19	
January-11	2.88	
May-11	0.56	
August-11	0.58	
November-11	0.16	
February-12	2.00	
May-12	0.94	
August-12	0.81	
November-12	0.09	
February-13	2.09	
May-13	0.37	**Std Deviation = 0.88**
Mean last 8 samples	**0.88**	**Nitrate values have**
Difference last 8 samples		**DECREASED**
mean minus background	**-0.34**