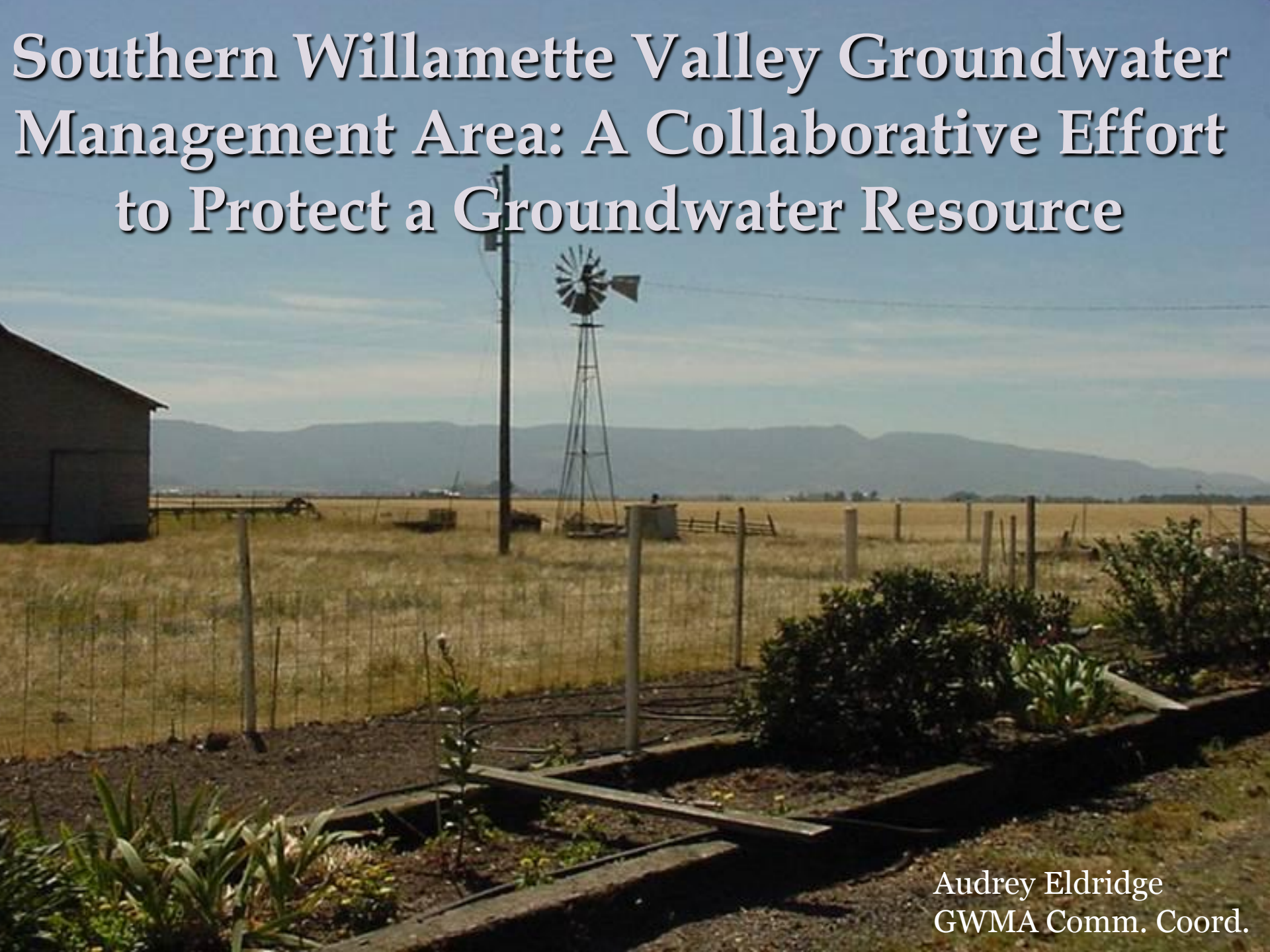
Southern Willamette Valley Groundwater Management Area: A Collaborative Effort to Protect a Groundwater Resource

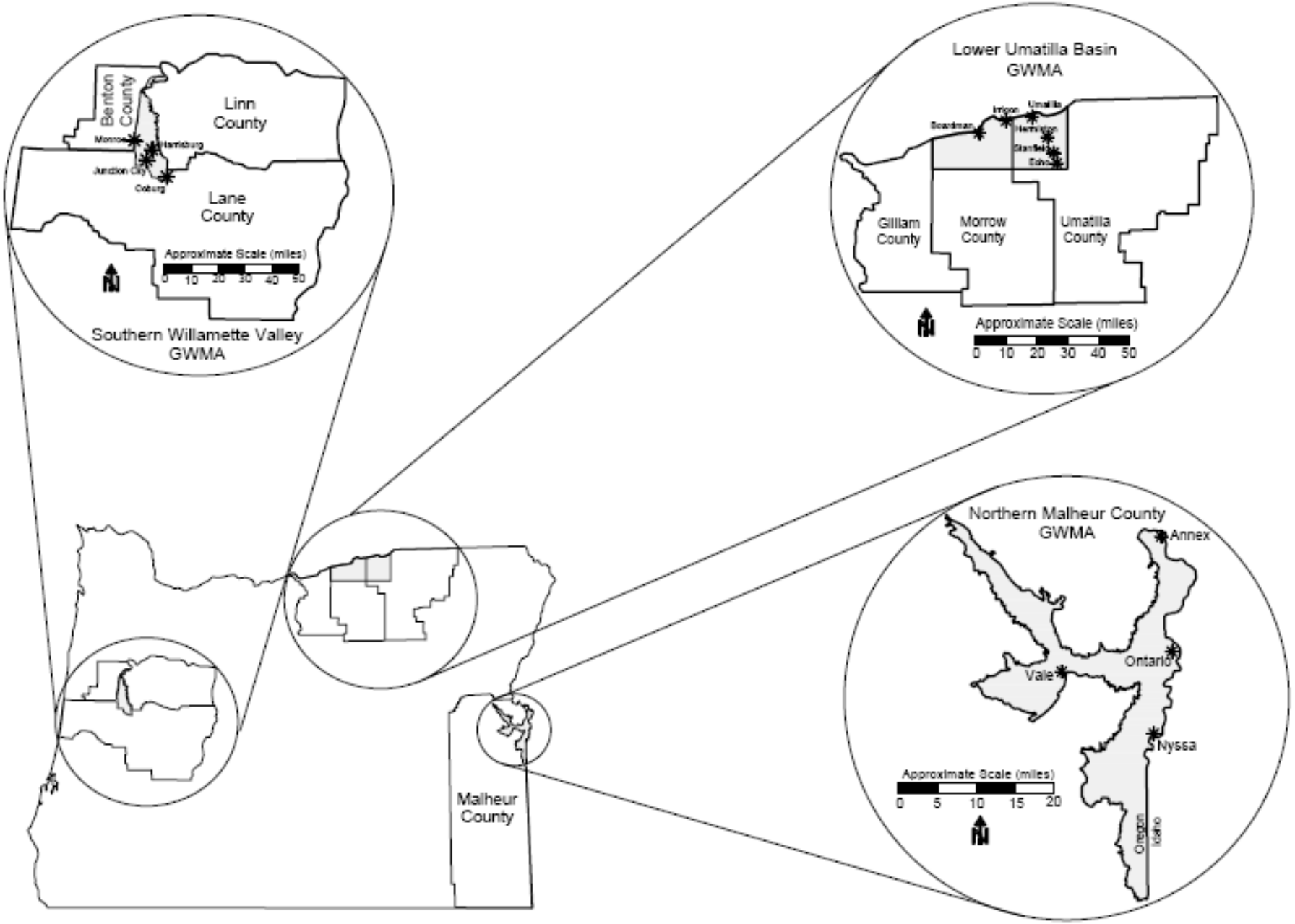


Audrey Eldridge
GWMA Comm. Coord.

A Groundwater Management Area (GWMA)

is a tool used by DEQ to address area-wide groundwater contamination when the contamination likely originates from many sources.

Location of Oregon's Groundwater Management Areas



Reasons why we should all be concerned about the groundwater quality in this area:

- SWV has been one of the fastest growing parts of the state, with many rural homes relying on groundwater
- While the Department of Human Services monitors the quality of public water supplies, there are no water quality regulations for private wells
- Nitrate presents health risks especially for the very vulnerable

Nearly 100 Percent of GWMA Residents Rely on Groundwater

GWMA Standard 7.0 mg/L

PDWS Standard 10.0 mg/L

DEQ Regional Groundwater Studies

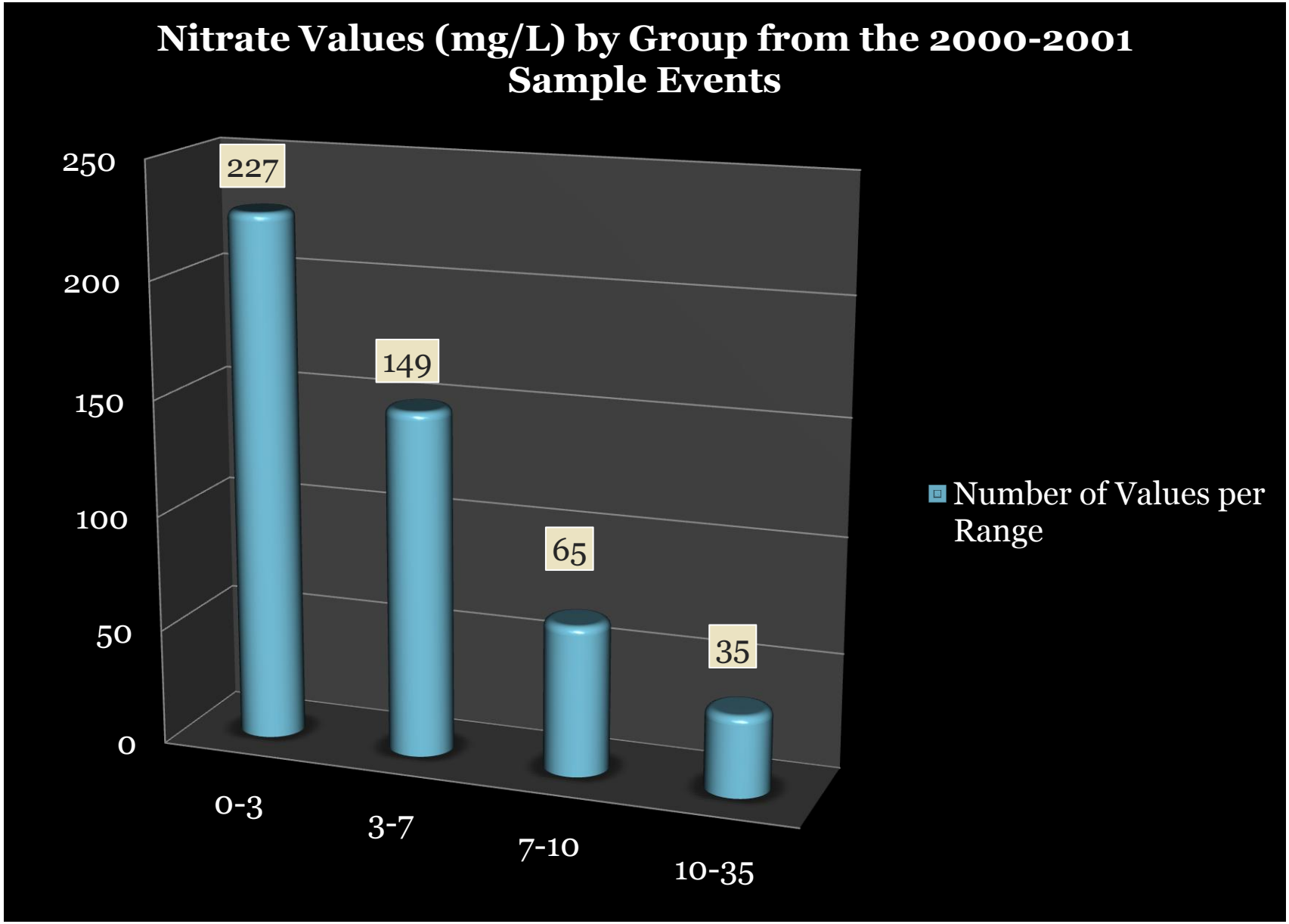
45 areas investigated since the 1980's

- 26 studies identified areas of contamination
- Contaminants include:
  - ❖ Nitrate
  - ❖ Pesticides
  - ❖ VOCs
  - ❖ Bacteria

Sampling Programs using domestic wells

- 2000-2001 Nitrate Testing
  Looked for good coverage of the area, and targeted shallow wells

- 2002 Study
  Looked to confirm earlier results, and to determine if any other parameter of concern was present


Nitrate Values (mg/L) by Group from the 2000-2001 Sample Events
250
200
150
100
50
0
227
149
65
35
0-3
3-7
7-10
10-35
Number of Values per Range

Oregon GWMA Process (in general)

(1) Document contamination

(2) Declare a Groundwater Management Area (GWMA)

(3) Appoint an Advisory Committee

(4) Form an Action Plan

(5) Implement the Action Plan

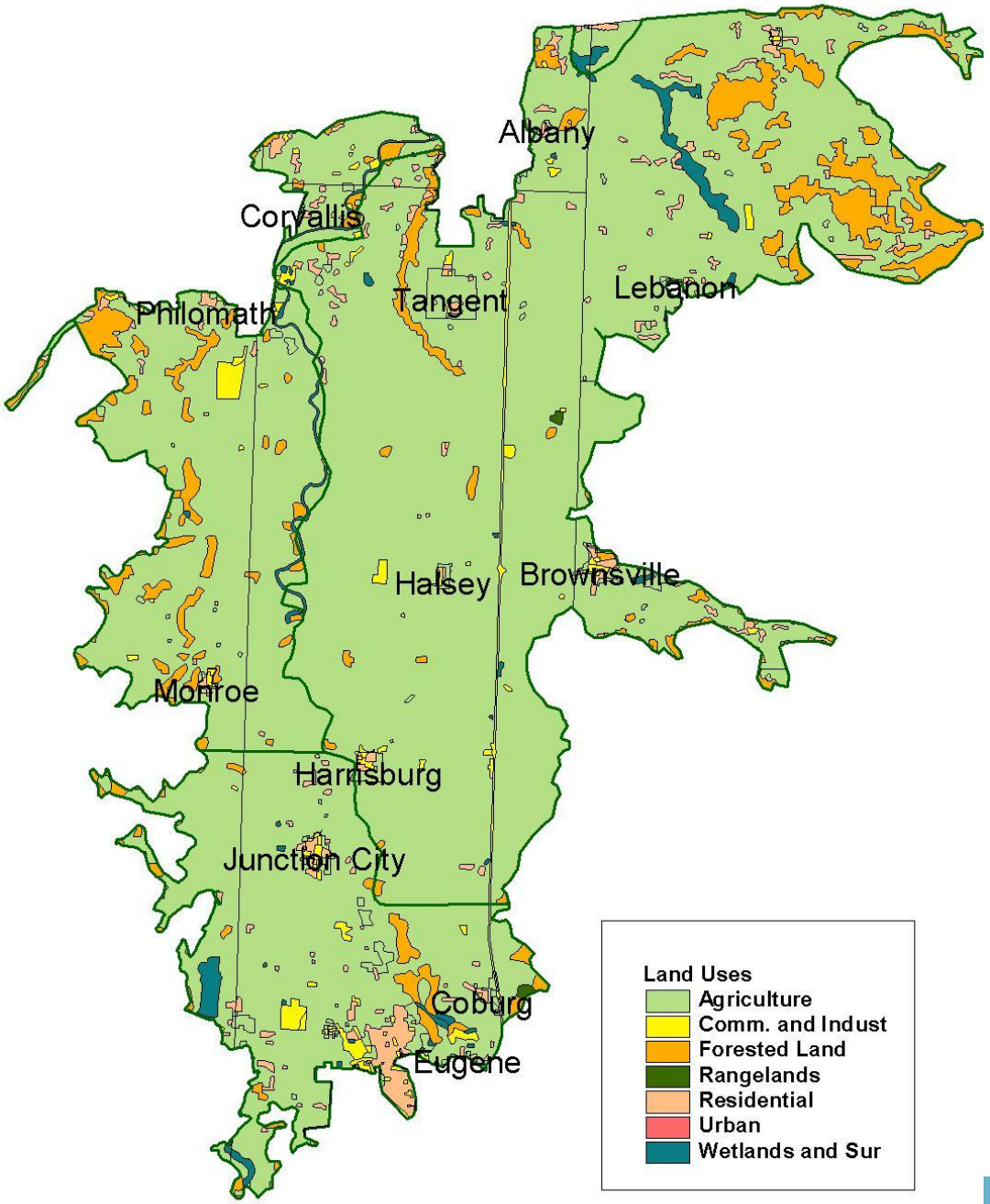
(6) Rescind the GWMA declaration

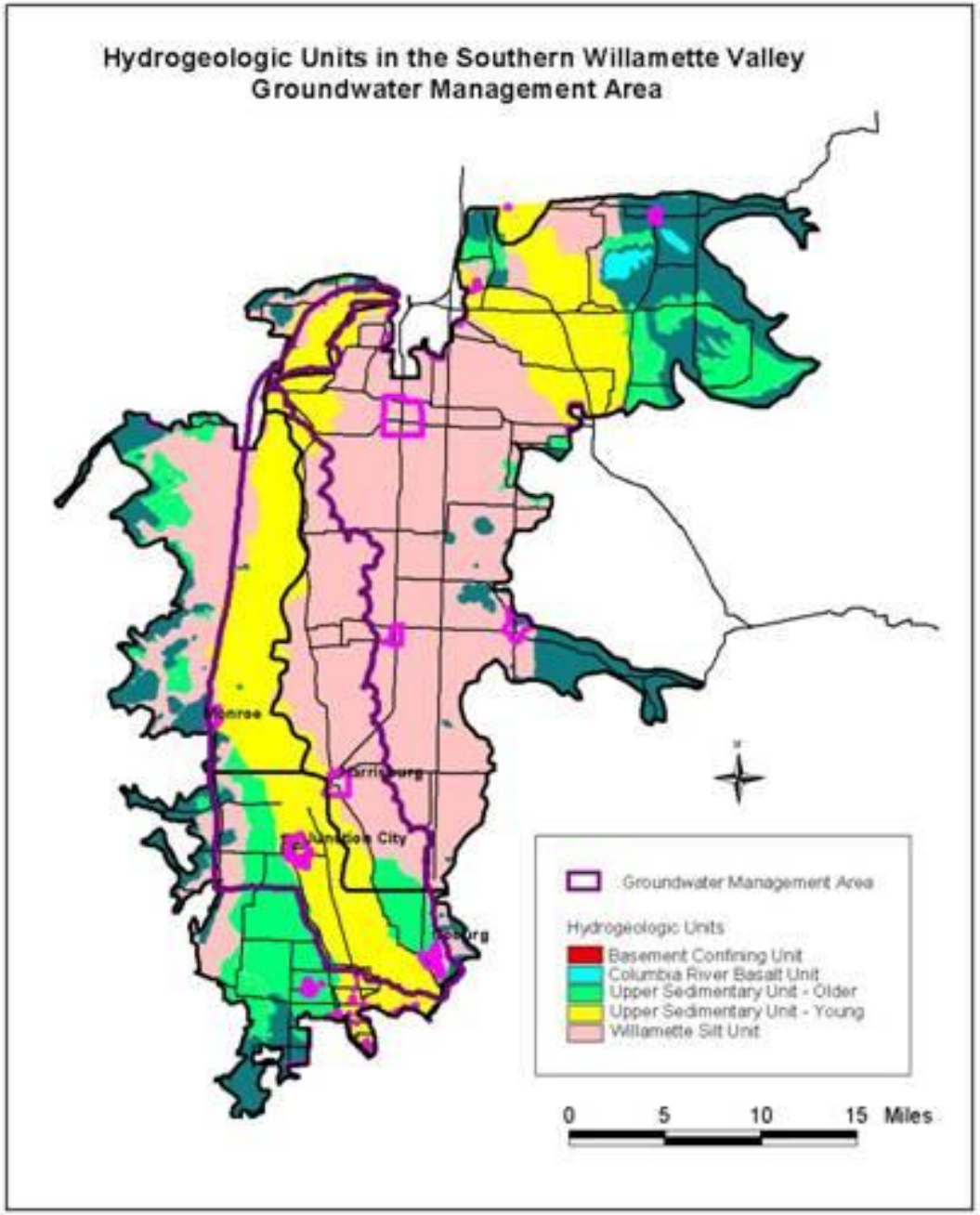
Southern Willamette Valley Groundwater Management Committee

LAND USES

93%
Agriculture

Some localized areas of commercial, residential and a smattering of silverculture



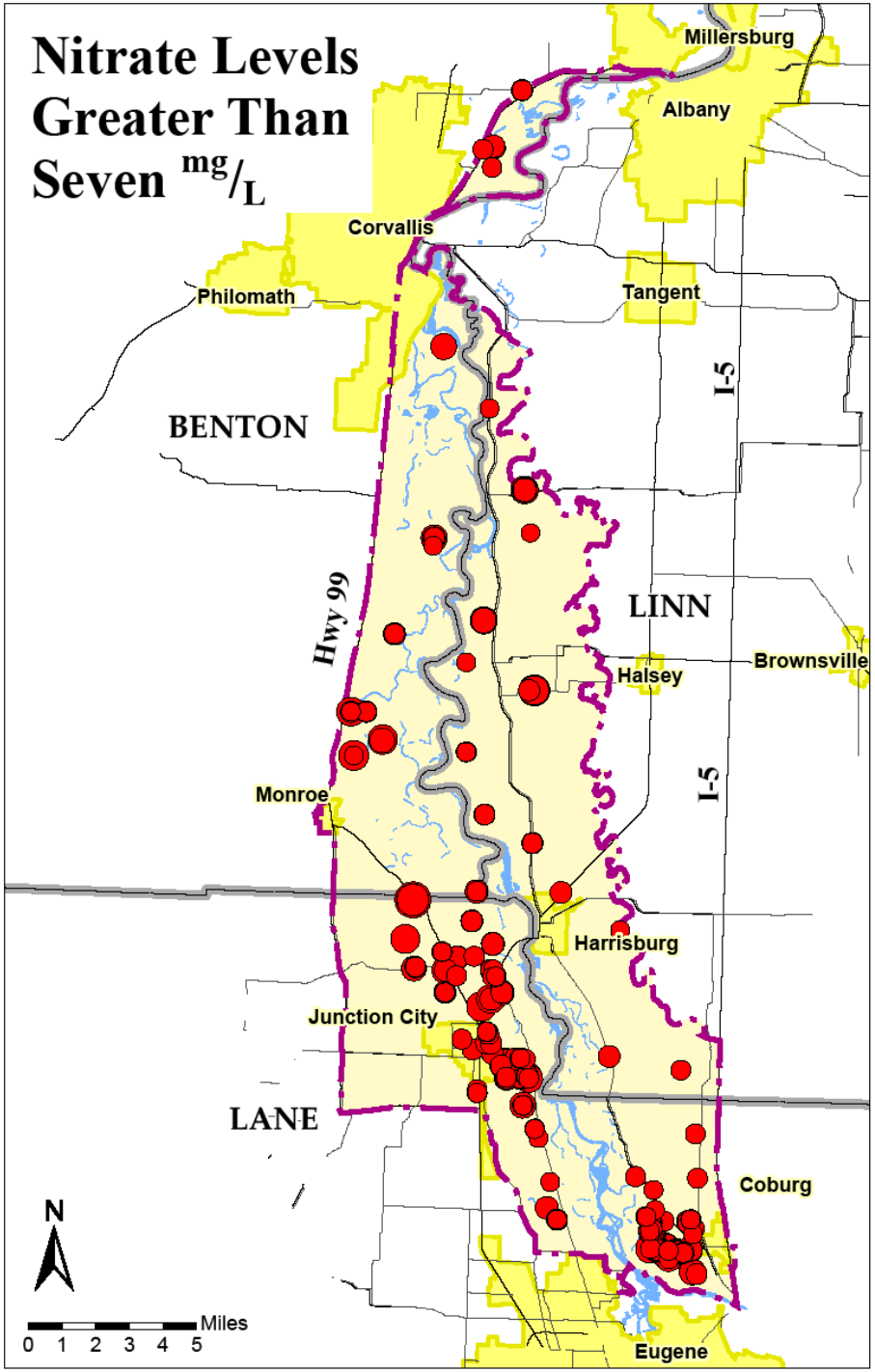


Hydrogeologic Units

Willamette Silt

Alluvial Materials – younger

Alluvial Materials – older

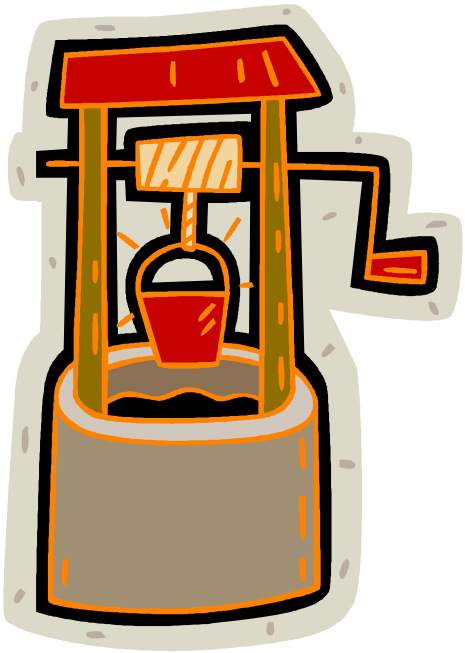

Nitrate Levels Greater Than Seven mg/L
Millersburg
Albany
Corvallis
Philomath
Tangent
I-5
BENTON
Hwy 99
LINN
Brownsville
Halsey
Monroe
I-5
Harrisburg
Junction City
LANE
Coburg
N
Miles
0 1 2 3 4 5
Eugene

Back to Back Land Uses

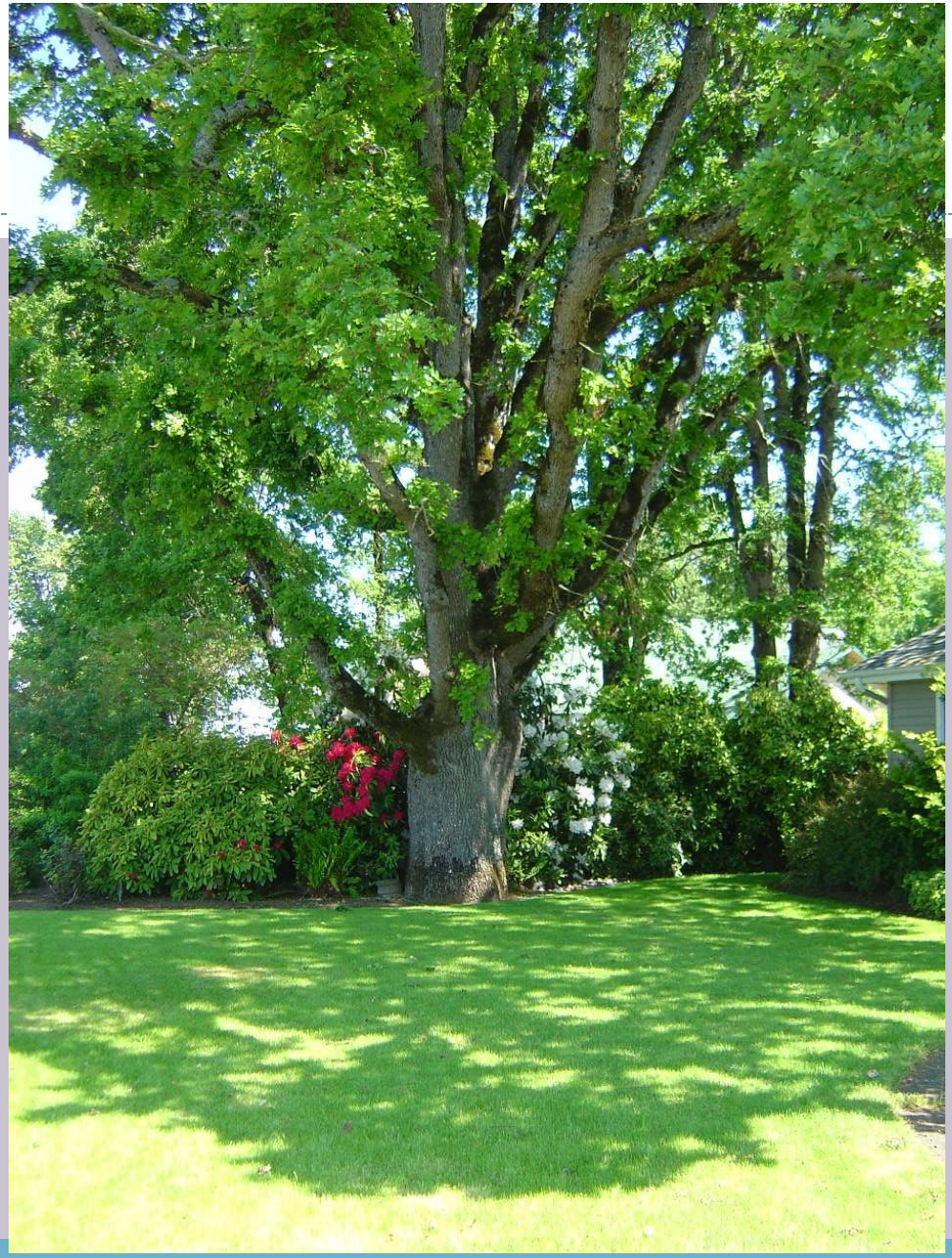
Public Water Systems

- 54 Total Public Water Supplies within GWMA.
  - **15 State Regulated**
  - **39 Federally Regulated**
    - 13 are cities, rural sub-divisions, and/or mobile home parks.
    - 8 are schools and/or places of work.
    - 18 are rest areas, restaurants, gas stations, etc…

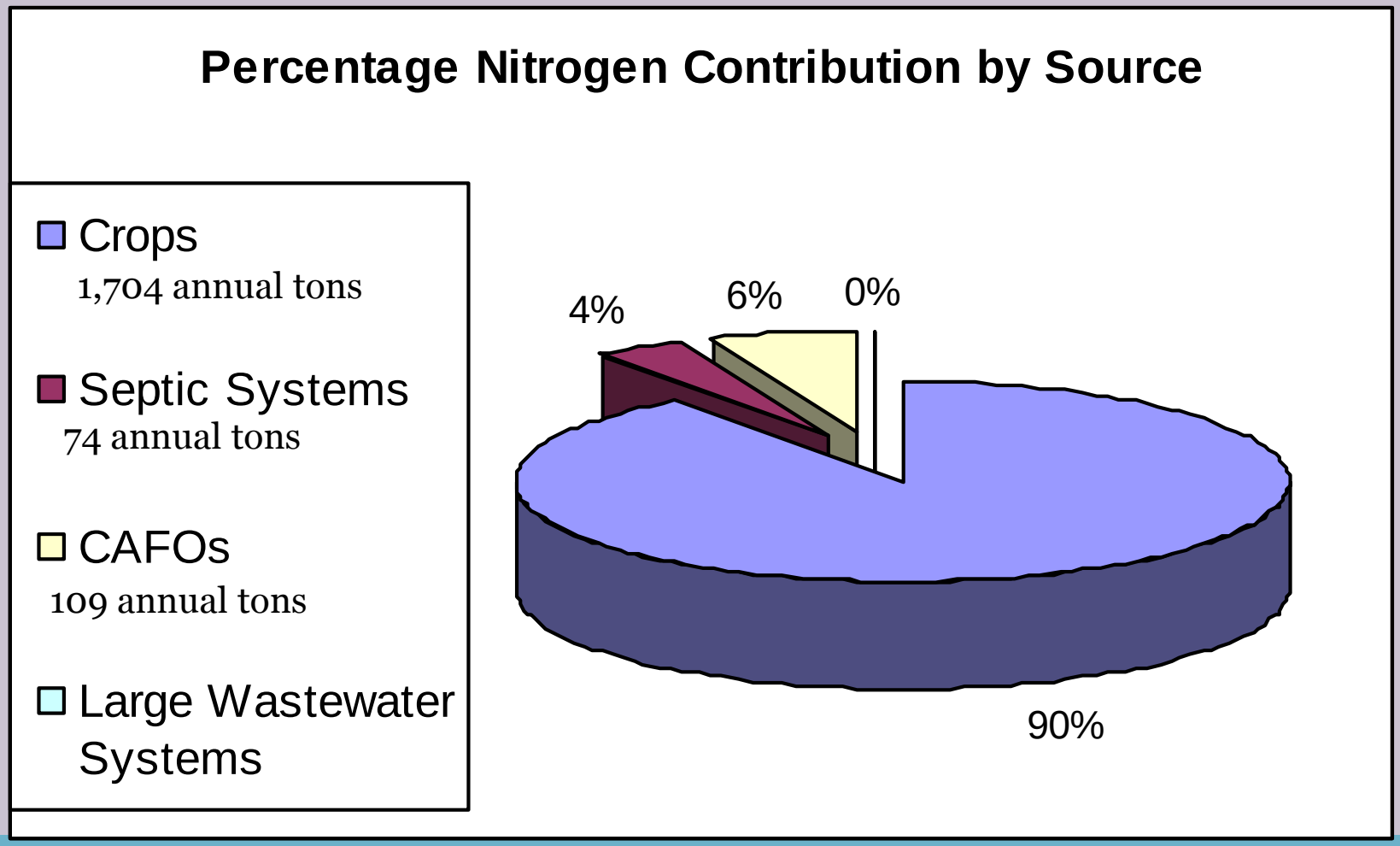
Drinking Water Systems



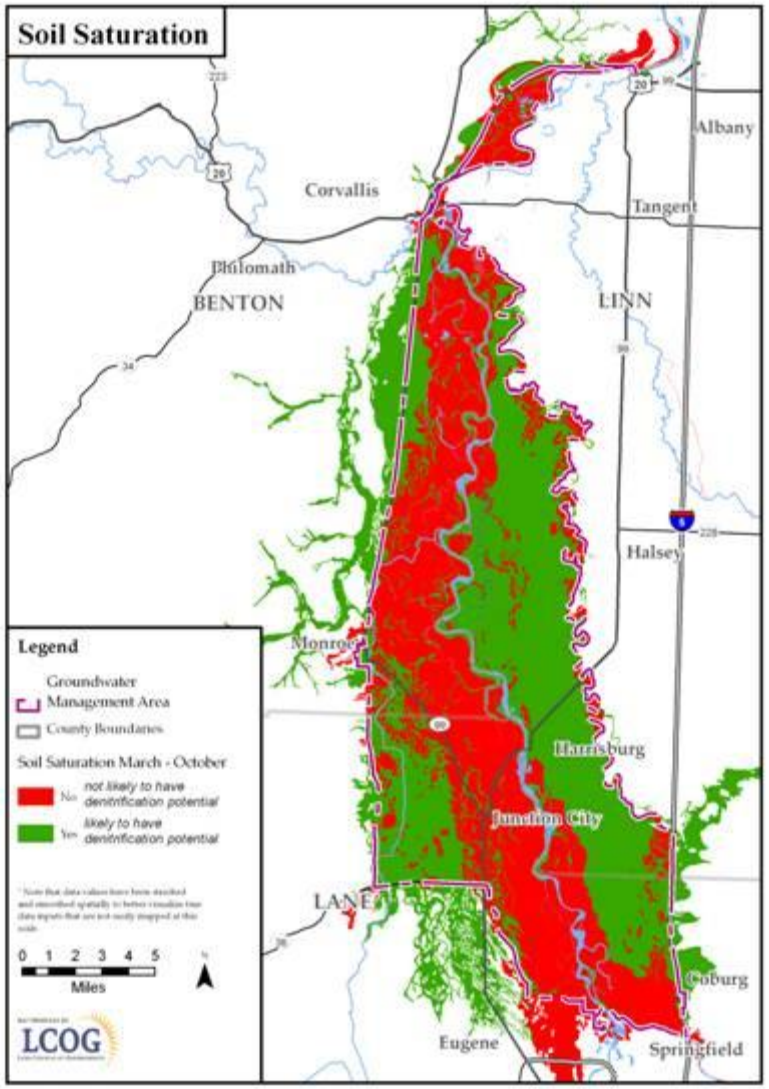
- Federally Regulated
  - Serves 25 or more people or has 15 or more service connections.
- State Regulated
  - Serves 10 to 24 people or has 4 to 14 service connections.
- Private
  - ~2,300 wells

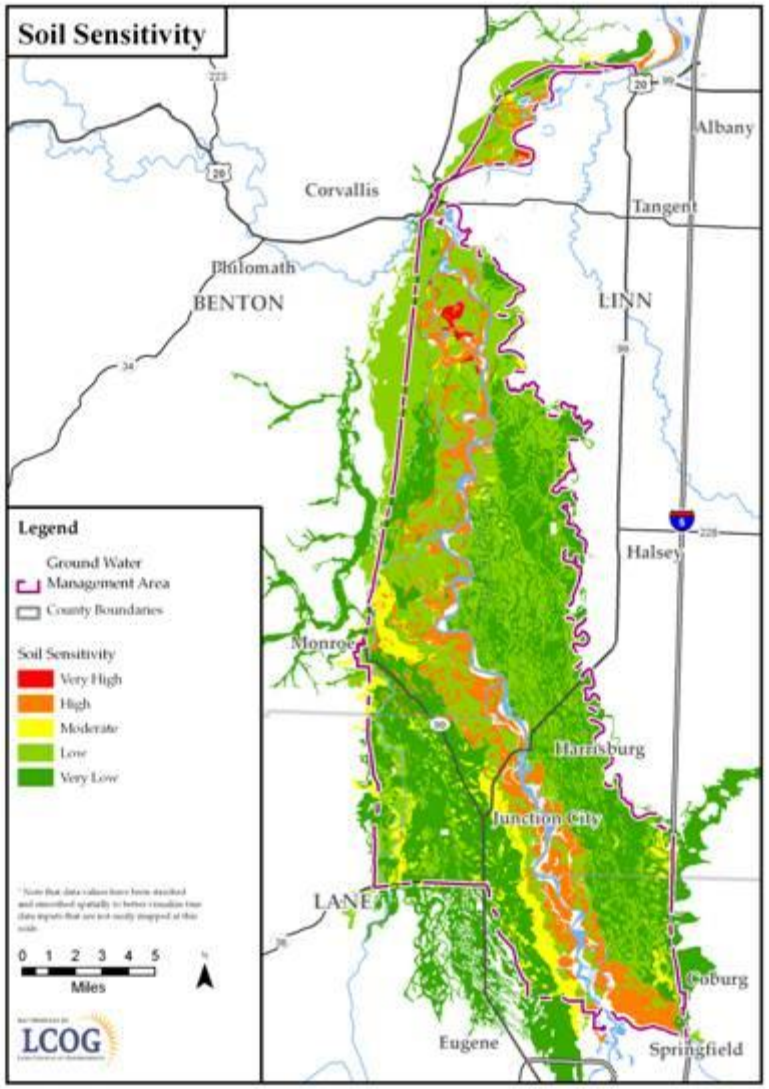


Four Sources of Nitrate Analyzed by the Nitrogen Budget



Qualitative Effects of Soil Conditions and Nutrient Fate in Groundwater



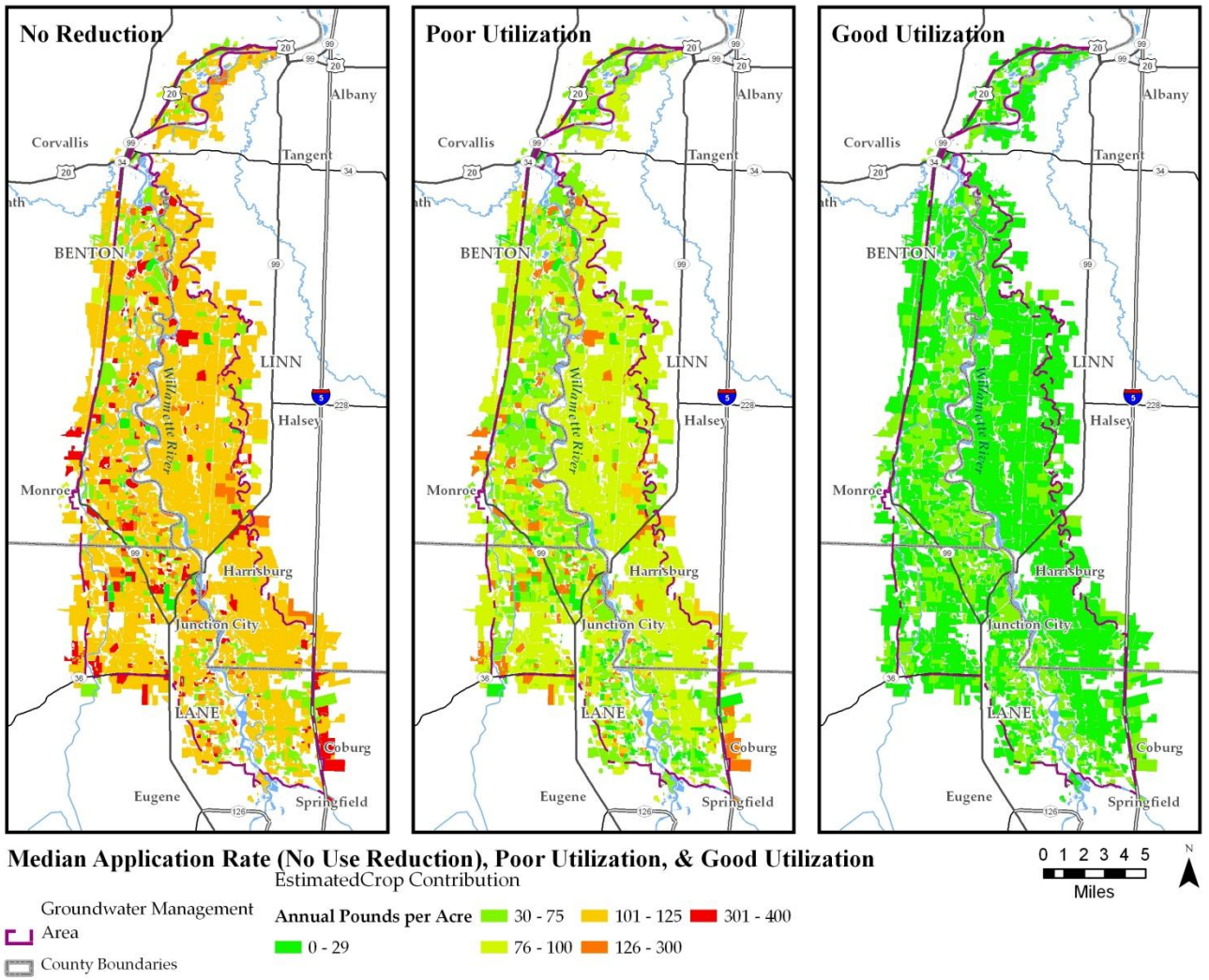


Uptake ratios take into account conditions and management practices

Field Classification	Percent of Crop Lands	Poor Utilization (low) Uptake Ratio	Good Utilization (high) Uptake Ratio
Alfalfa	.29%	15%	60%
Beans/peas	.19%	10%	60%
Berries & vineyards	1.29%	30%	70%
Christmas trees	.34%	50%	80%
Clover	1.13%	15%	60%
Corn	.13%	30%	65%
Double cropping	.10%	30%	70%
Grains	4.26%	10%	80%
Grass seed rotation	56.60%	40%	85%
Hayfield	6.59%	40%	85%
Irrigated annual rotation	12.55%	50%	50%
Irrigated perennial	3.18%	60%	90%
Mint	2.52%	40%	65%
Orchard	.96%	60%	90%
Pasture	3.93%	40%	85%
Sugar beet seed	.69%	50%	70%
Turfgrass	.90%	40%	85%

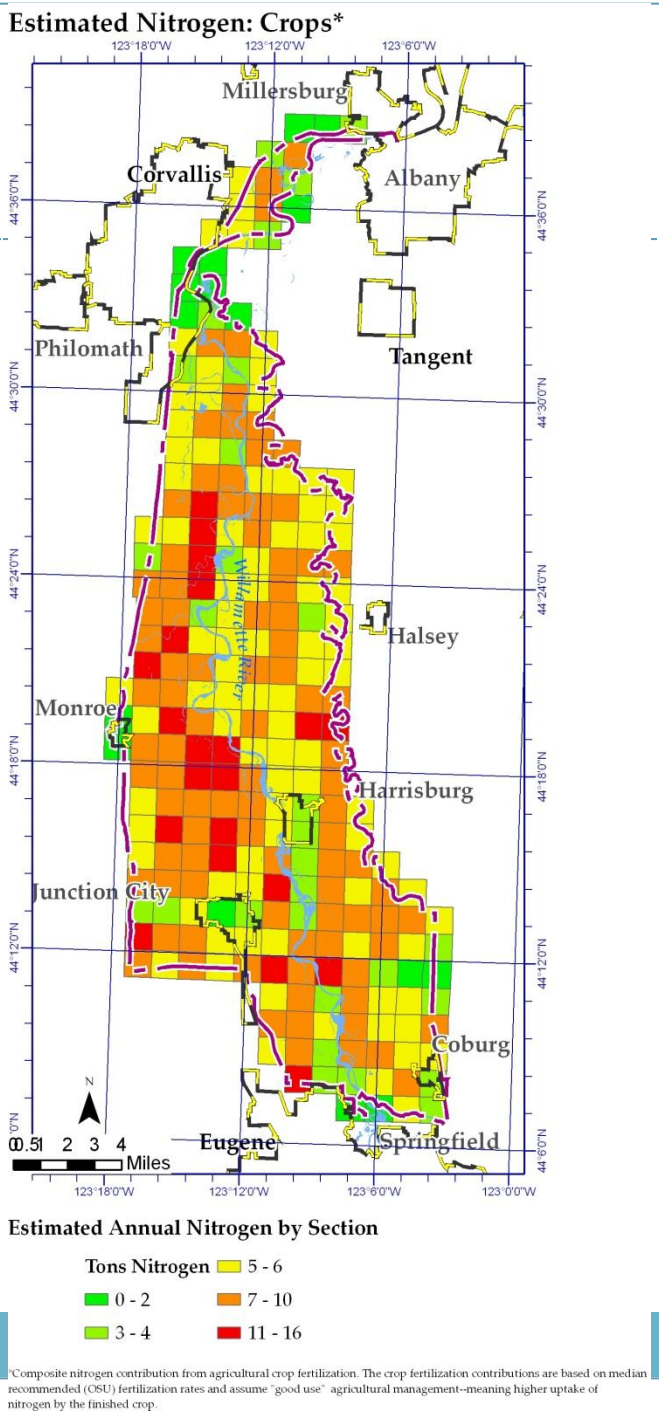
Nitrogen Potentially Lost Per Acre Depending on Utilization

(conditions and management practices)

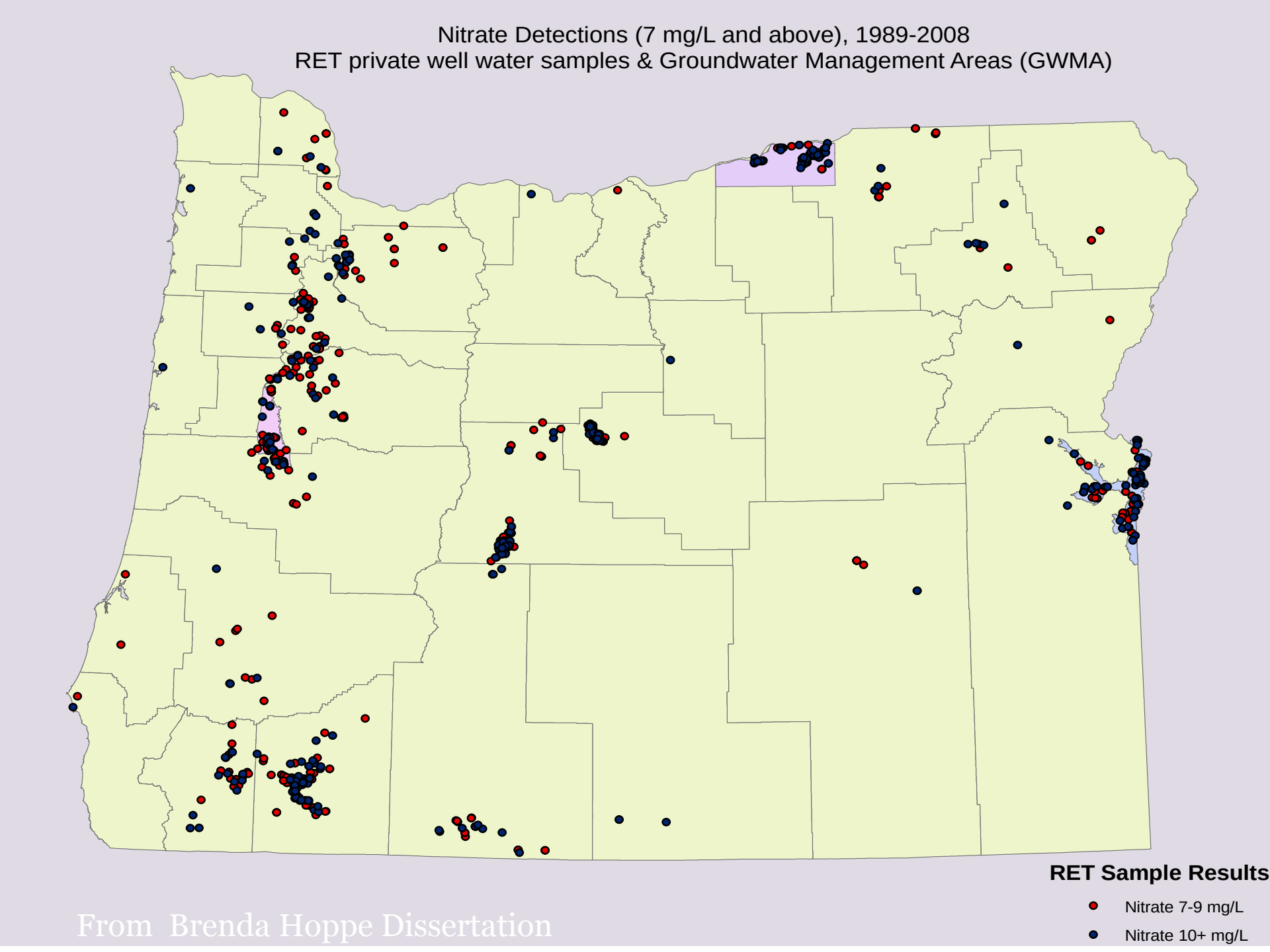


- **Fertilizer applications with a good utilization scenario**

- **Estimated annual nitrogen impact to groundwater from fertilizer by Section.**



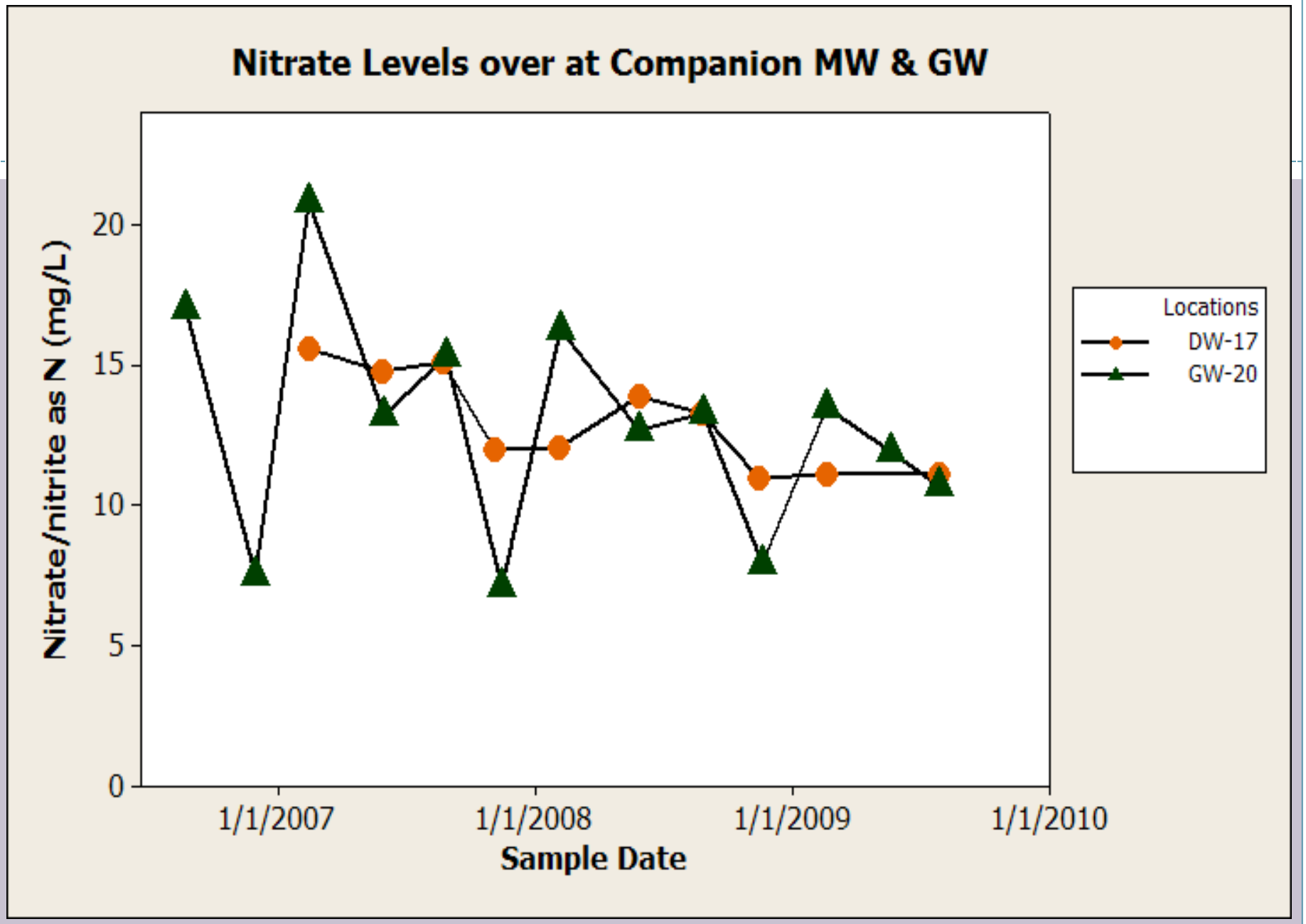
*Composite nitrogen contribution from agricultural crop fertilization. The crop fertilization contributions are based on median recommended (OSU) fertilization rates and assume "good use" agricultural management--meaning higher uptake of nitrogen by the finished crop.


Nitrate Detections (7 mg/L and above), 1989-2008
RET private well water samples & Groundwater Management Areas (GWMA)
RET Sample Results
Nitrate 7-9 mg/L
Nitrate 10+ mg/L
From Brenda Hoppe Dissertation

Long Term
Measuring Overall Groundwater Quality

- Network of 40 domestic and monitoring wells established


Dawson Rd
Hubbard Rd
GW - 20 Hubbard
DW-17 Hubbard
99W
Old River Rd
Image State of Oregon
© 2009 Google
© 2009 Europa Technologies
Google
44°21'36.71" N 123°16'48.50" W
elev 273 ft
Jun 29, 2005
Eye alt 8883 ft


Nitrate Levels over at Companion MW & GW
Nitrate/nitrite as N (mg/L)
0
5
10
15
20
1/1/2007
1/1/2008
1/1/2009
1/1/2010
Sample Date
Locations
DW-17
GW-20

SWV GWMA Long Term Monitoring

2008

17 Domestic Wells

- **4 decreasing**
- **8 steady**
- **5 increasing**

24 Monitoring Wells

- **7 decreasing**
- **7 steady**
- **9 increasing**
- **1 no show**

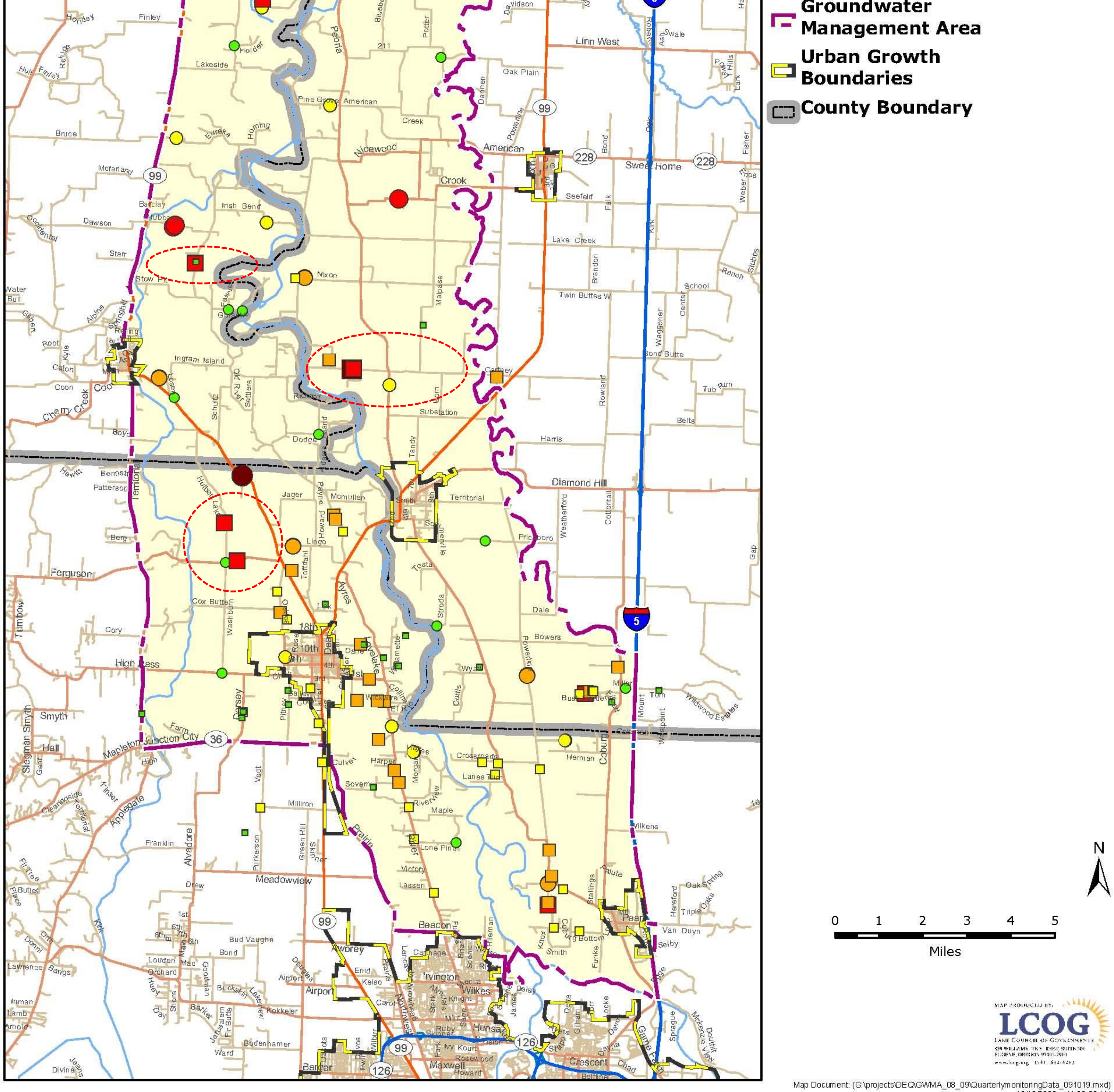
2009

15 Domestic Wells

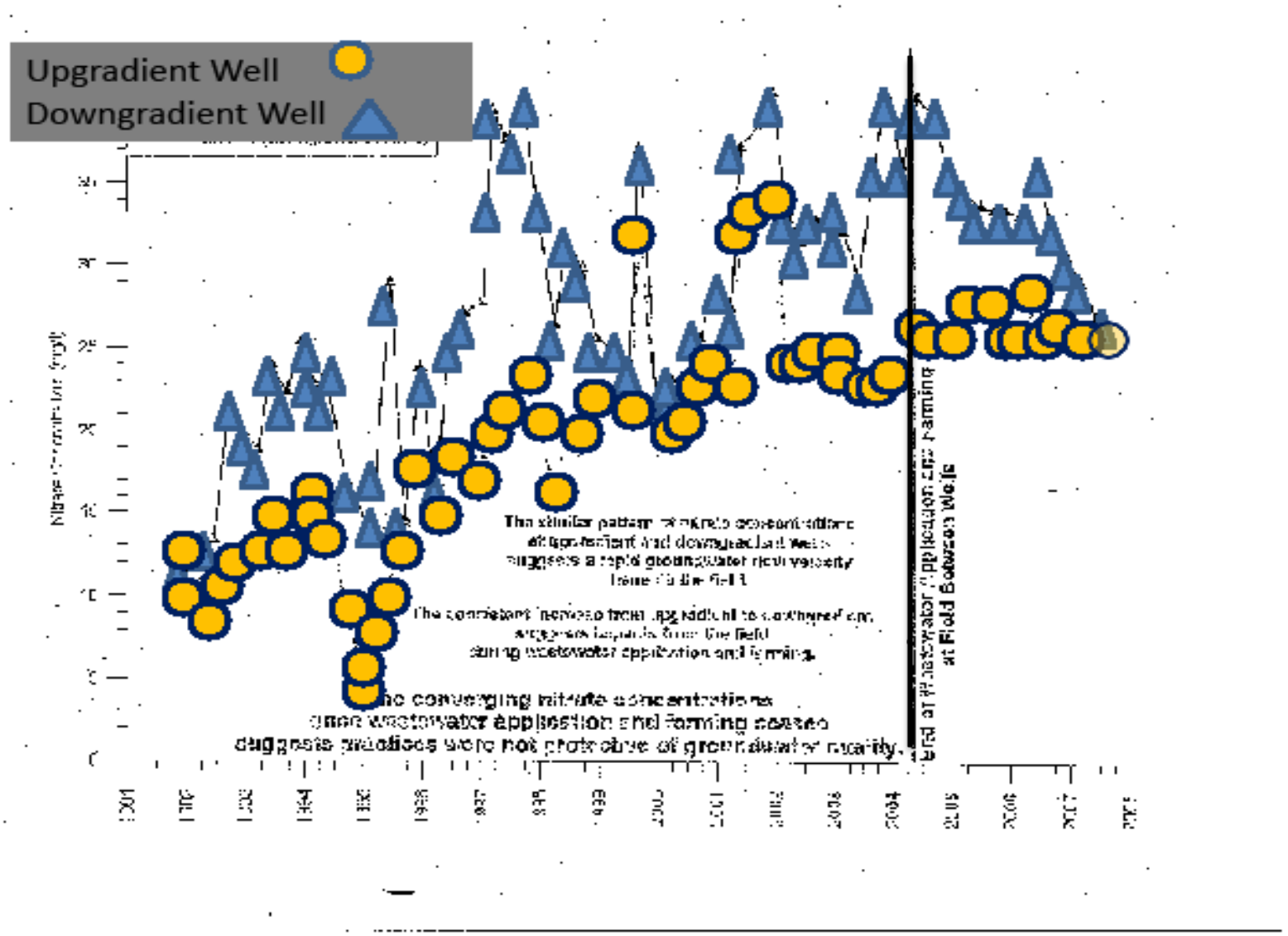
- **10 decreasing**
- **2 steady**
- **4 increasing**

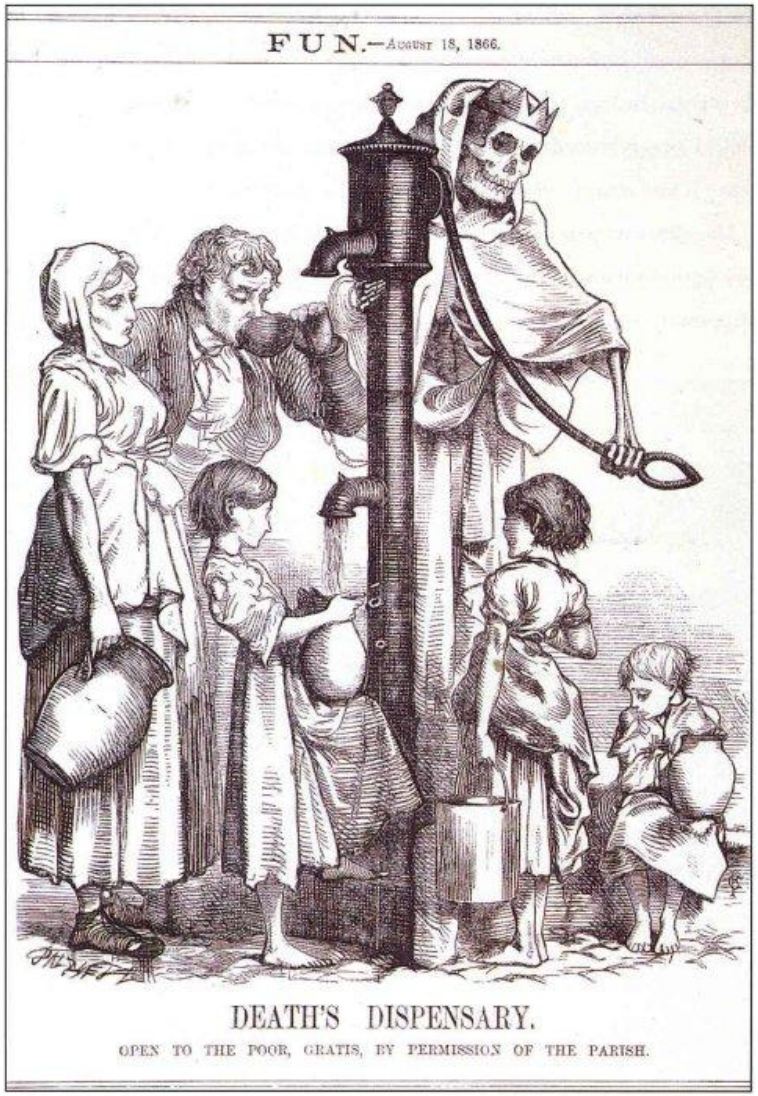
24 Monitoring Wells

- **10 decreasing**
- **6 steady**
- **7 increasing**
- **1 no show**


Groundwater Management Area
Urban Growth Boundaries
County Boundary
N
0 1 2 3 4 5
Miles
MAP PRODUCED BY: LCOG LANE COUNCIL OF GOVERNMENTS
Map Document: (G:\projects\DEQ\GWMA_08_09\QuarterlymonitoringData_091019.mxd)
10/19/2009 -- 11:39:20 AM

LUB GWMA NITRATE IN GROUNDWATER – WASTEWATER IRRIGATION




FUN.—August 18, 1866.
DEATH'S DISPENSARY.
OPEN TO THE POOR, GRATIS, BY PERMISSION OF THE PARISH.


'94 2 17

http://gwma.oregonstate.edu/

Overall Goal

Thank you

Nitrate (mg/L) Statistics for the May 2009 Event Compared with the Long Term Monitoring Locations

	Long Term Aug 2006 - July 2009	Synoptic May 2009	Long Term May 2009
Mean	4.90	5.73	5.27
Standard Deviation	5.44	4.85	5.44
Min	0.01	0.01	0.01
Maximum	27.6	35.9	27.5
Median	4.68	5.74	4.60
25% data below	0.72	2.3	1.11
75% data below	6.41	8.4	7.16
Total number	492	108	36