

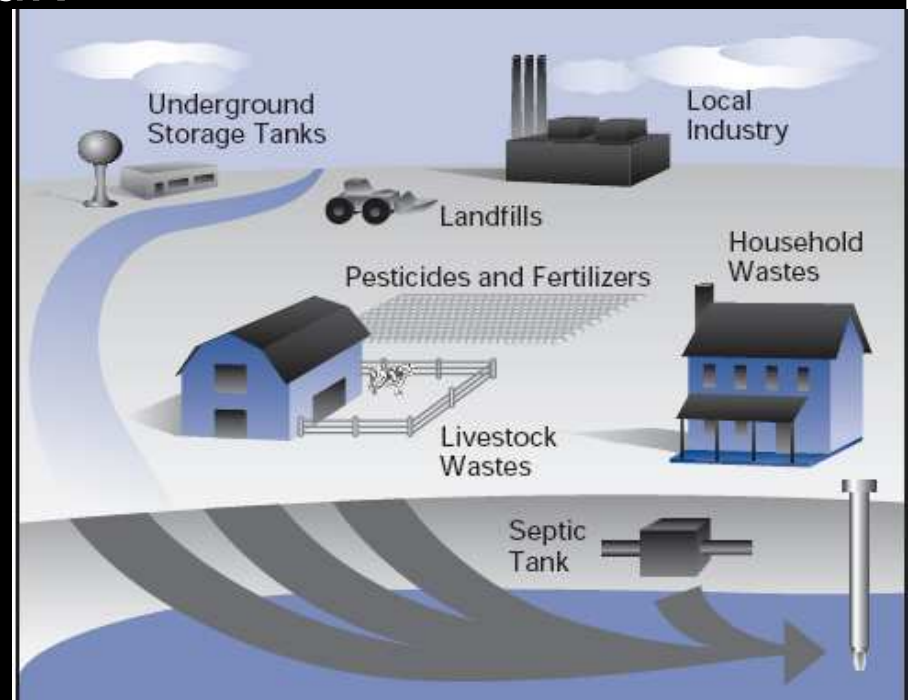
Private Wells in Oregon



- Over 350,000 private wells in Oregon
- 16% of Oregon's population
- Given population growth forecasts, will likely increase

Wells are vulnerable

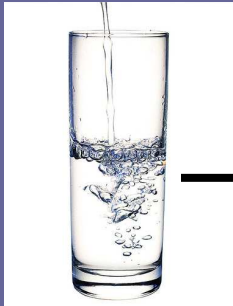
- Private wells draw from groundwater
- Contamination can occur:
 - UST
 - Landfills
 - Industry
 - Wastewater
 - Manure
 - Septic tanks
 - Field applications



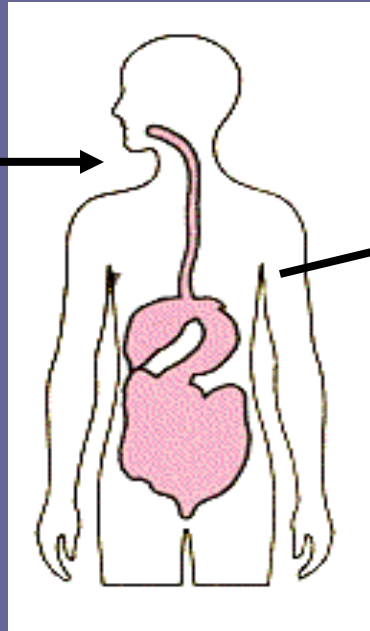
Nitrate: Most Widespread Contaminant



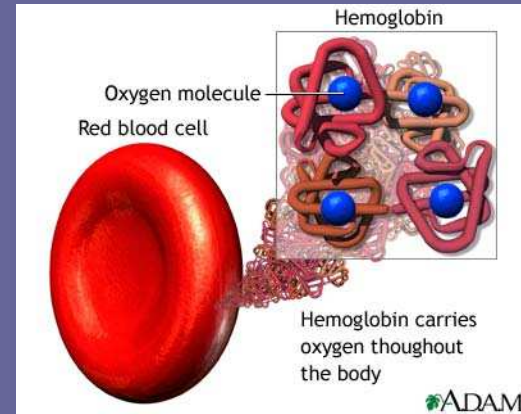
- MCL is 10 mg/L (ppm)
- Established to protect infants from methemoglobinemia
- Other concerns include:
 - Noncancer: thyroid hormone disruptions, diabetes, adverse reproductive outcomes, acute respiratory infections
 - Cancer: non-Hodgkin lymphoma, colon, renal, bladder, ovary



nitrate



Reduced to nitrite



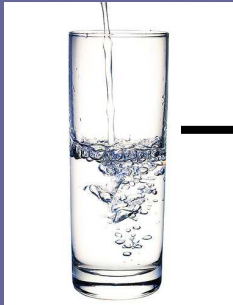
Oxidizes Hb



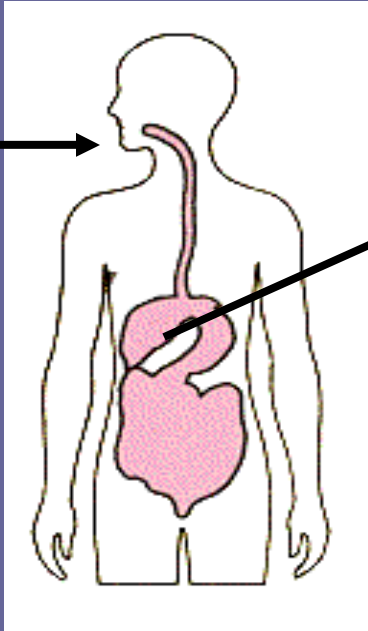
>10%

Methemoglobinemia

MeHb

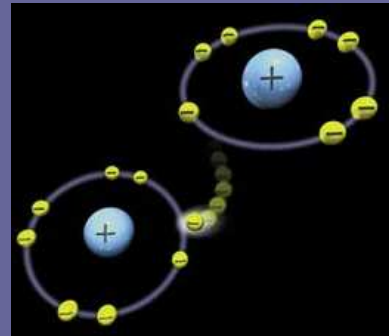
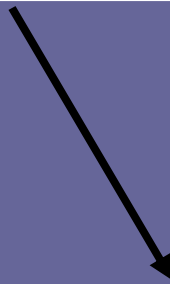


nitrate

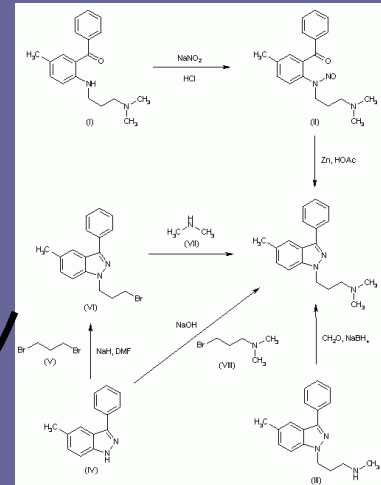


Nitrosation

Reduced to nitrite



Free radicals of NO and O₂



N-nitroso compounds

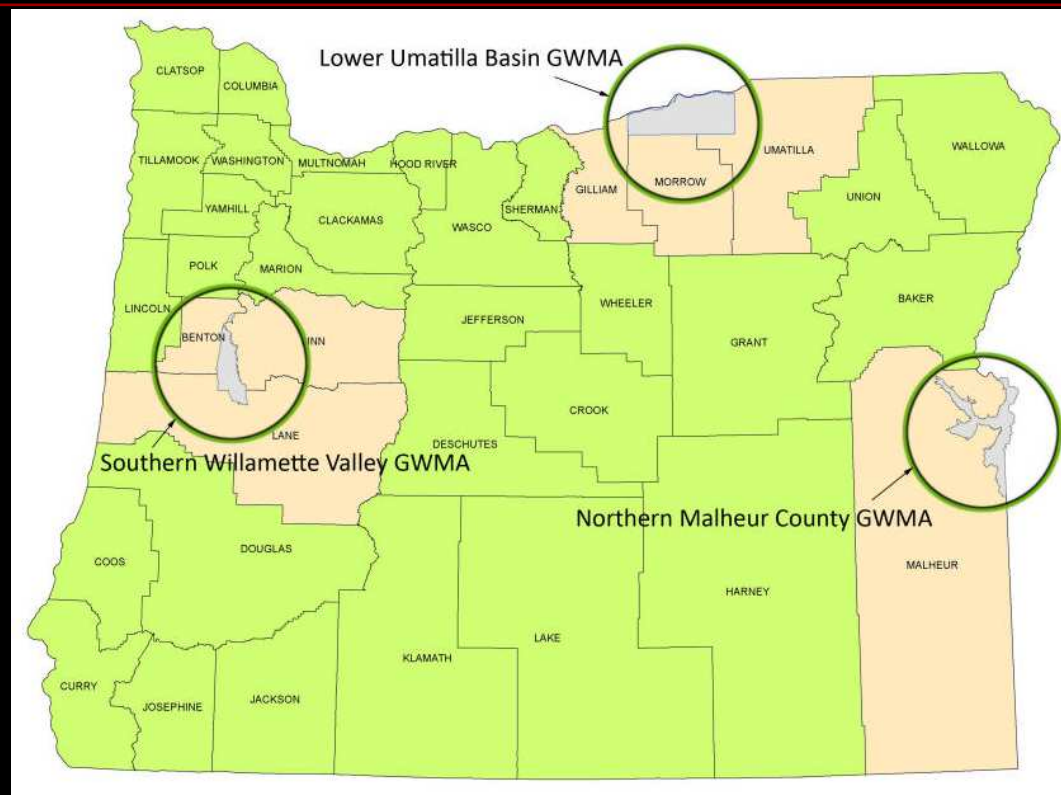
- CANCER
- BIRTH DEFECTS
- DIABETES
- ACUTE RESPIRATORY INFECTIONS



Groundwater Quality Protection Act

- DEQ given a range of GW protection responsibilities
- Requires GWMA designation if an area has elevated contaminant levels from non-point sources
 - For nitrate, if concentrations exceed 7 mg/L
 - Stakeholder Committee formed, voluntary action plan developed, some education outreach occurs

Oregon currently has 3 GWMAs



Declared for widespread nitrate contamination

Domestic Well Testing Act

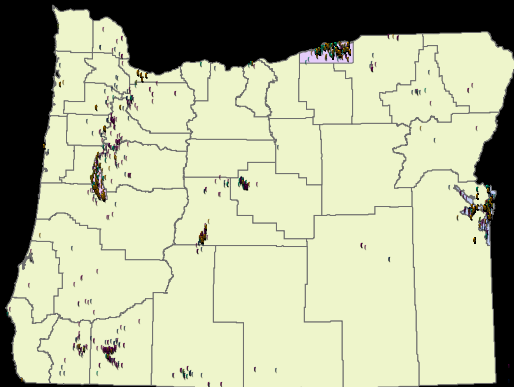


- Requires that an owner of a property with a private well must test for **nitrate** and **coliform** if the property is being sold or changing ownership
- 2009 amendment adds **arsenic**

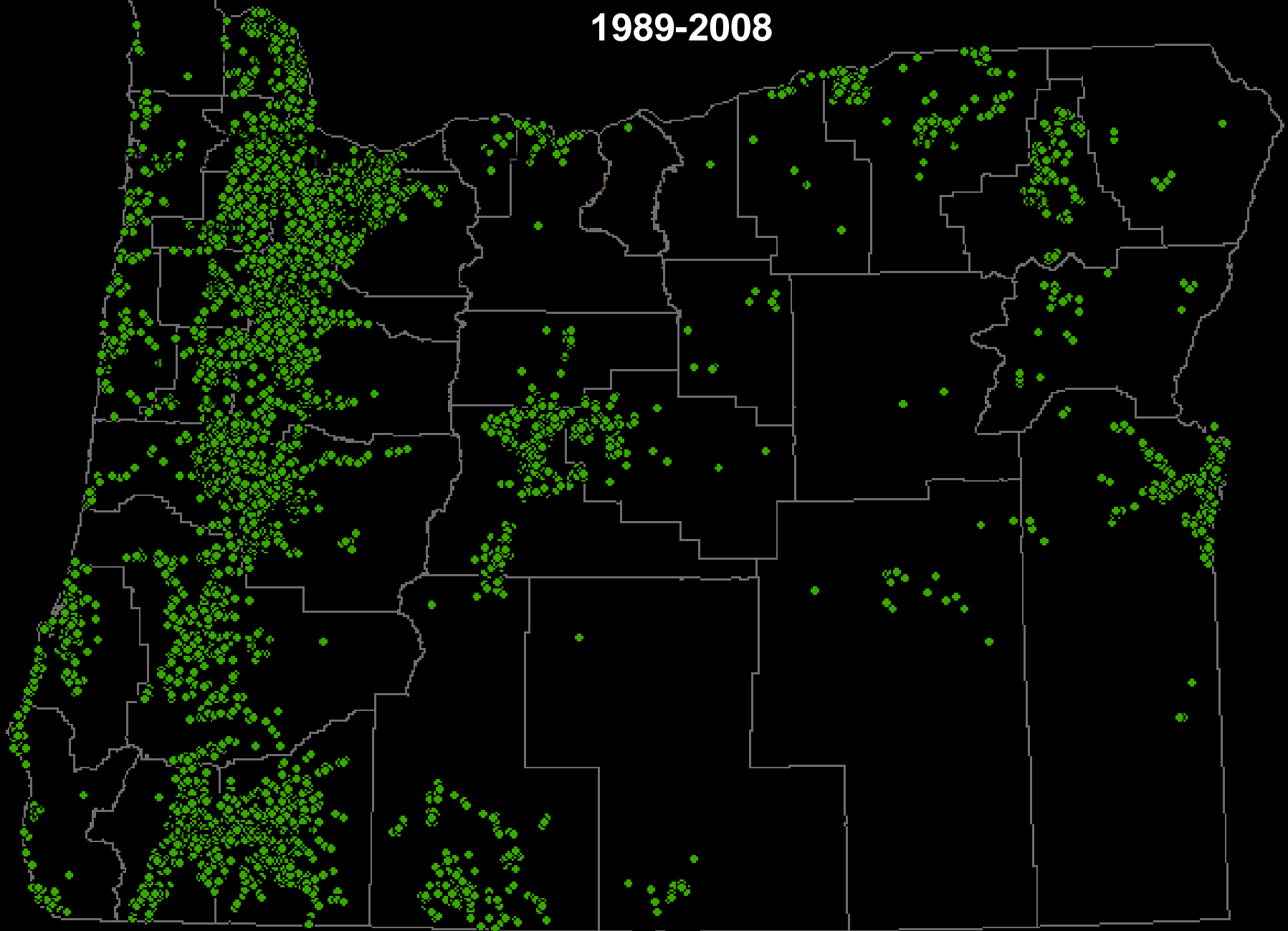
ORS 448: Testing & Data Submission

- Seller submits results and reporting form to DHS
 - Property address, owner name, well ID and depth, info on who sampled, and if buyer notified
- DHS sends to DEQ
- DEQ enters data into the RET database (2004)
 - Data available 1989-2008

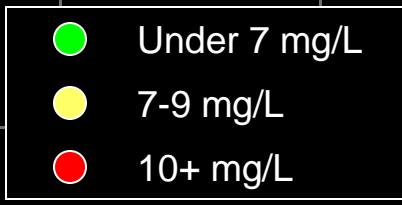
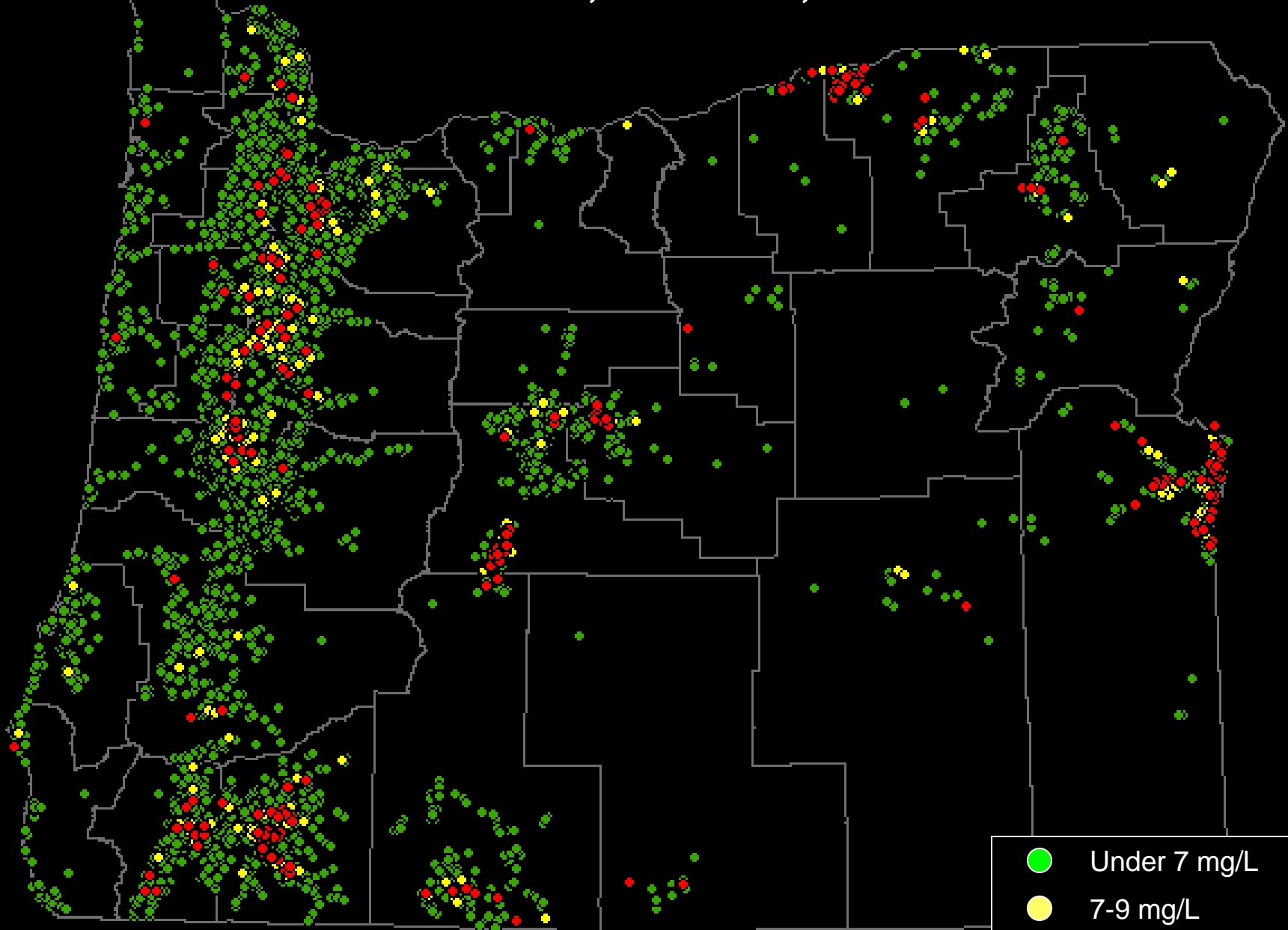
Spatial/Statistical Analysis of RET data



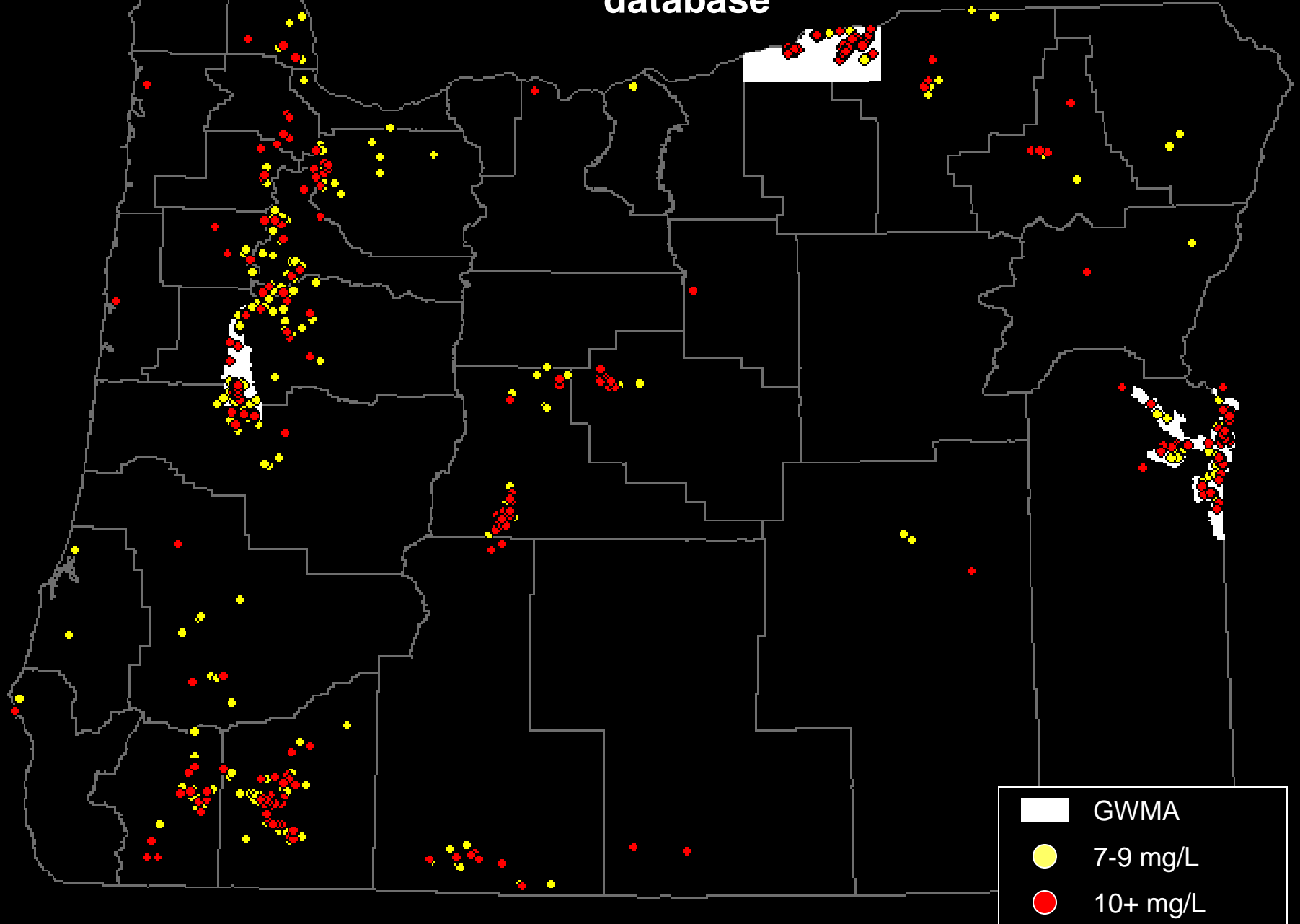
Locations of All Private Wells Listed in the RET Database 1989-2008



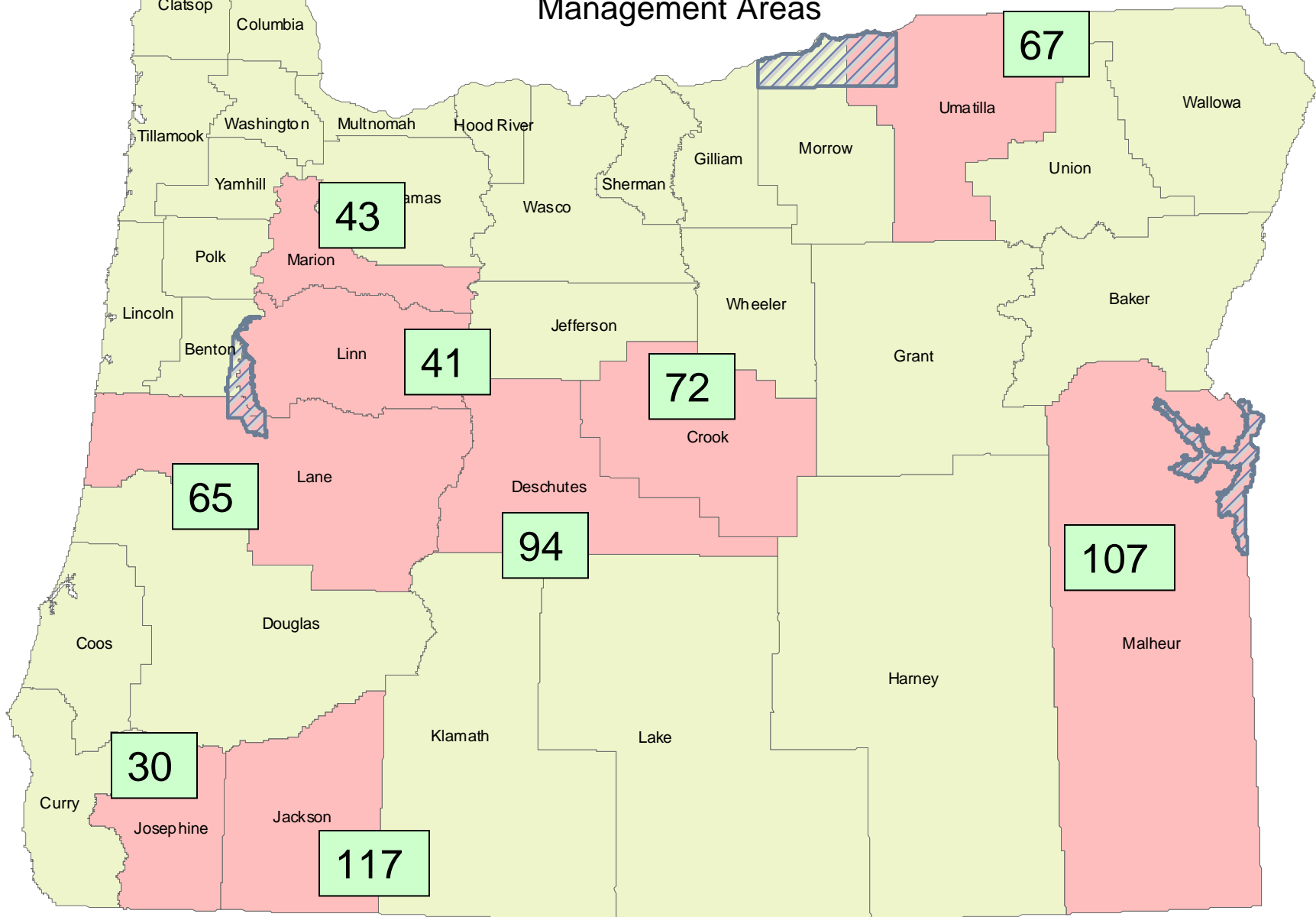
Nitrate detections, 1989-2008, RET database



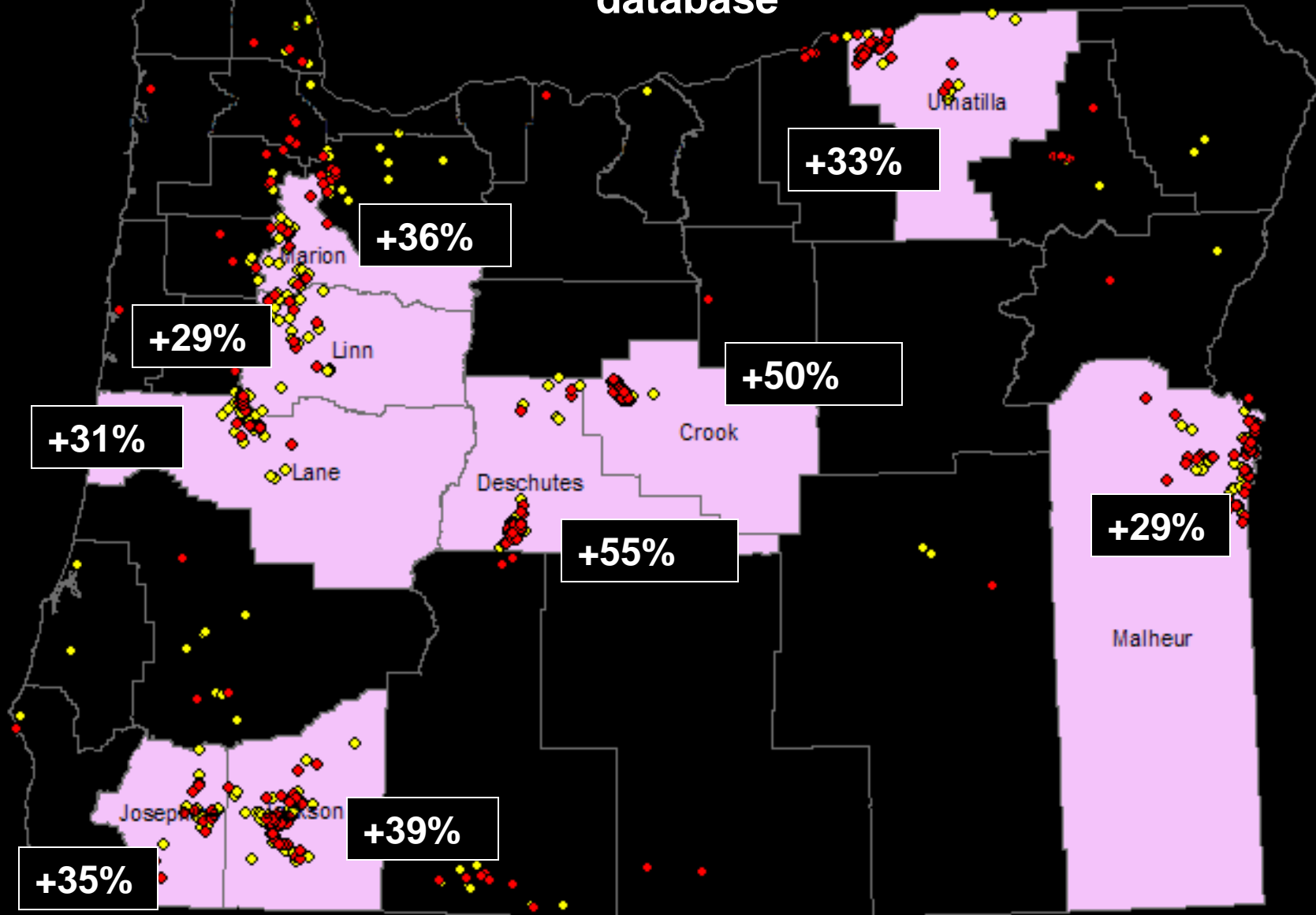
Nitrate detections (7 mg/L and above), 1989-2008, RET database



Oregon Counties with the Highest Number of Wells with Nitrate above 7 mg/L & Groundwater Management Areas



Nitrate detections (7 mg/L and above), 1989-2008, RET database



% Population Forecast, 2000-2040 (State average = 37%)