

# Private Wells in Oregon

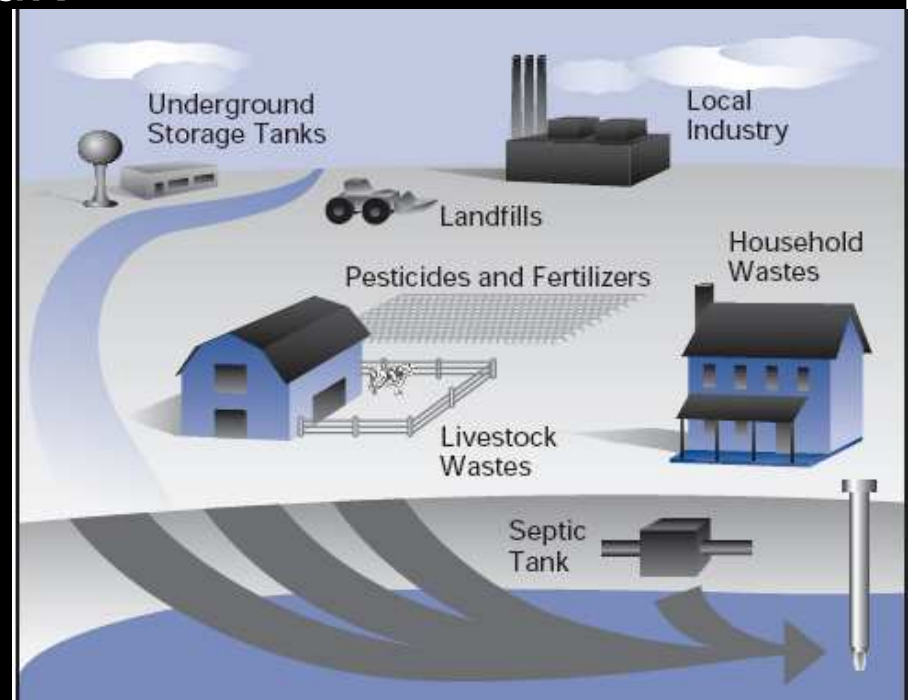
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- Over 350,000 private wells in Oregon
- 16% of Oregon's population
- Given population growth forecasts, will likely increase

# Wells are vulnerable

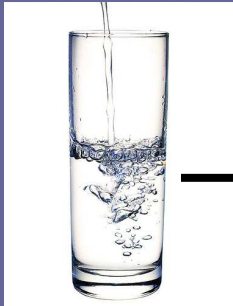
- Private wells draw from groundwater
- Contamination can occur:
  - UST
  - Landfills
  - Industry
  - Wastewater
  - Manure
  - Septic tanks
  - Field applications



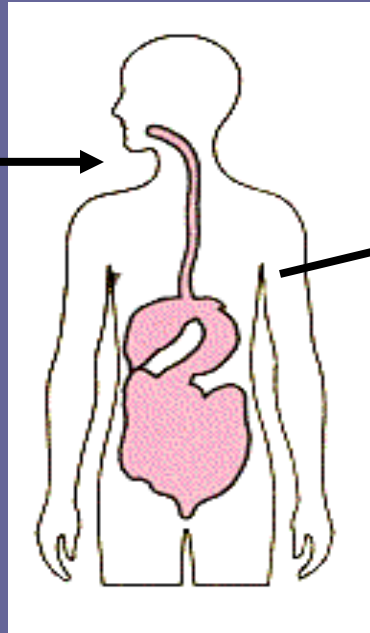
# Nitrate: Most Widespread Contaminant



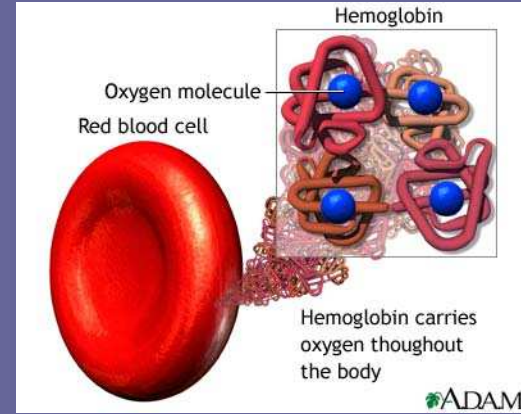
- MCL is 10 mg/L (ppm)
- Established to protect infants from methemoglobinemia
- Other concerns include:
  - Noncancer: thyroid hormone disruptions, diabetes, adverse reproductive outcomes, acute respiratory infections
  - Cancer: non-Hodgkin lymphoma, colon, renal, bladder, ovary



nitrate



Reduced to nitrite



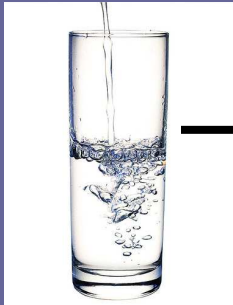
Oxidizes Hb



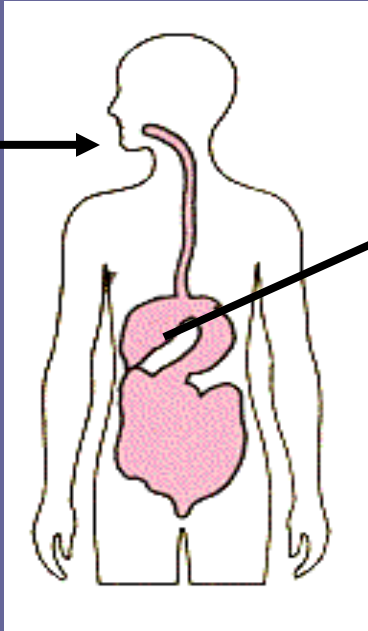
>10%

Methemoglobinemia

MeHb

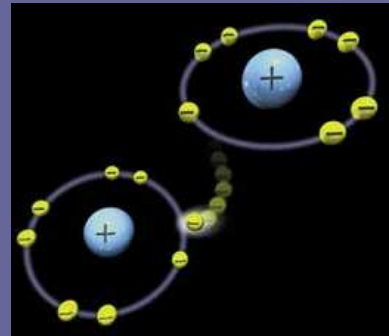
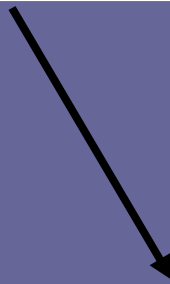


nitrate

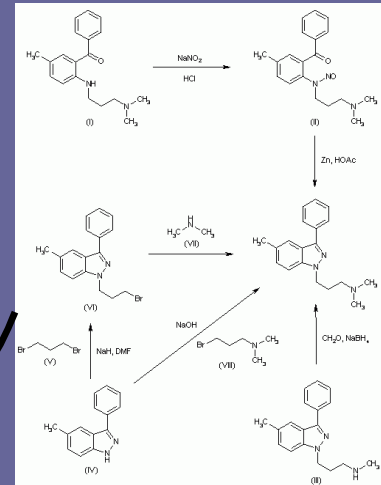


# Nitrosation

Reduced to nitrite



Free radicals of NO and O<sub>2</sub>



N-nitroso compounds

**CANCER**

**BIRTH DEFECTS**

**DIABETES**

**ACUTE RESPIRATORY  
INFECTIONS**

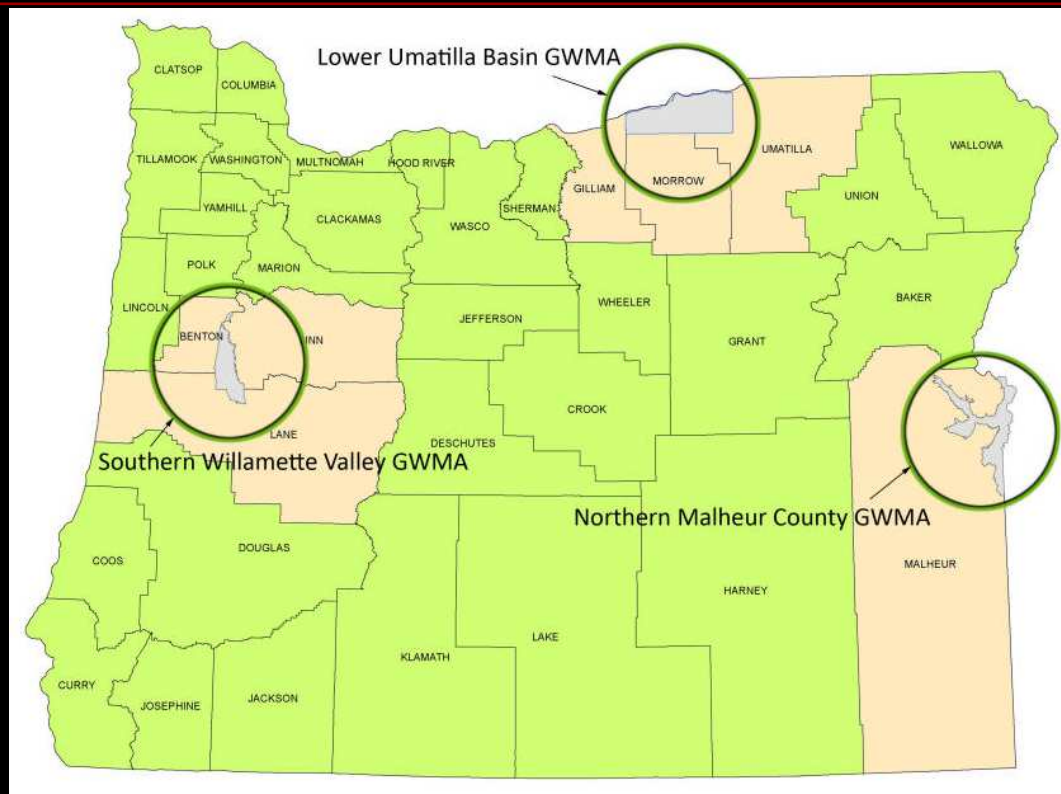


# Groundwater Quality Protection Act

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- 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 GWMA's



Declared for widespread nitrate contamination

# Domestic Well Testing Act

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- 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**

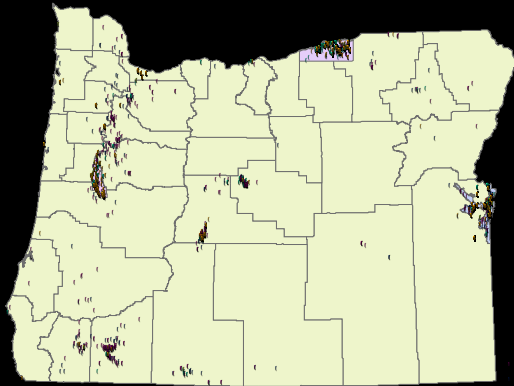
# ORS 448: Testing & Data Submission

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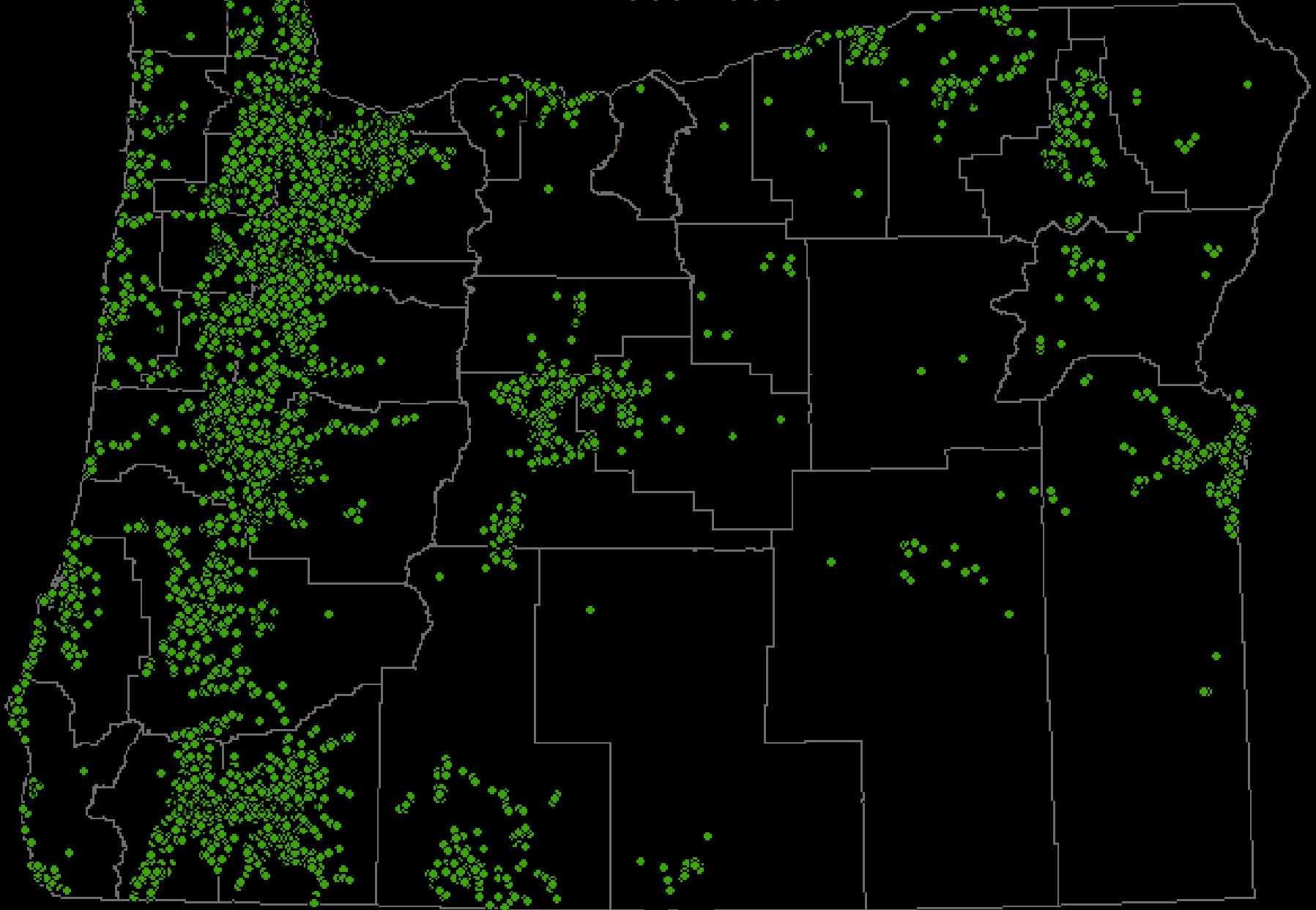
- Seller submits results and reporting form to DHS
  - Property address, owner name, well ID and depth, info on who sampled, and if buyer notified
- DHS sends to DEQ
- DEQ enters data into the RET database (2004)
  - Data available 1989-2008

# Spatial/Statistical Analysis of RET data

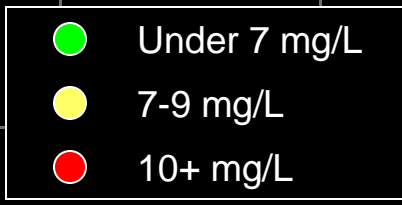
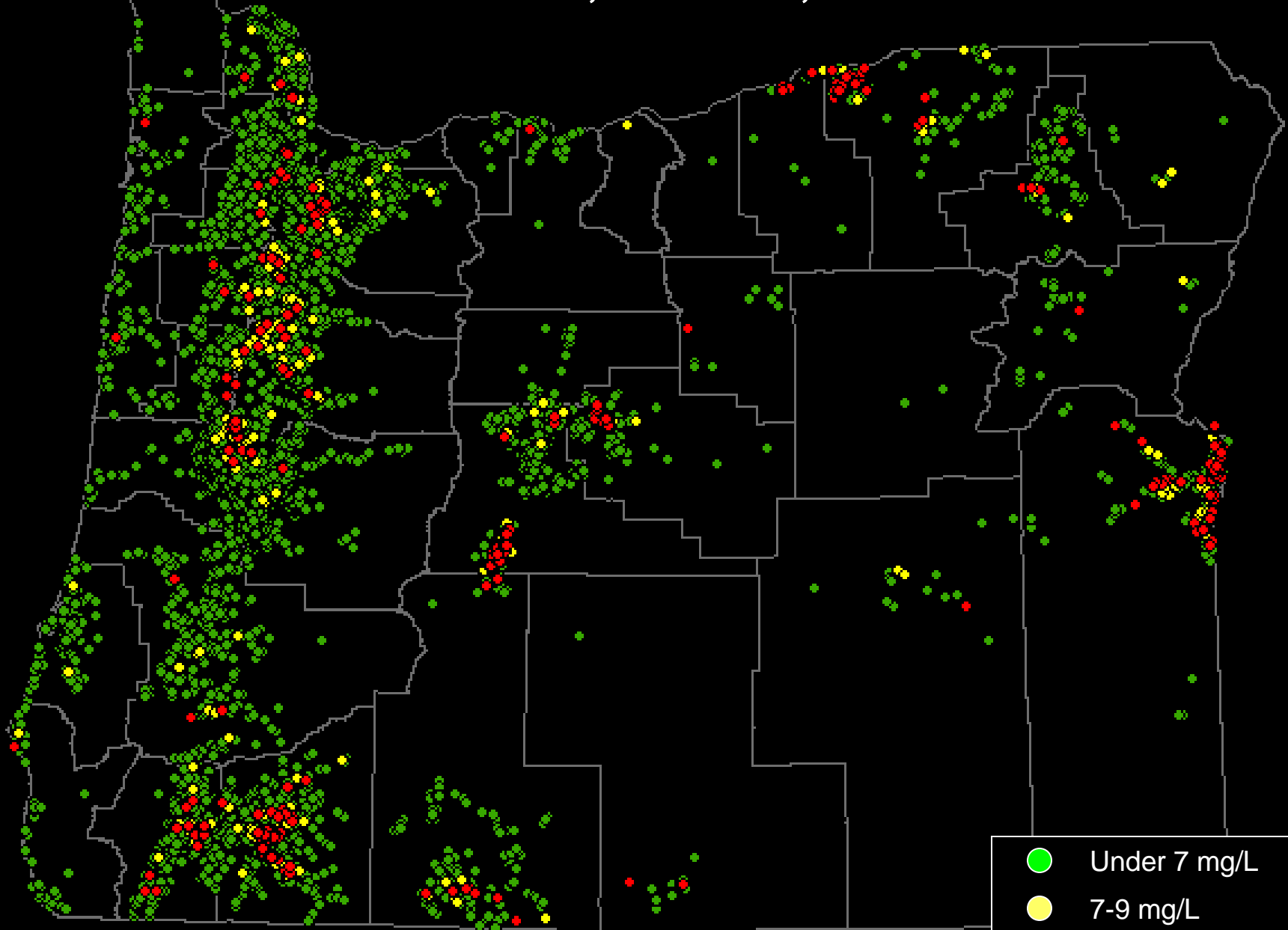
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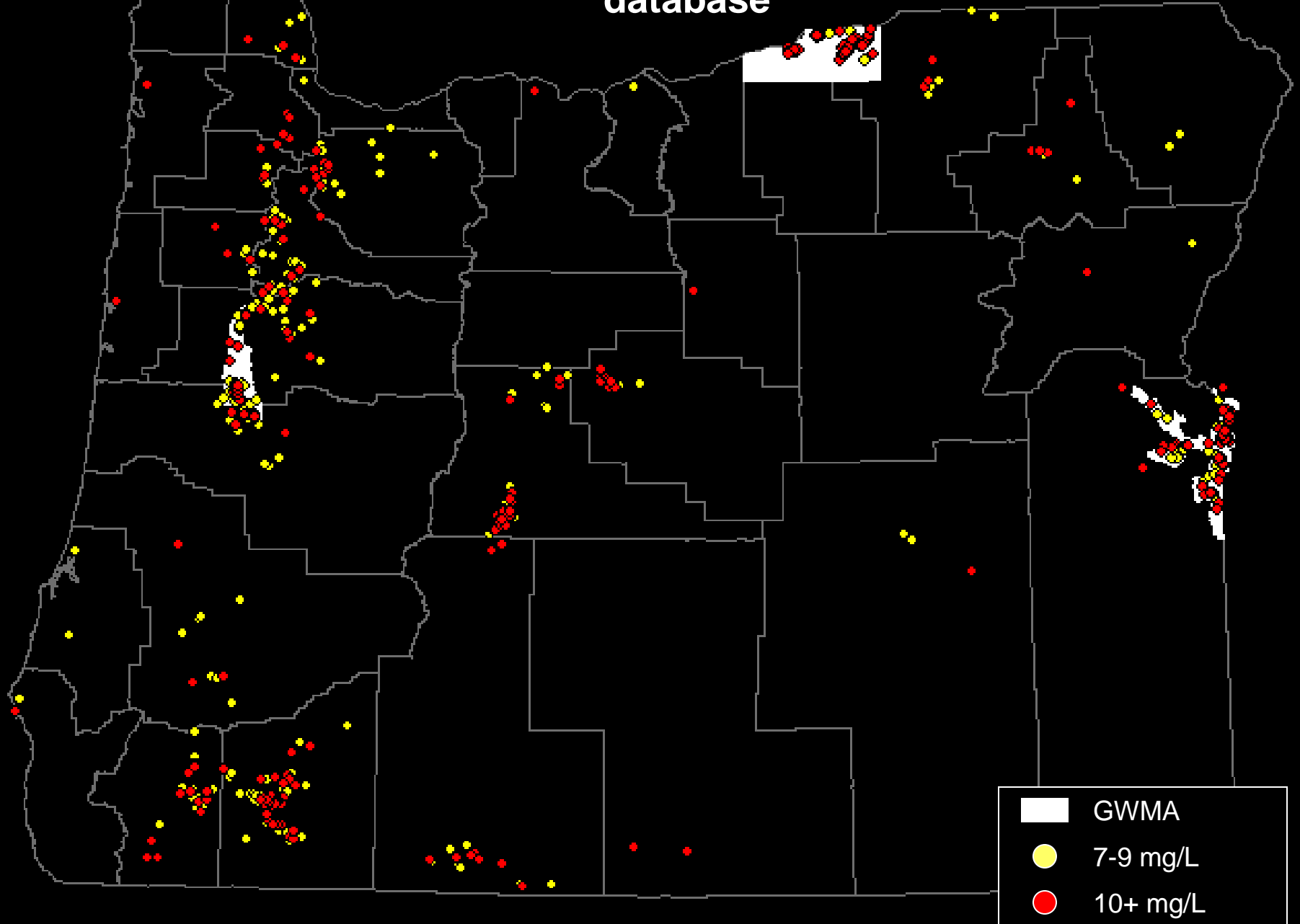
# Locations of All Private Wells Listed in the RET Database 1989-2008



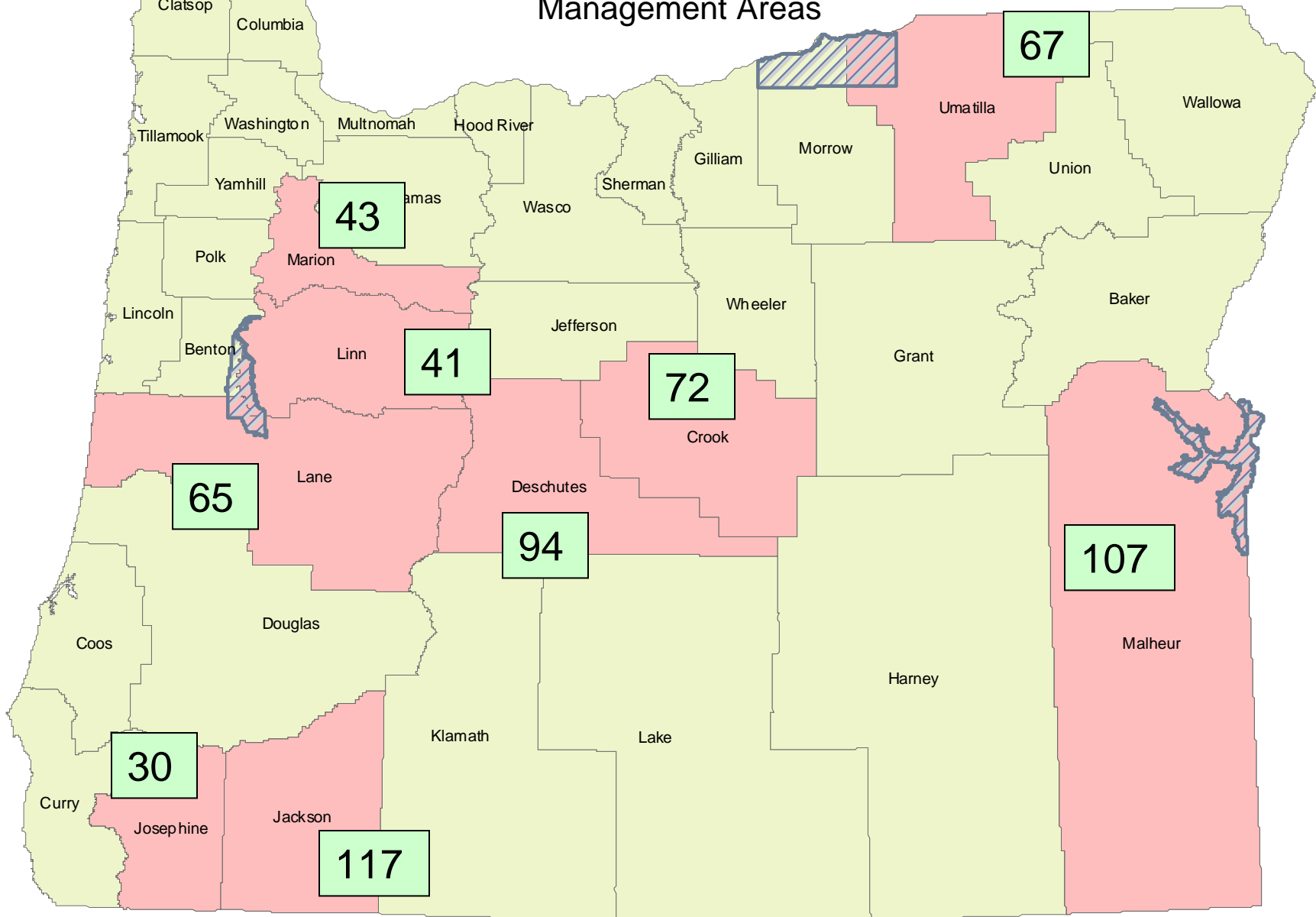
# Nitrate detections, 1989-2008, RET database



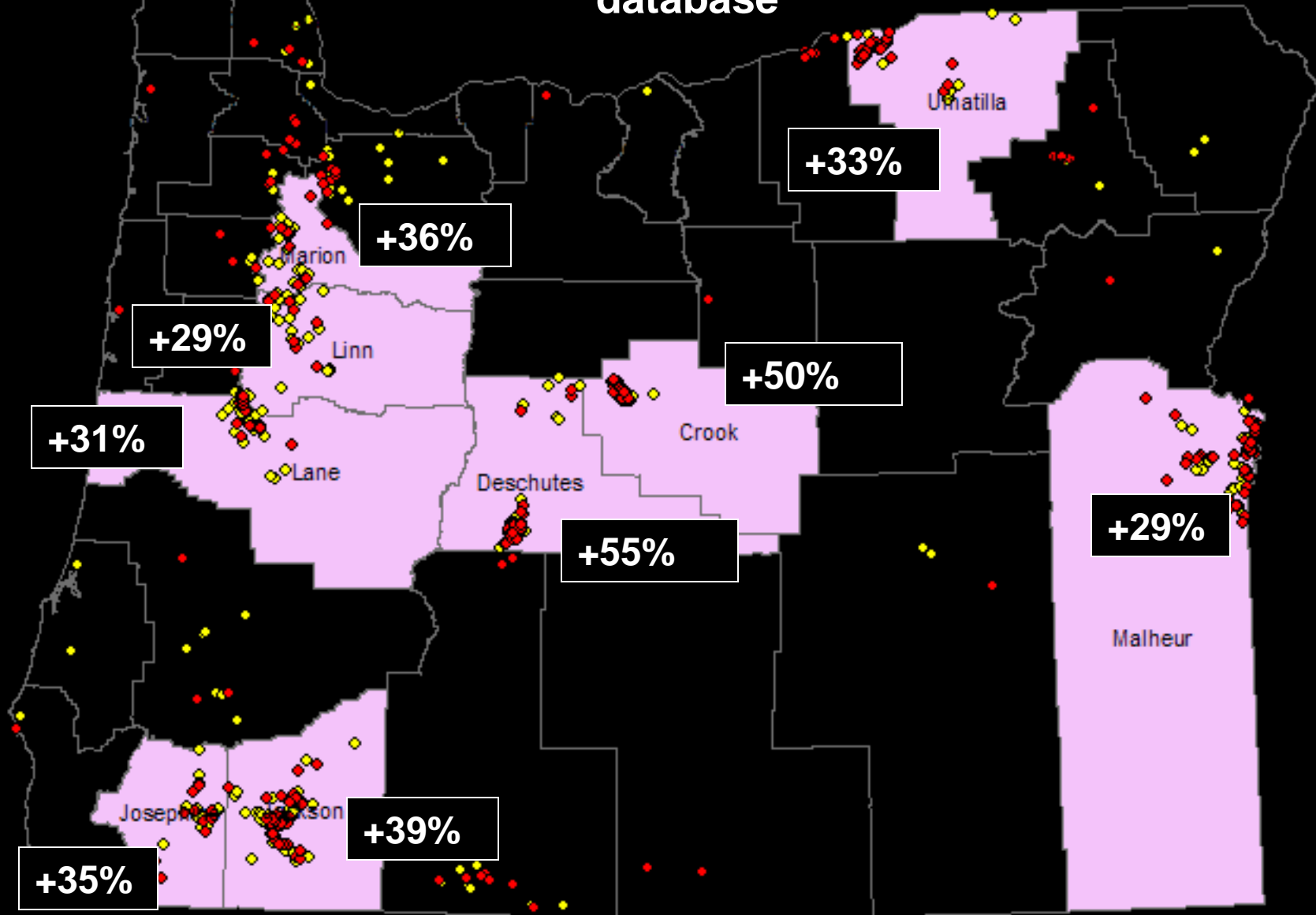
# Nitrate detections (7 mg/L and above), 1989-2008, RET database



# 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%)**