

Development and Application of a Regression Equation for Estimating the Occurrence of Atrazine in Shallow Ground Water Underlying Agricultural Areas of the United States

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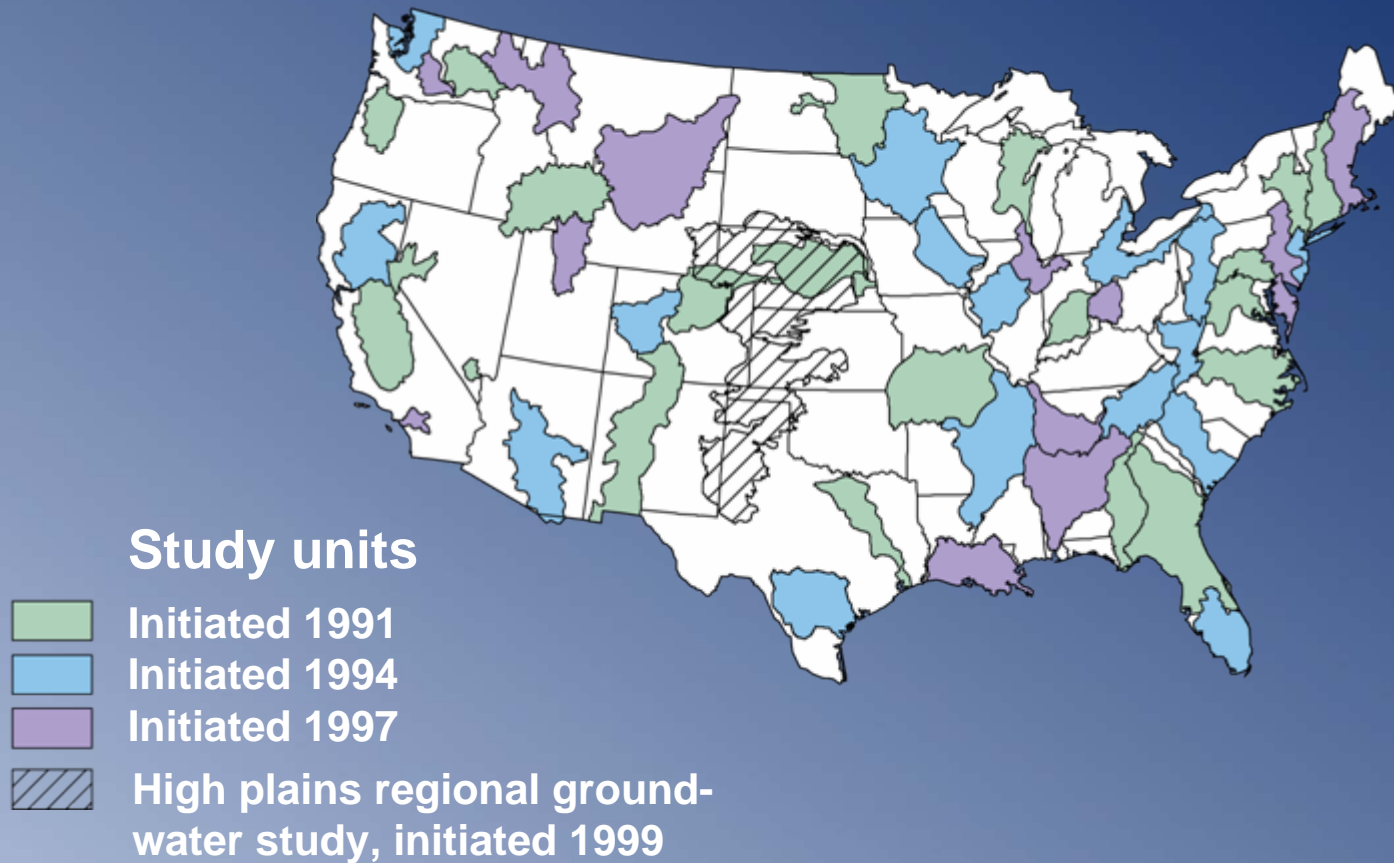
“Moving from Monitoring to Prediction”

Develop predictive model to:

- Estimate atrazine occurrence in unmonitored areas
- Improve understanding of governing processes

Monitoring

National Water Quality Assessment Program (NAWQA)

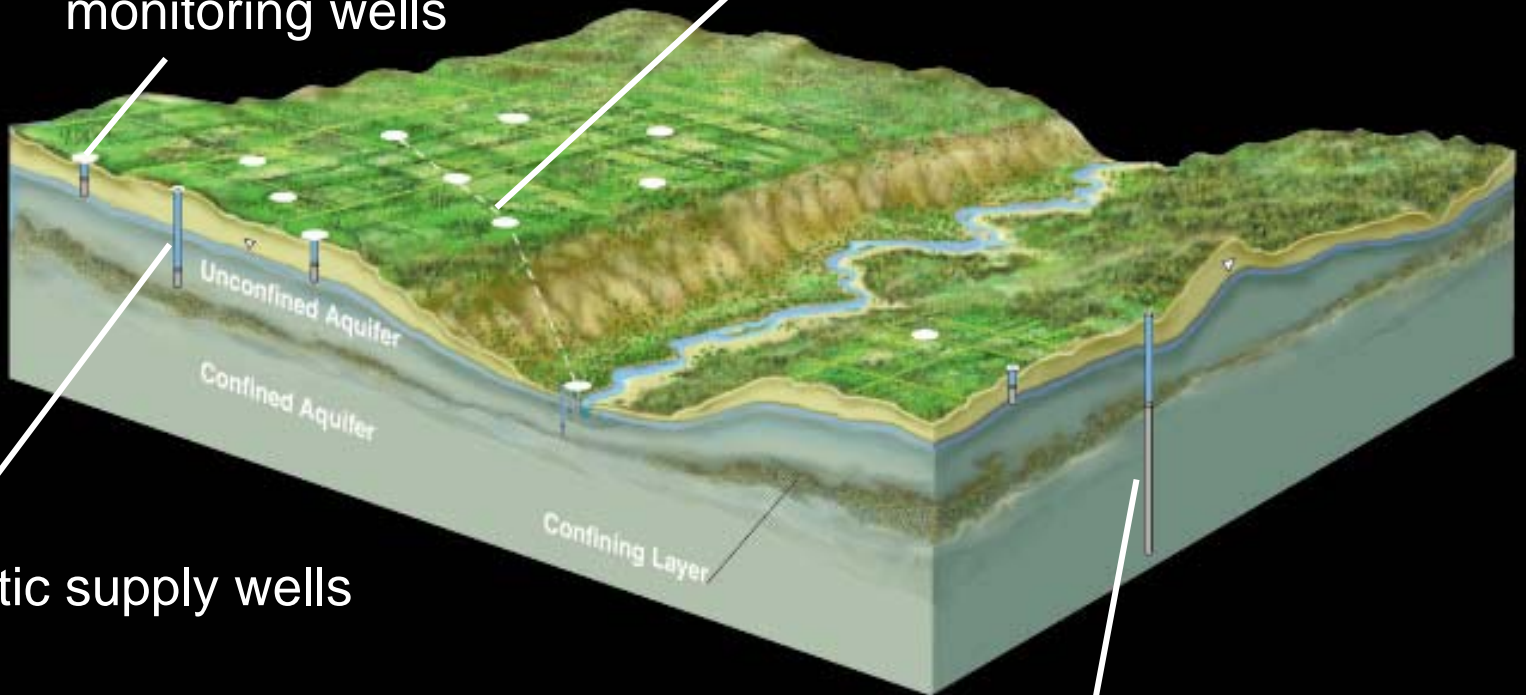


Monitoring

Land Use Studies

Flowpath Studies

Shallow
monitoring wells



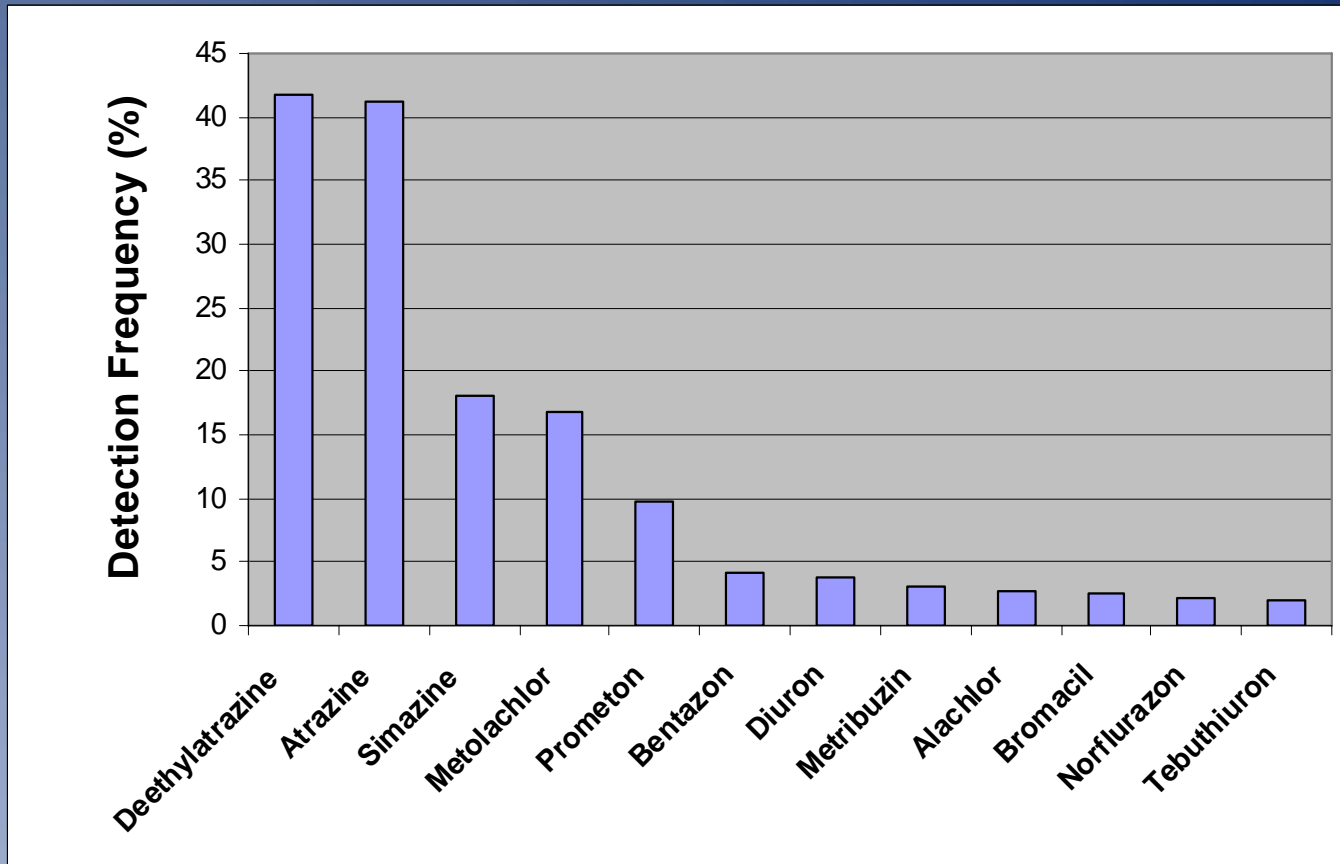
Domestic supply wells

Major Aquifer Studies

Community supply wells

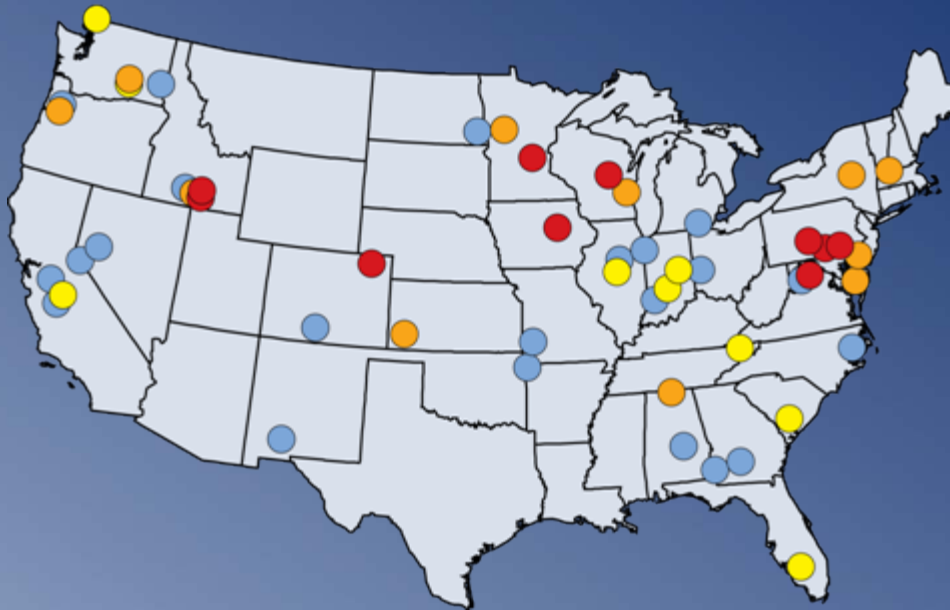
Monitoring

Most Frequently Detected Pesticides (Agricultural Land Use Studies)



Monitoring

Agricultural Land Use Studies



Atrazine detection frequency, as a percentage of wells sampled in each study



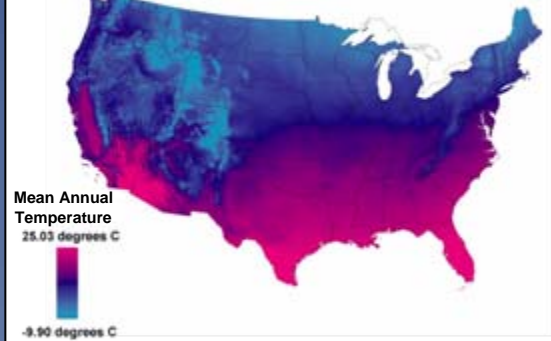
Modeling

Explanatory Variables

Atrazine-use Intensity



Climate



Soil and Aquifer Characteristics



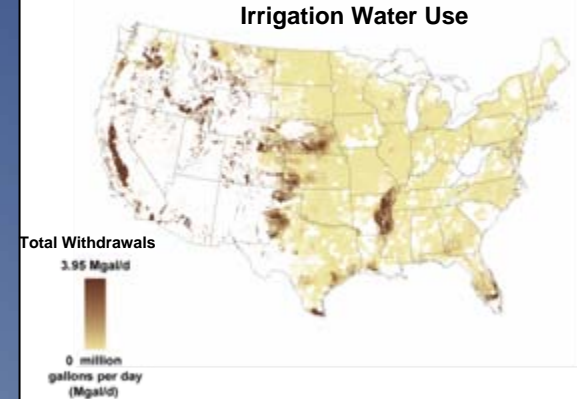
Agricultural Management Practices



Land use and Population



Irrigation Water Use

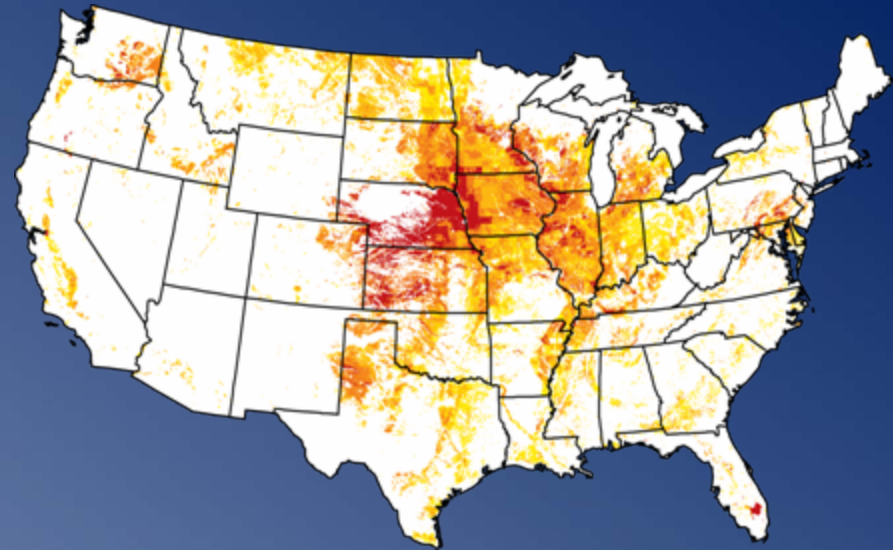
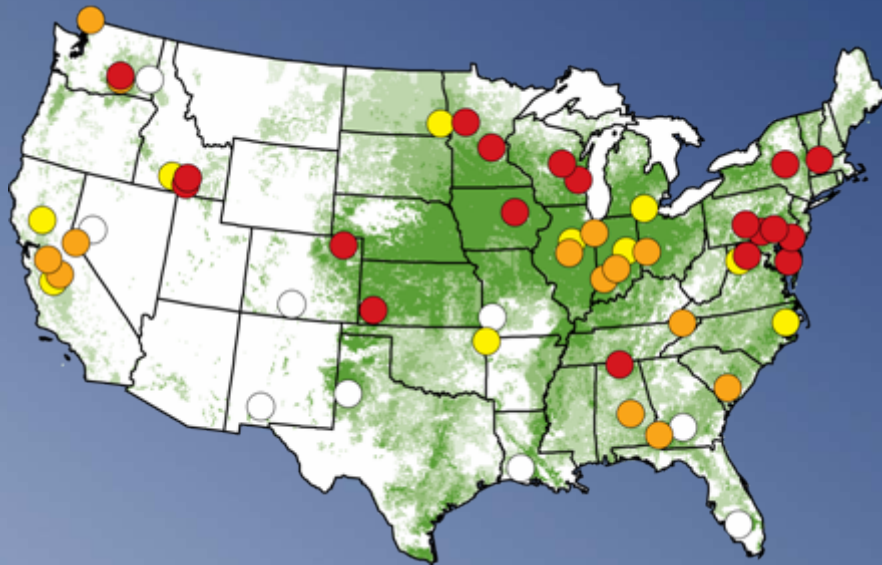


Modeling

Detection frequency correlated with:

- **Use**
 - Intensity of use (kg/km^2)
 - Agricultural land (%)
- **Agricultural-management practices**
 - Artificial drainage (%)
- **Soil characteristics**
 - Available water-holding capacity (fraction)
 - Vertical permeability (in/hr)

Prediction



Atrazine detection frequency

- Not detected
- Low
- Medium
- High

Atrazine use

- Very low
- Low
- Medium
- High



Increasing predicted frequency of atrazine detection

Improved Understanding

National-scale predictive models:

- **Governing factors:**
 - atrazine use (intensity and presence of agricultural land)
 - agricultural-management practices (artificial drainage)
 - soil characteristics (permeability and AWC)
- Use is a necessary but insufficient variable
- Soil characteristics and agricultural-management practices are important factors in predicting atrazine transport



National-scale predictive models:

- Comprehensive National assessment
- Predict occurrence in unmonitored areas
- Prioritize future monitoring
 - Verify/refine predictive models
 - Improve understanding
- Improve understanding of governing processes