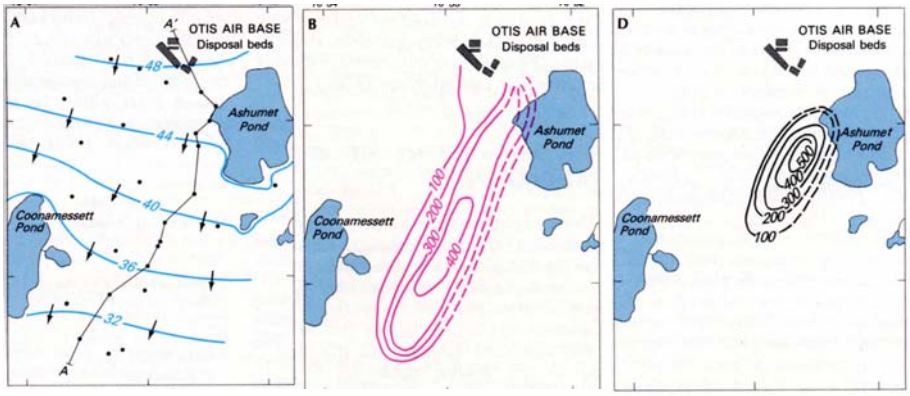
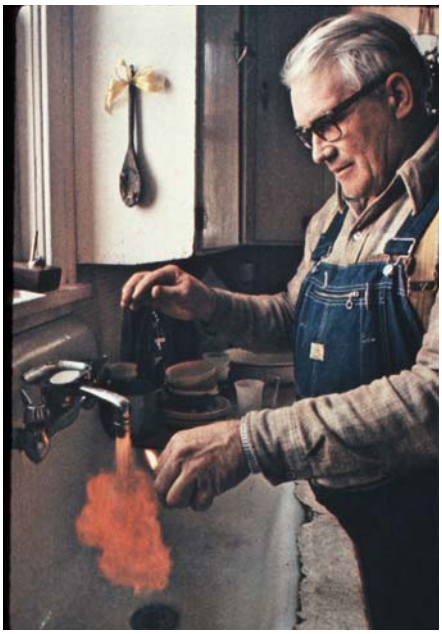
Ground Water Transport Processes



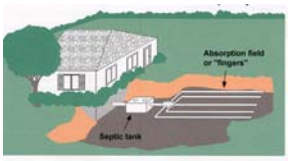
Ground Water Flow Direction

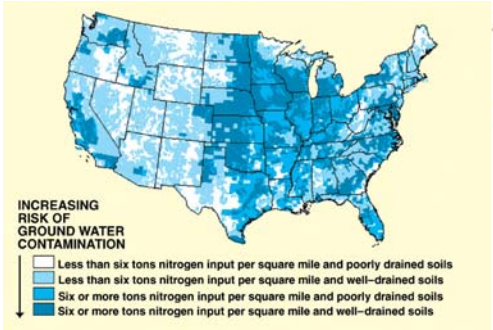
Plume Migration in Flow Direction

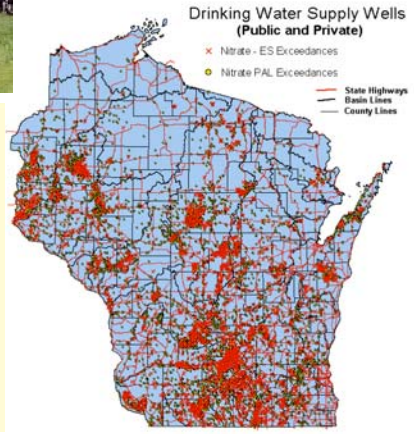
Retardation of Contaminants that Sorb to Aquifer Solids



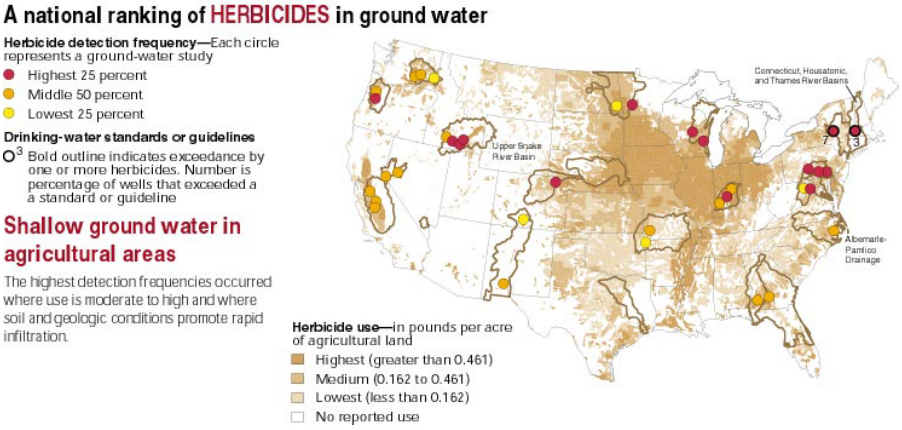
Ground Water Pollutants
Non-point Human, Animal and Agricultural Sources of Nitrate





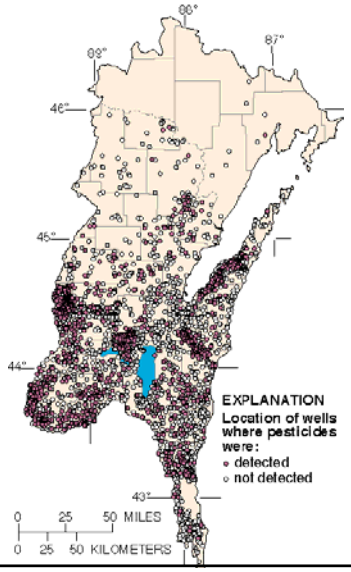


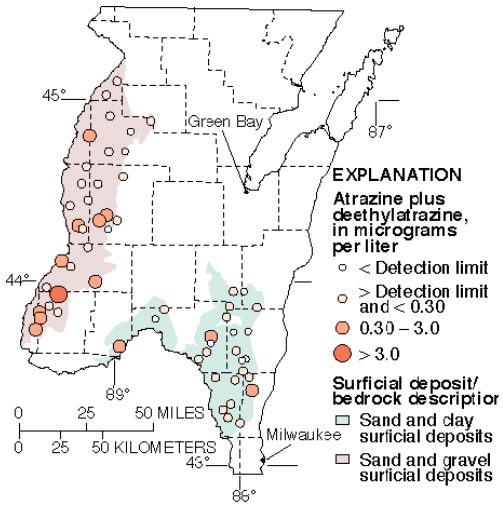
Ground Water Pollutants
Agricultural Chemicals



Ground Water Pollutants
Agricultural Chemicals

Pesticide detections

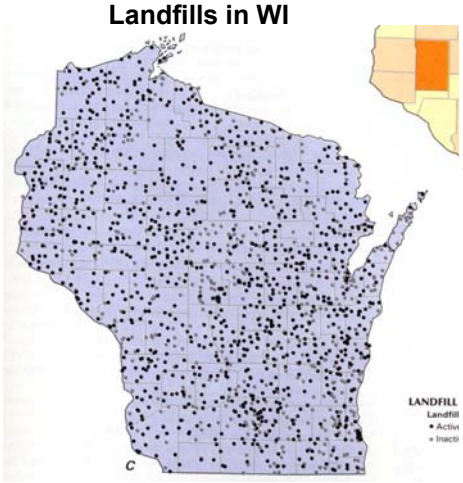




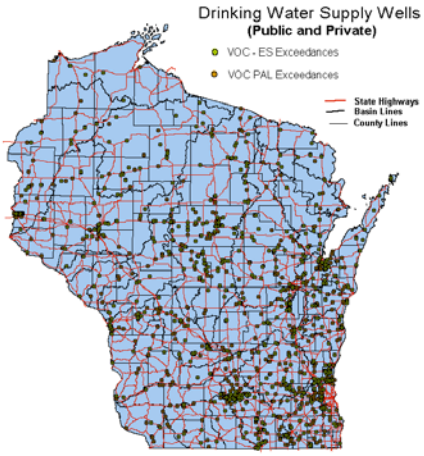
Atrazine in WI groundwater

Ground Water Pollutants
Landfill Leachate

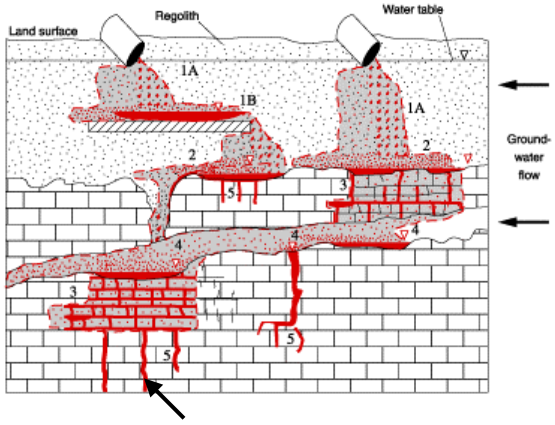
Active and Closed Landfills in WI



Volatile Organic Contaminants

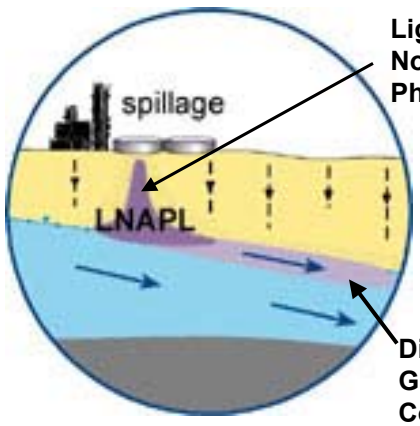


Ground Water Pollution
Industrial Point Sources



Dense Nonaqueous Phase Liquid
DNAPL

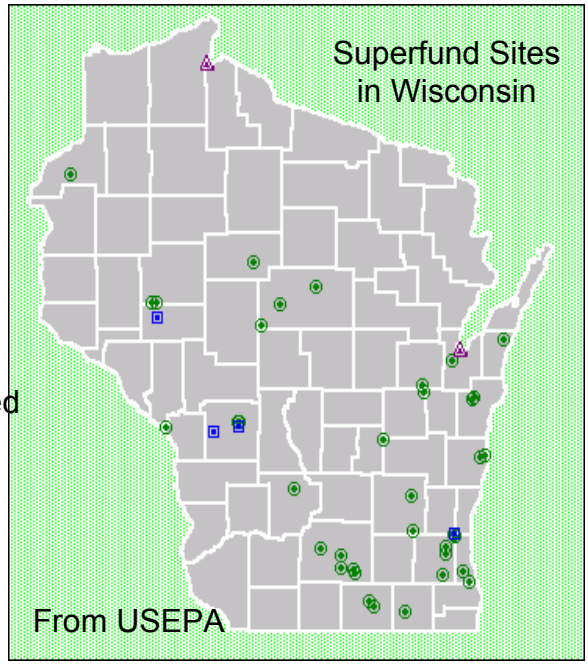
Ground Water Pollutants
Fuel Spills and Leaks



Light Nonaqueous Phase Liquid

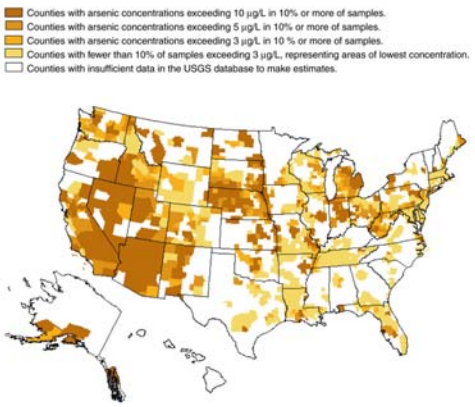
Dissolved Gasoline Components

Green = current
Blue = deleted
Purple = proposed

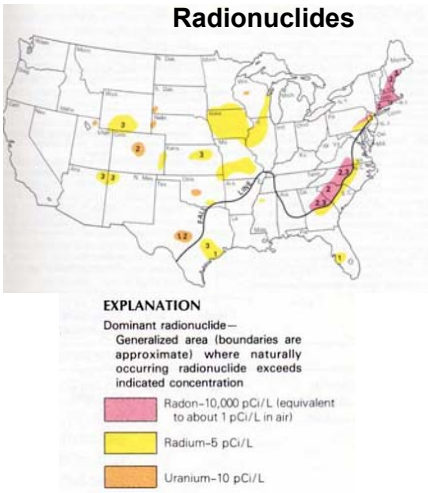


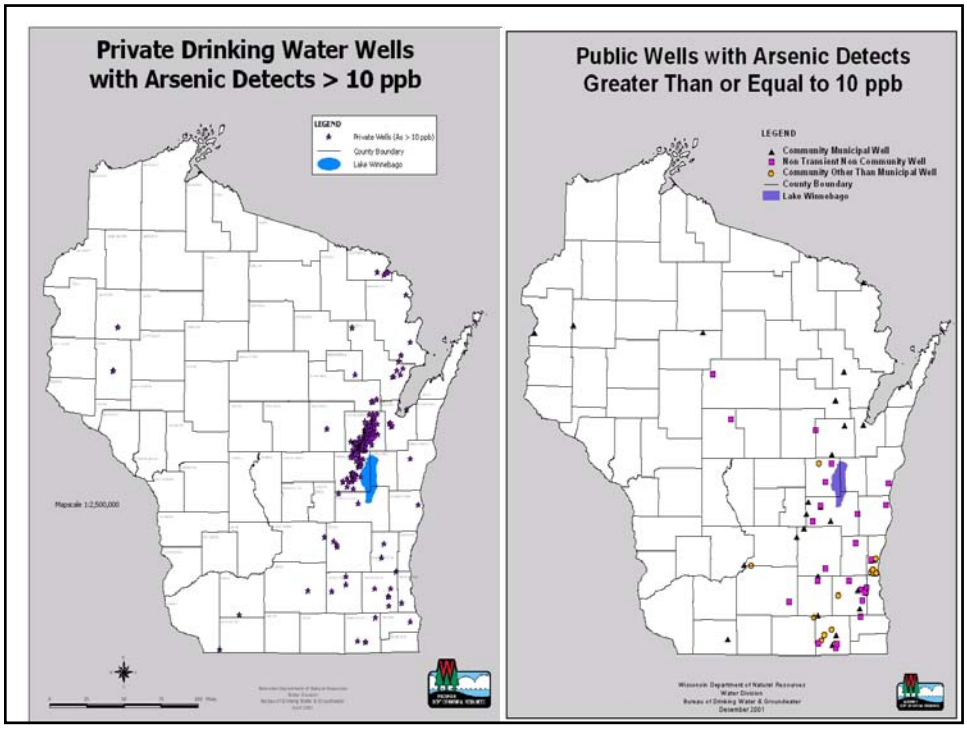
Ground Water Pollutants
Naturally occurring contaminants

Arsenic

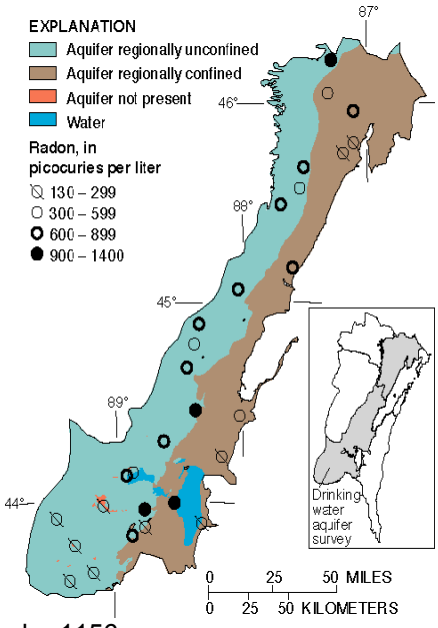


Radionuclides





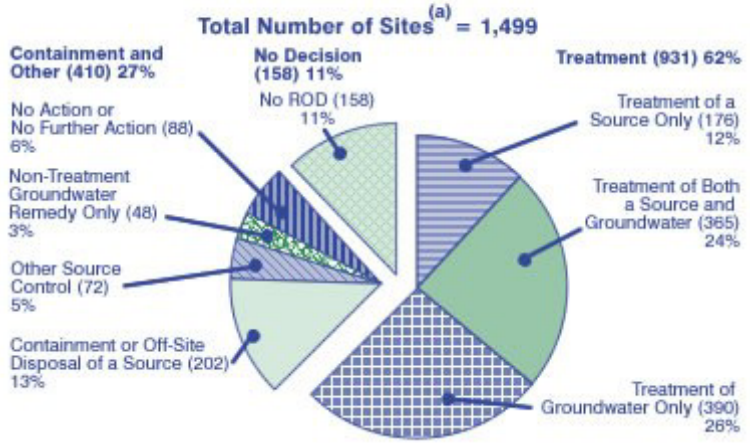
Radon



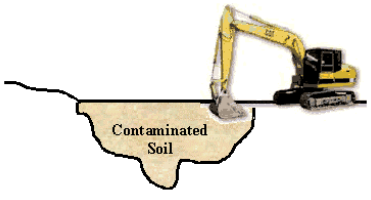
From USGS Circular 1156

Ground Water Remediation
Superfund Remedial Actions

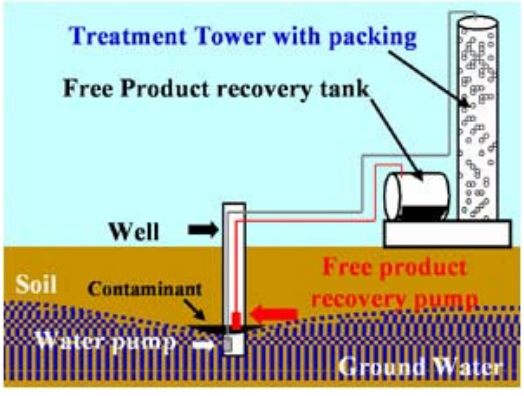
Figure 1: Superfund Remedial Actions: Actual Remedy Types at Sites on the National Priorities List (NPL) (FY 1982 - 2002)*



Ground Water Remediation
Common Strategies

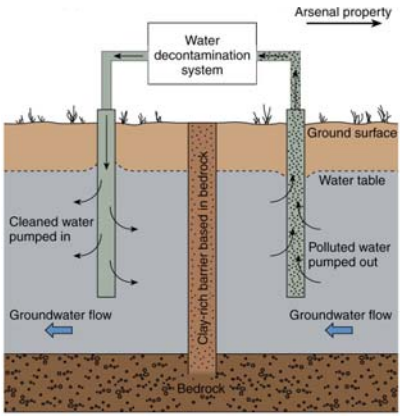


Source Removal

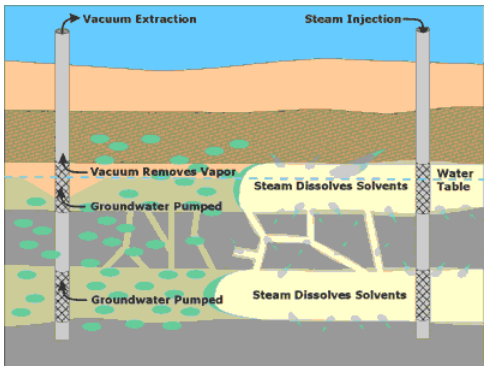


Pump-and-Treat

Ground Water Remediation
Advanced Strategies

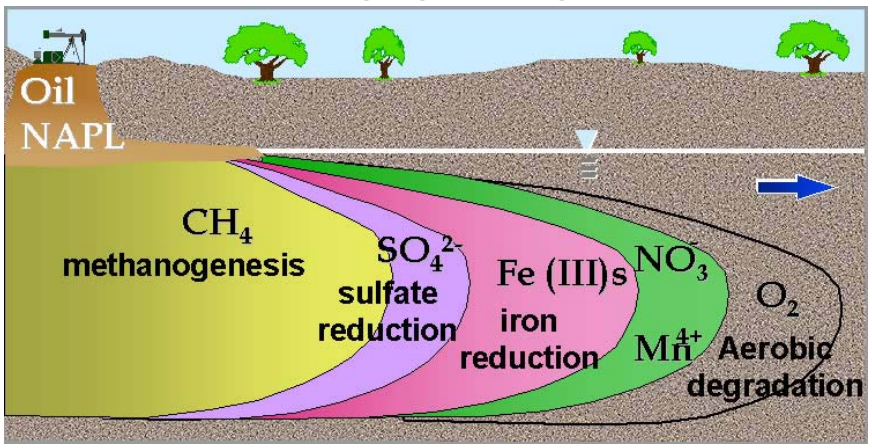


Pump-and-Treat with Barrier



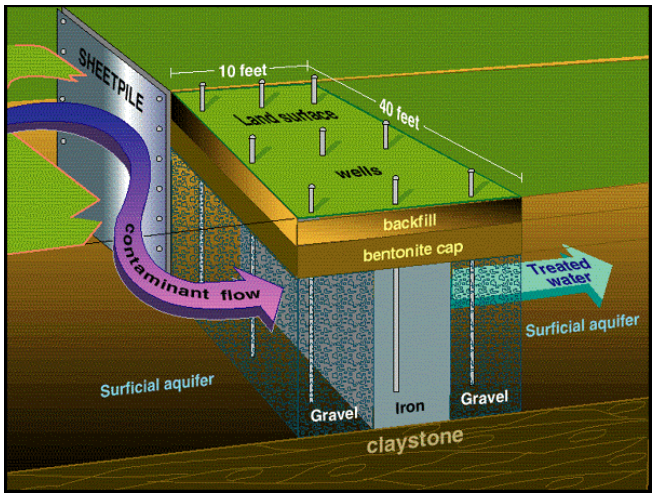
Steam Injection, Vacuum Extraction

Ground Water Remediation
Emerging Strategies



Natural Attenuation by Biodegradation

Ground Water Remediation
Emerging Strategies



Permeable Reactive Barriers