

The Ohio Ambient Ground Water Quality Monitoring Program Documents Water Quality Impacts

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Division of Drinking and Ground Waters

Working Together for Clean Water

9TH NATIONAL MONITORING CONFERENCE ■ April 28 – May 2, 2014 ■ Cincinnati, Ohio



Outline

- Ambient GW Quality Monitoring Program
 - Description, Well locations
- GW quality Impacts
 - Salt storage
 - Oil production
 - Agriculture
- Conclusions
 - Sustainability

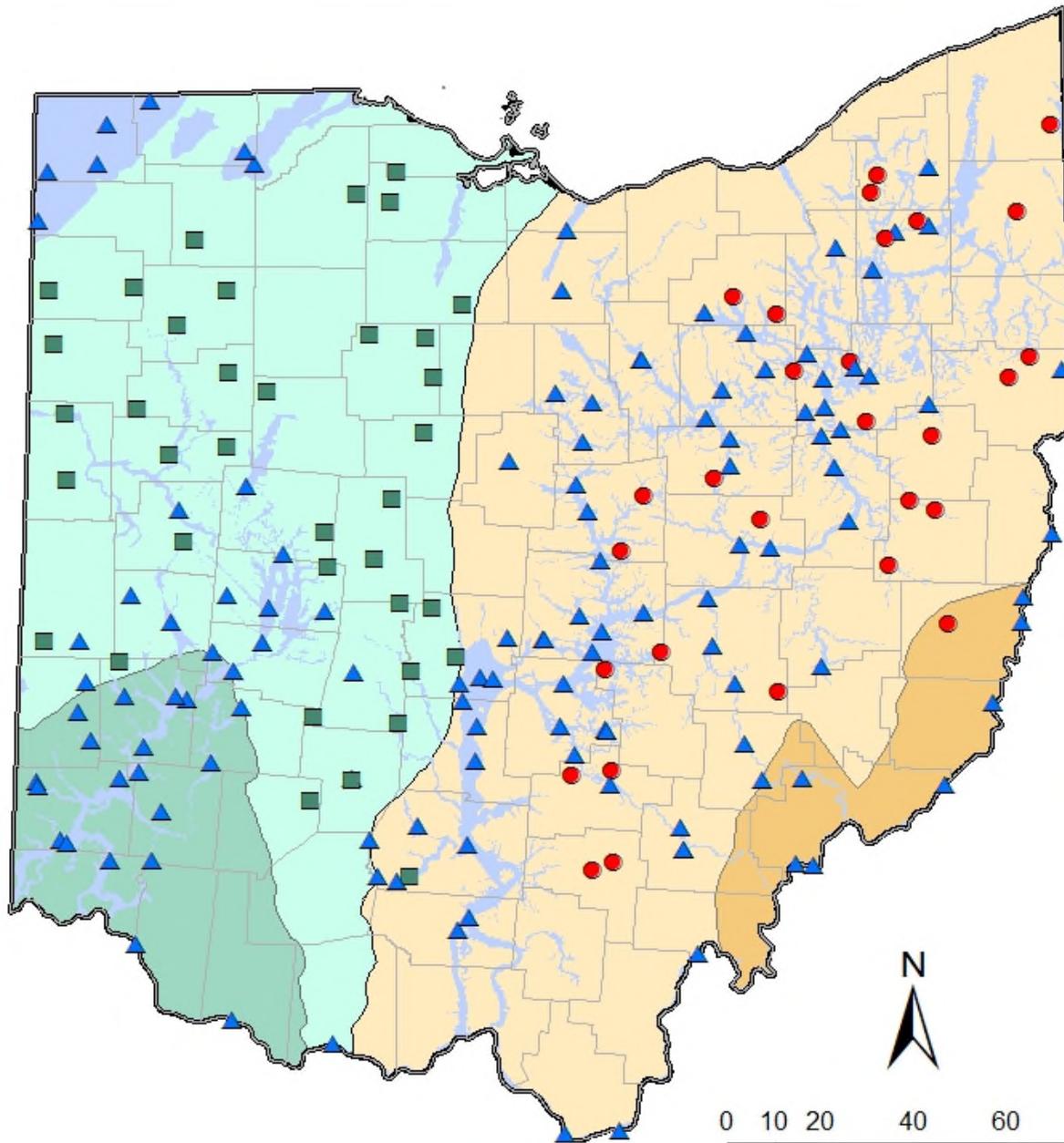


Ambient GW Quality Monitoring

- Approximately 200 active wells;
- Continuous data for some wells since 1970s;
- Analyze raw (untreated) water for 30 inorganic and 61 organic parameters;
- 92 % of active wells are public water system wells;
 - Primary focus of data collection is to characterize source water for GW based public water systems.
- Well aquifer types: Sand & Gravel 60%; Sandstone 17%; Carbonate 23%.



AGWQMP Well Locations and Major Aquifer Types



Active AGWQMP Wells

- ▲ Sand & Gravel Wells
- Sandstone Wells
- Carbonate Wells

Aquifer Lithology

- Sand and Gravel Aquifers
- Interbedded Sandstone/Shale
- Sandstone Aquifers
- Carbonate Aquifers
- Interbedded Carbonate/Shale



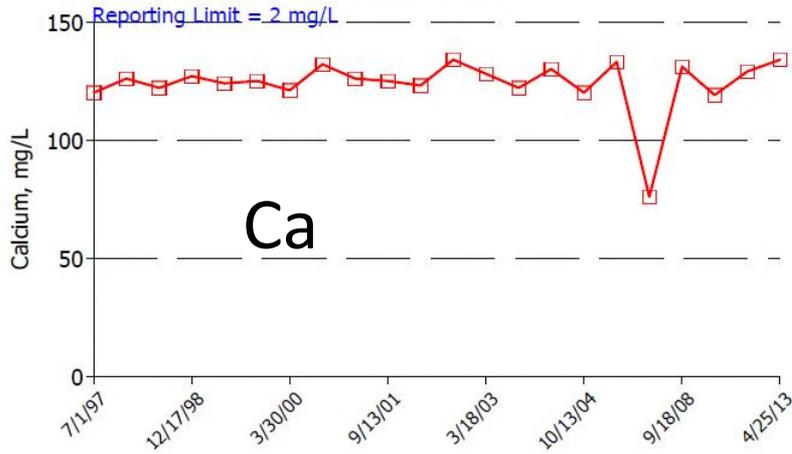
Developed using ODNR
State Aquifer Maps
March 2014

0 10 20 40 60 80
Miles

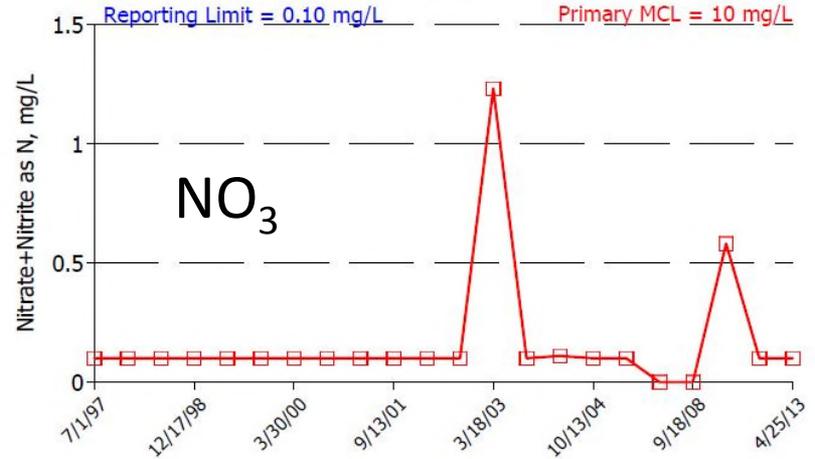
Ridgedale HS, NW Ohio

Carbonate Well: 200' deep; 97' casing

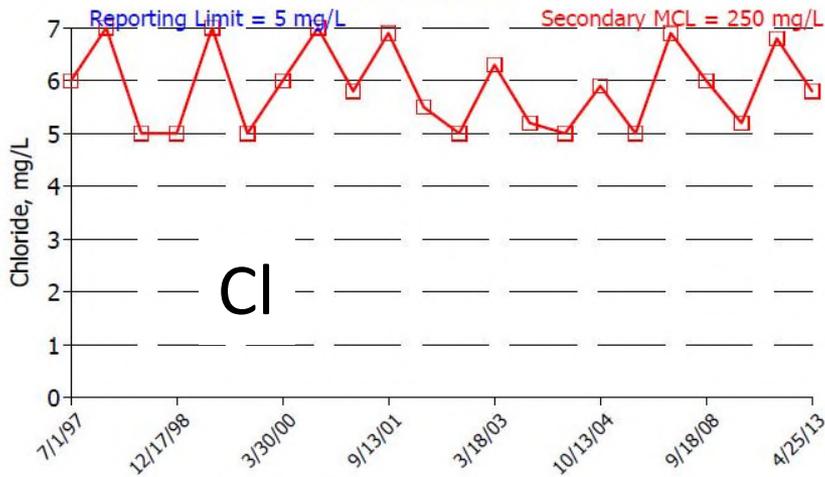
Calcium, Total



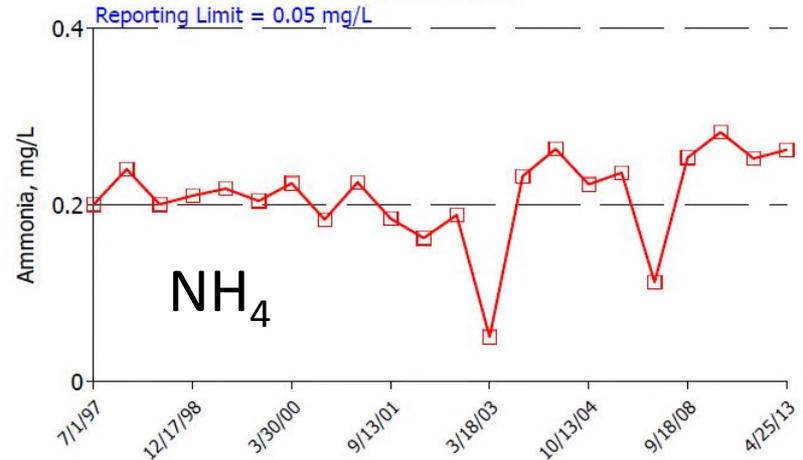
Nitrate+Nitrite as N



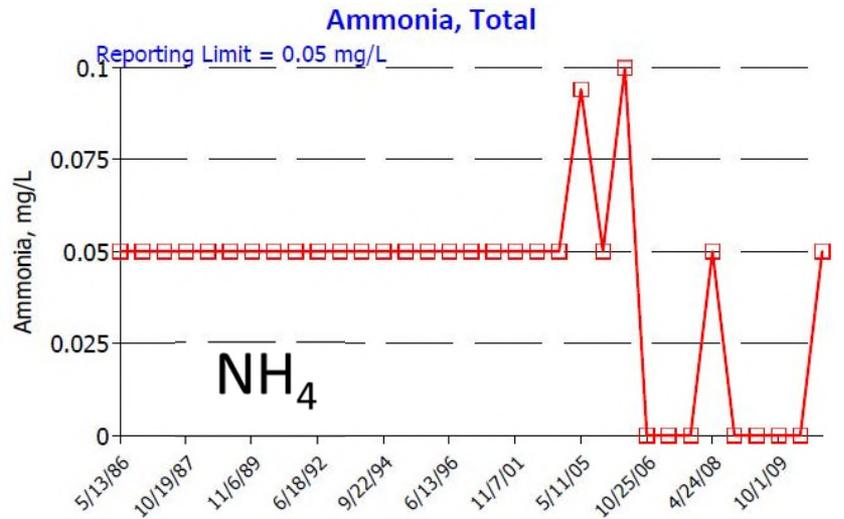
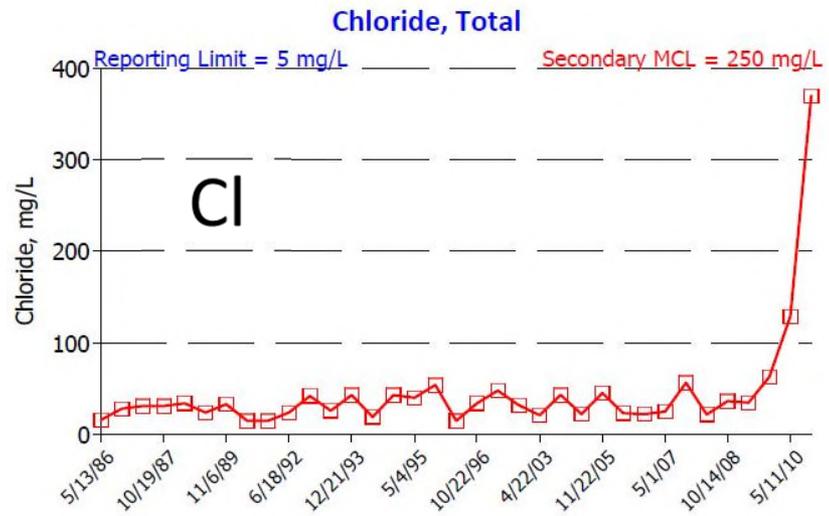
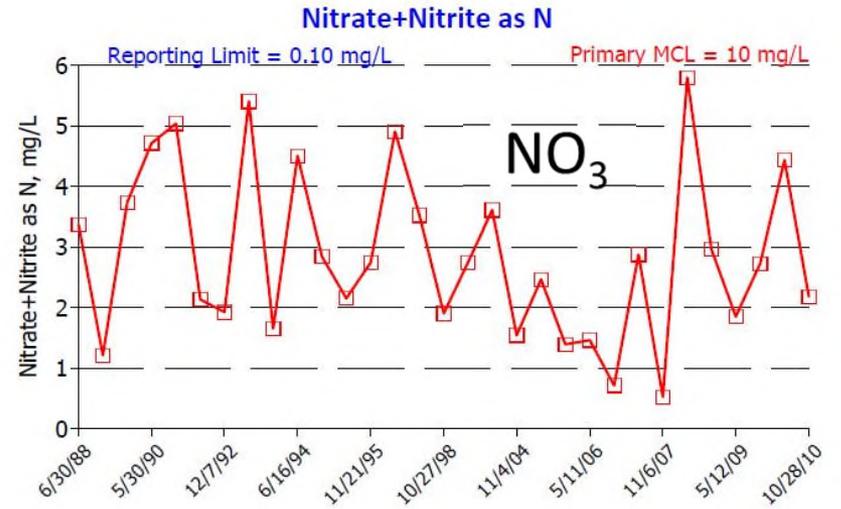
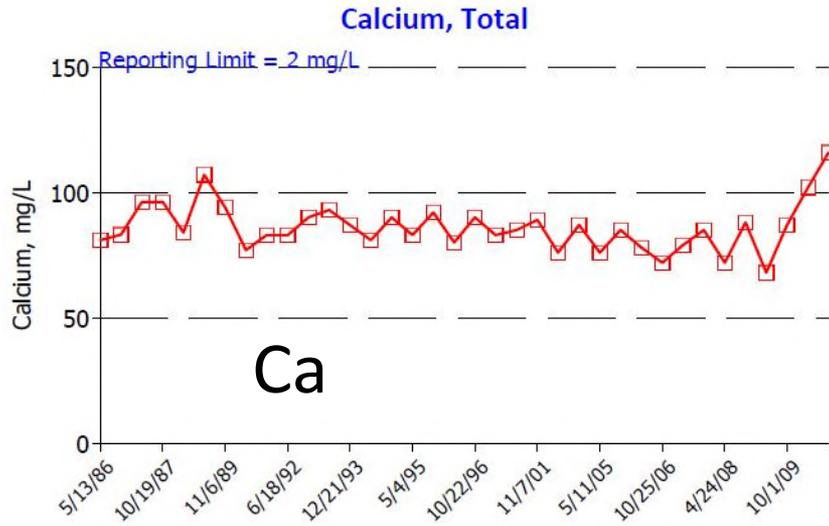
Chloride, Total

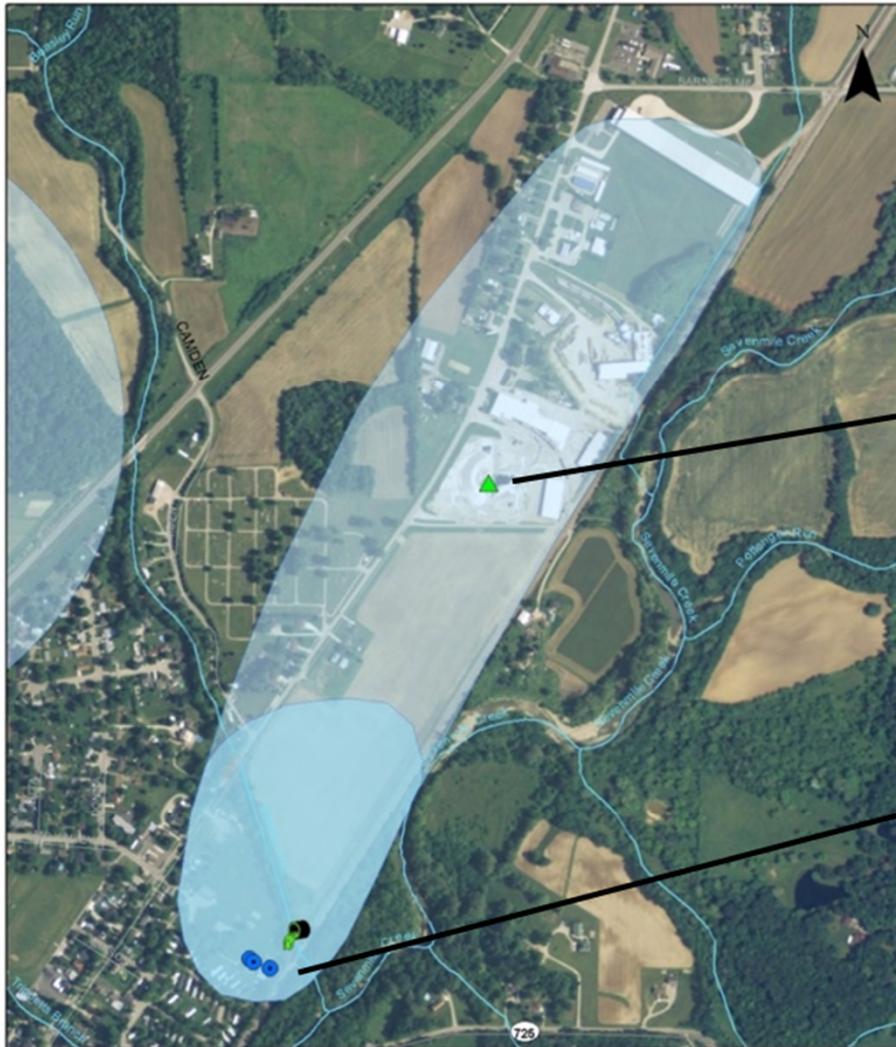


Ammonia, Total



Camden, SW Ohio Sand & Gravel Well: 41' deep; 28' casing





Location of salt storage

Location of wells

- Active Wells
- Inner Management Zones
- Source Water Protection Areas
- Camden Site Discharge
- ▲ Salt Pile Location



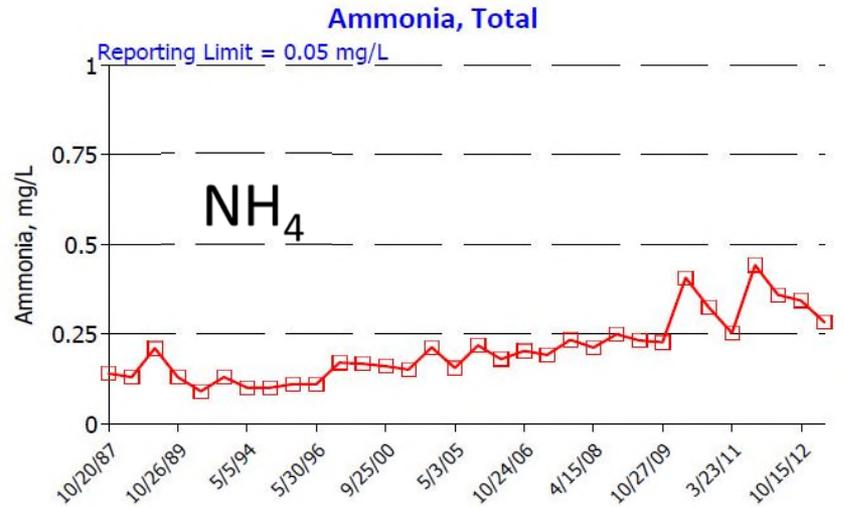
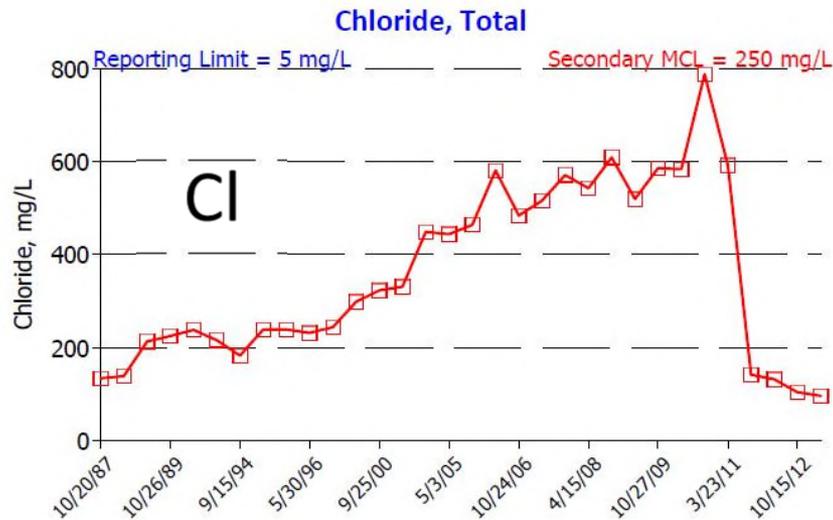
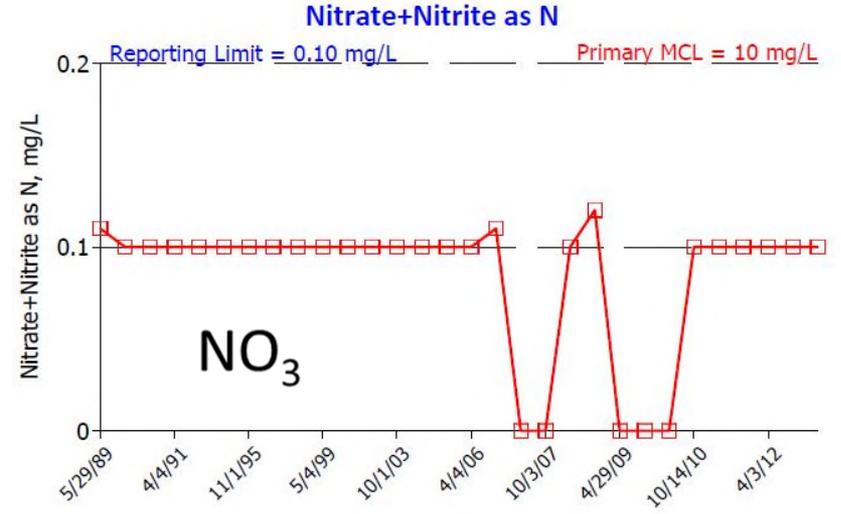
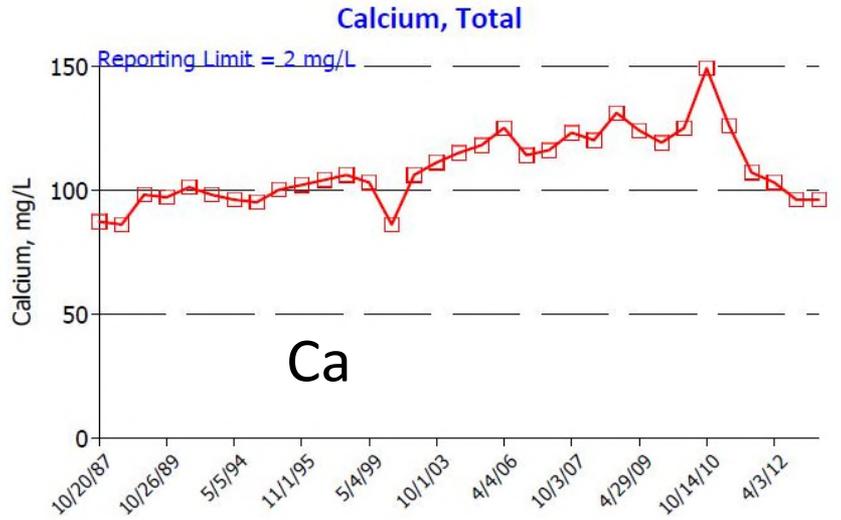
OhioEPA Environmental Protection Agency
 Division of Drinking and Ground Waters

Camden Site Investigation
 Village Drinking Water Source Protection Area



Cygnets, NW Ohio

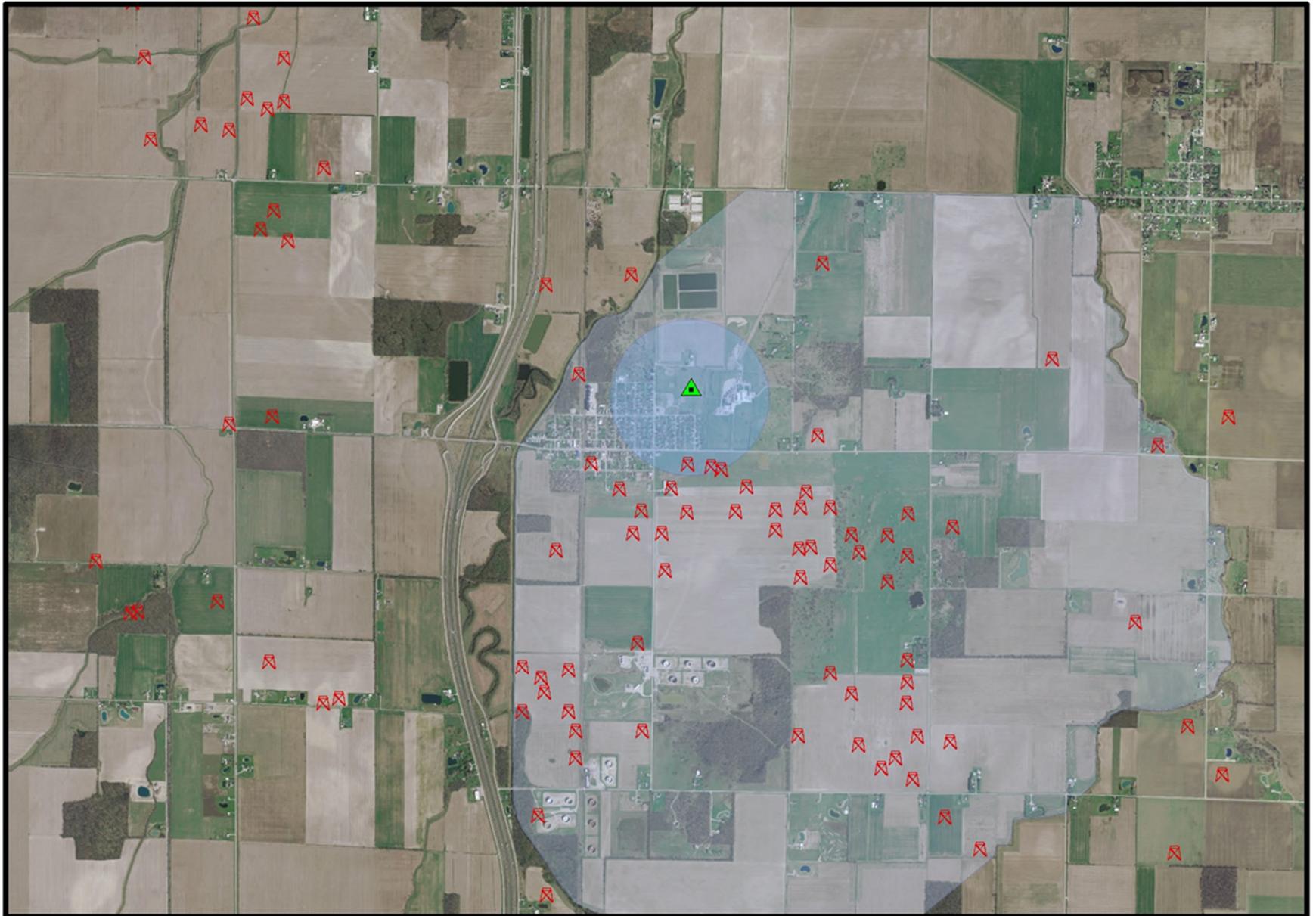
Carbonate Well: 209' deep; 40' casing





Wood County - Cygnet Well 1

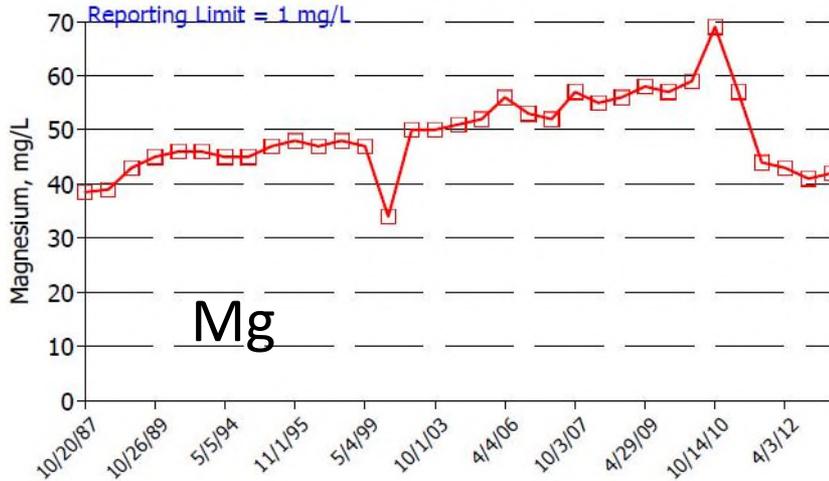
0 2,500 5,000 Feet



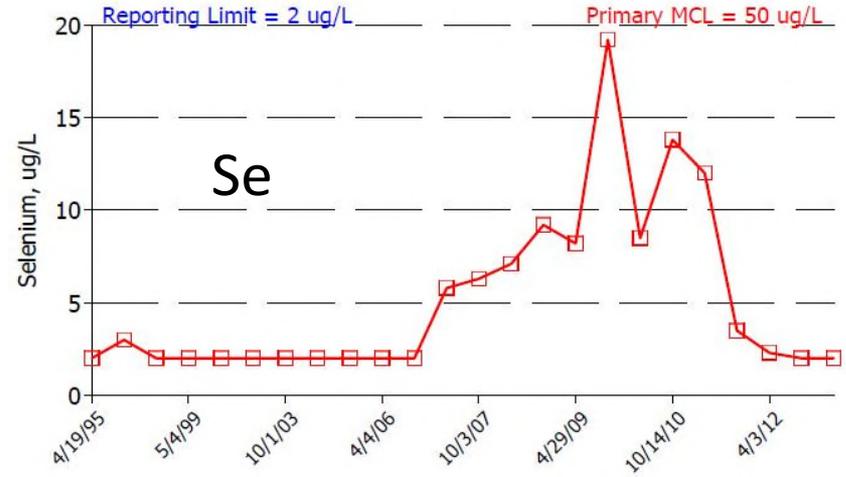
Cygnets, NW Ohio

Carbonate Well: 209' deep; 40' casing

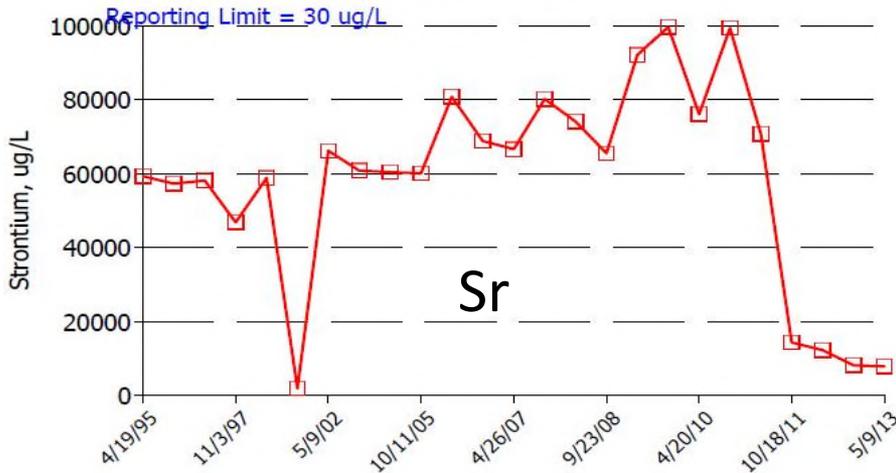
Magnesium, Total



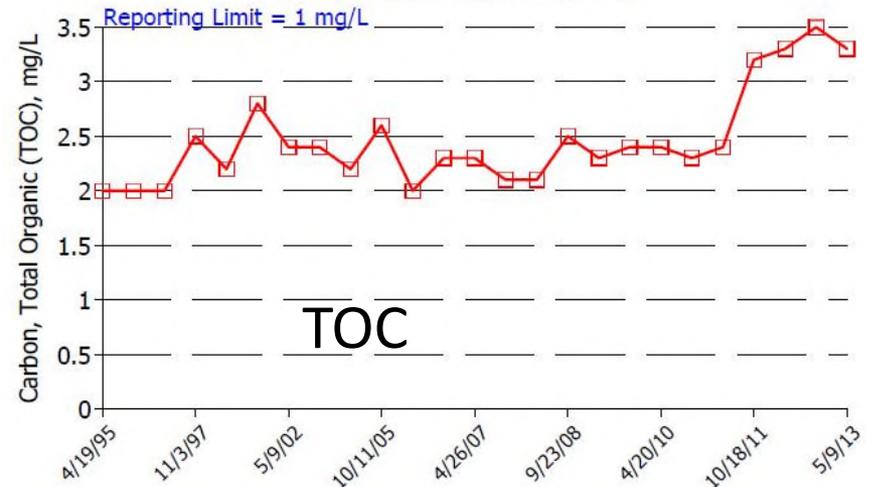
Selenium, Total



Strontium, Total

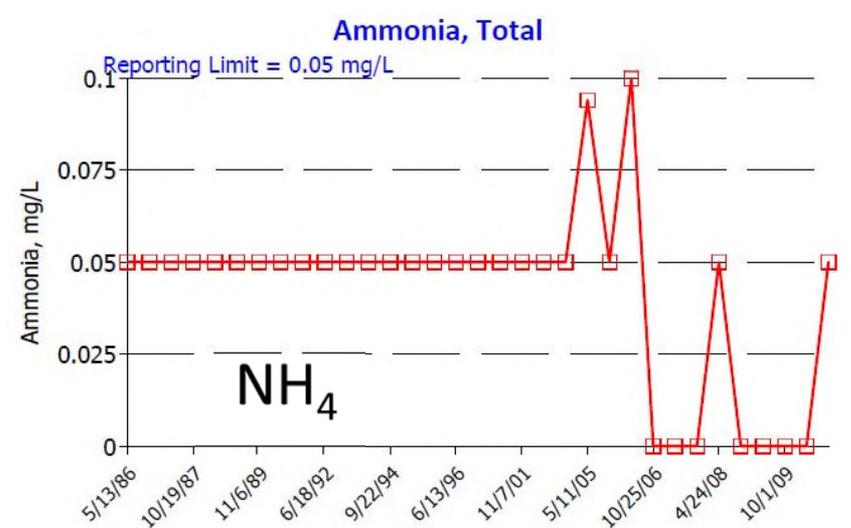
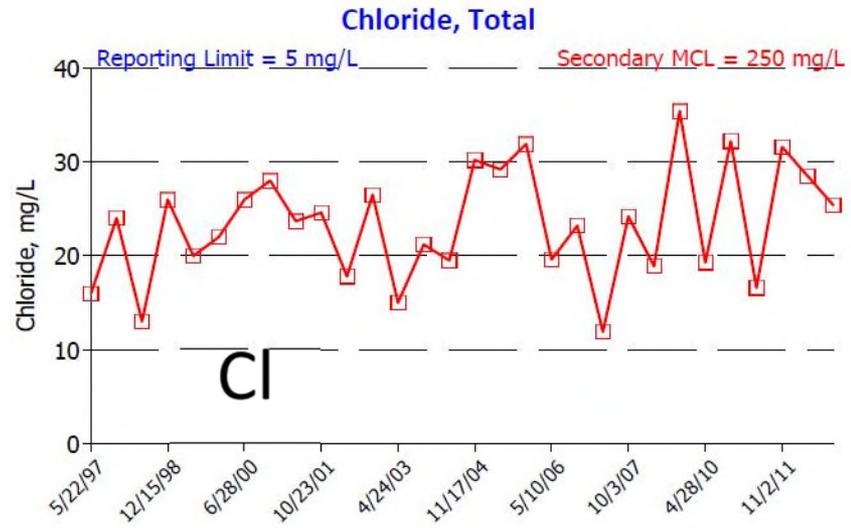
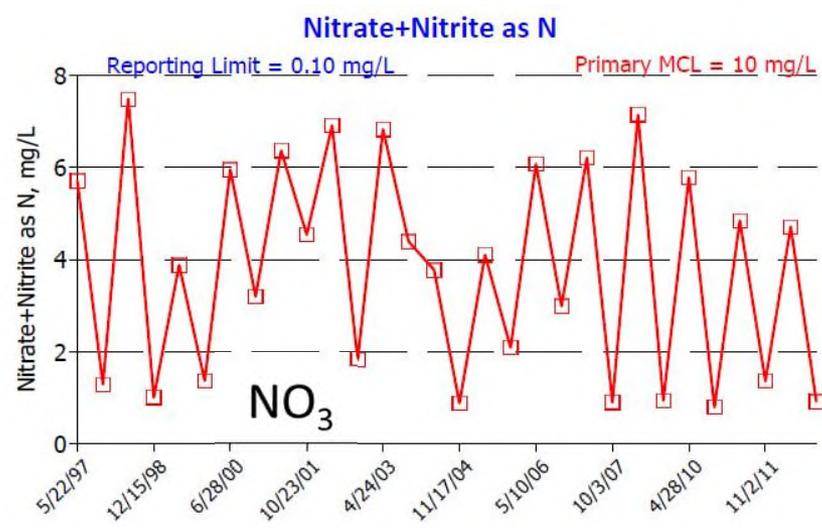
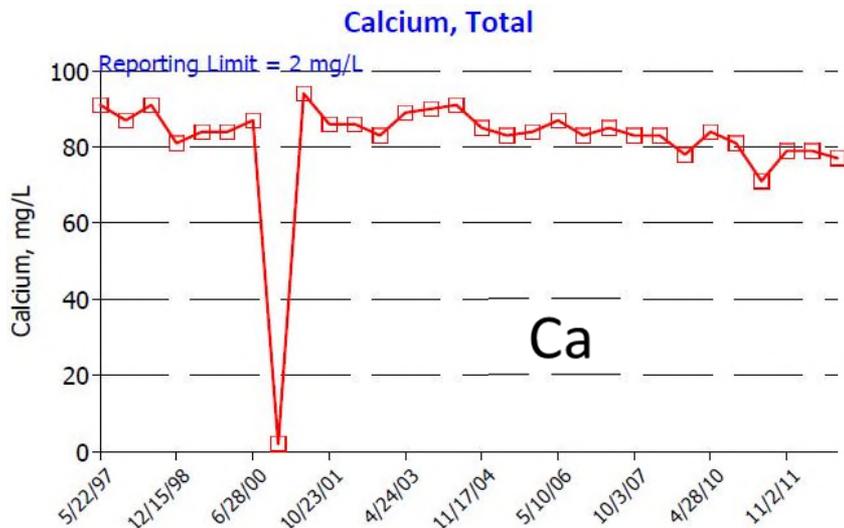


Carbon, Total Organic (TOC)



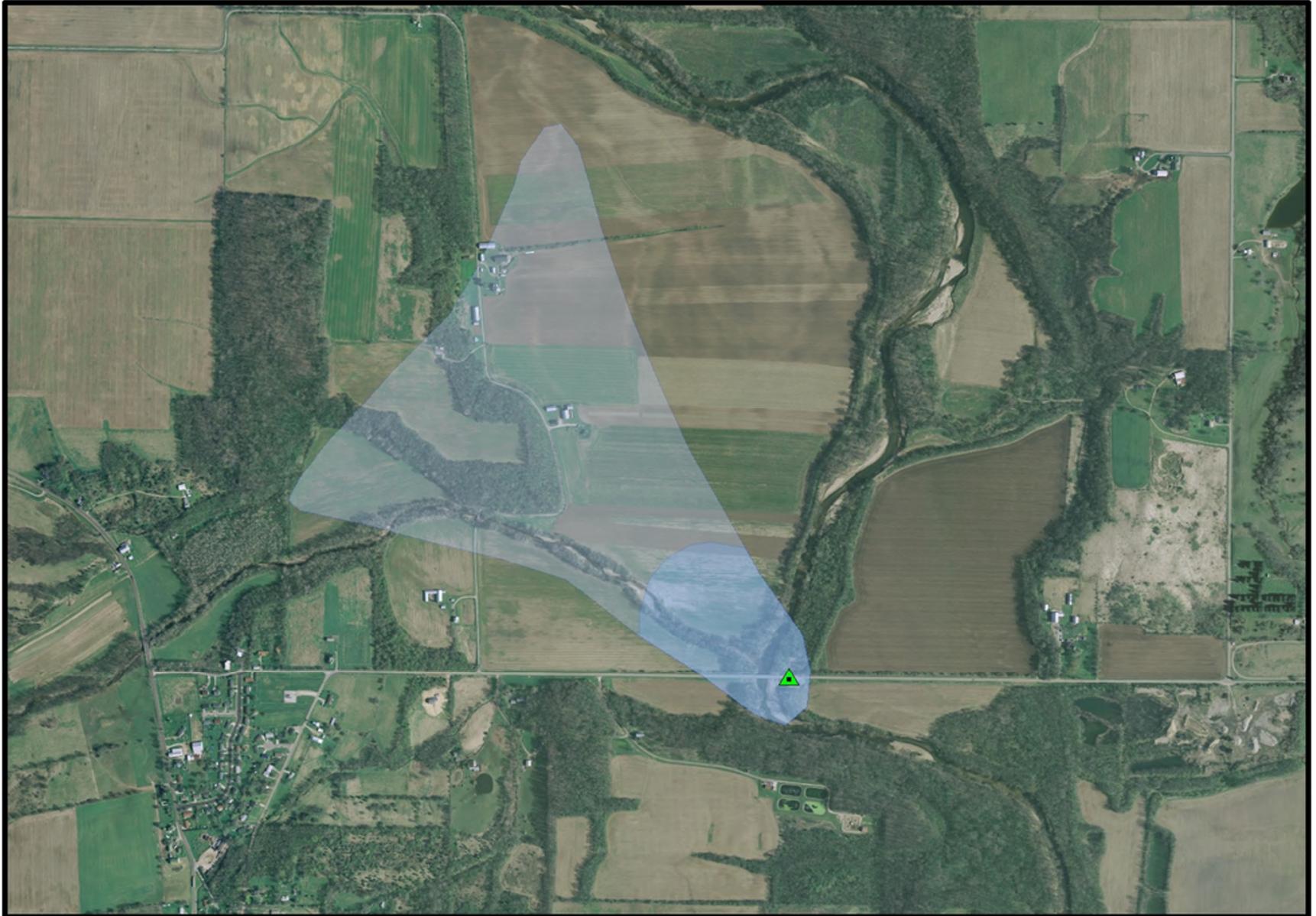
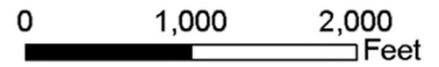
Gratis, SW Ohio

Sand & Gravel Well: 26' deep; 21' casing





Preble County - Gratis Well 1

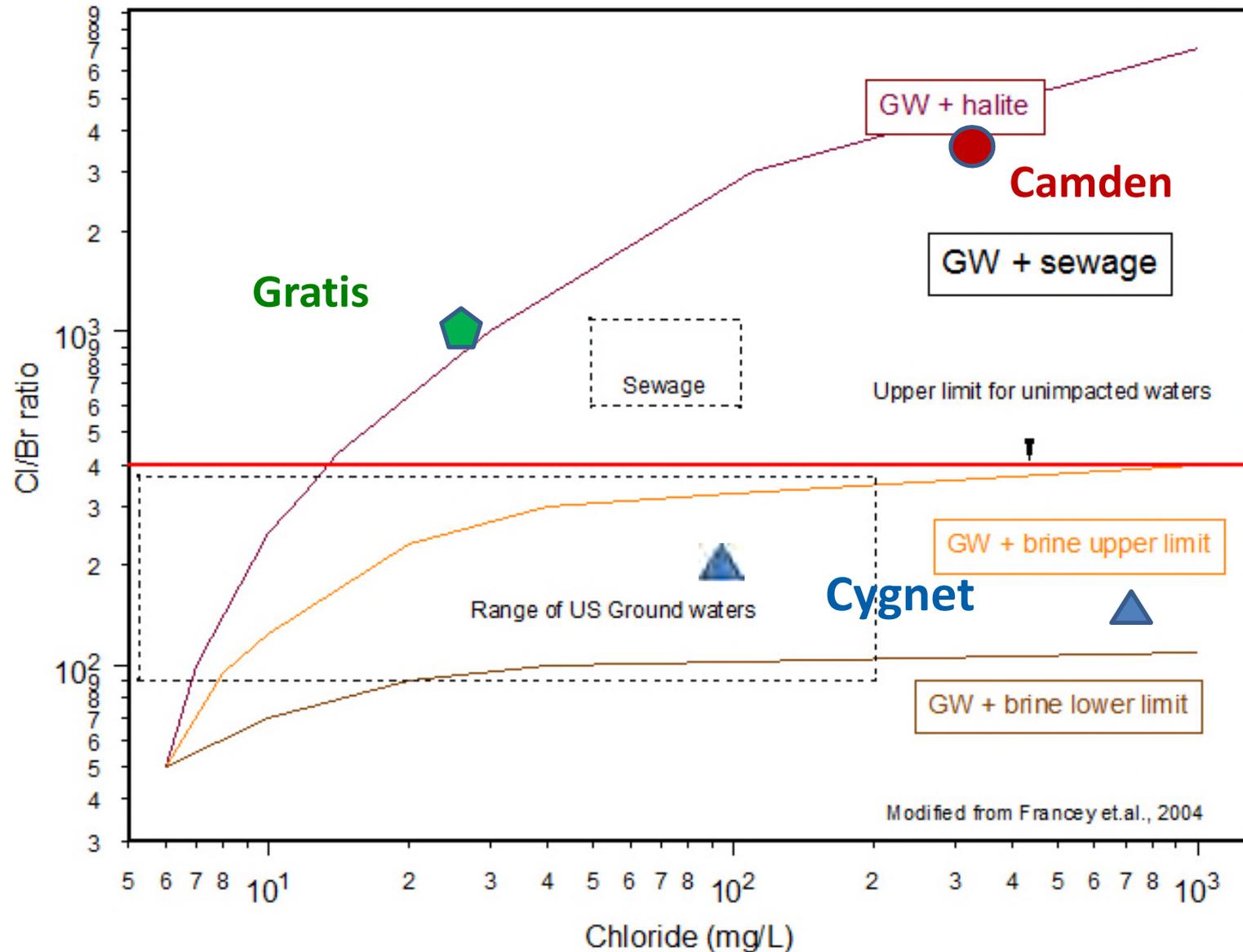


Cl/Br Ratios

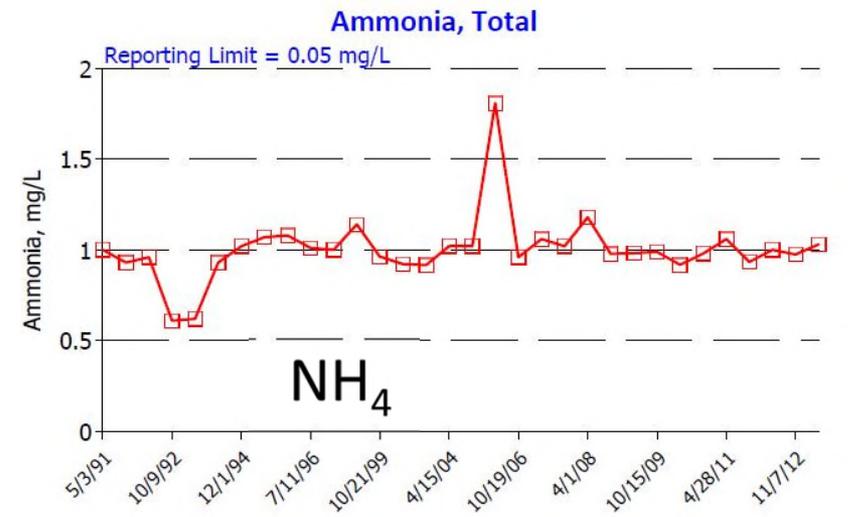
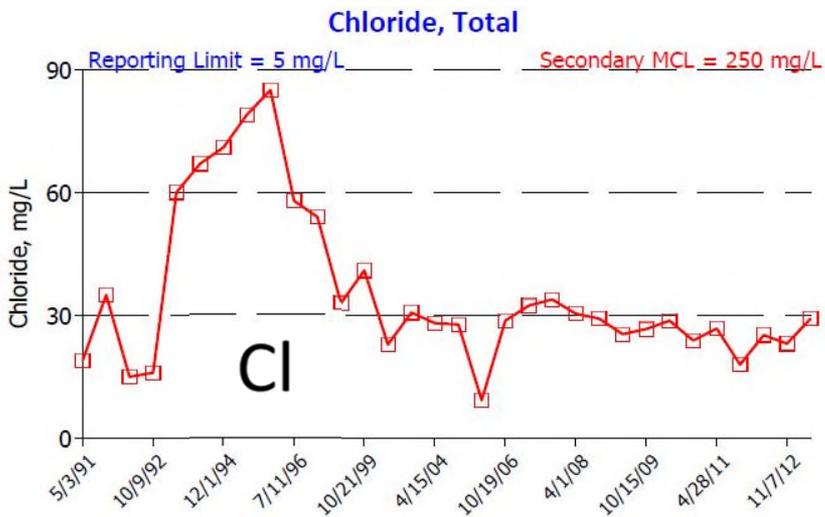
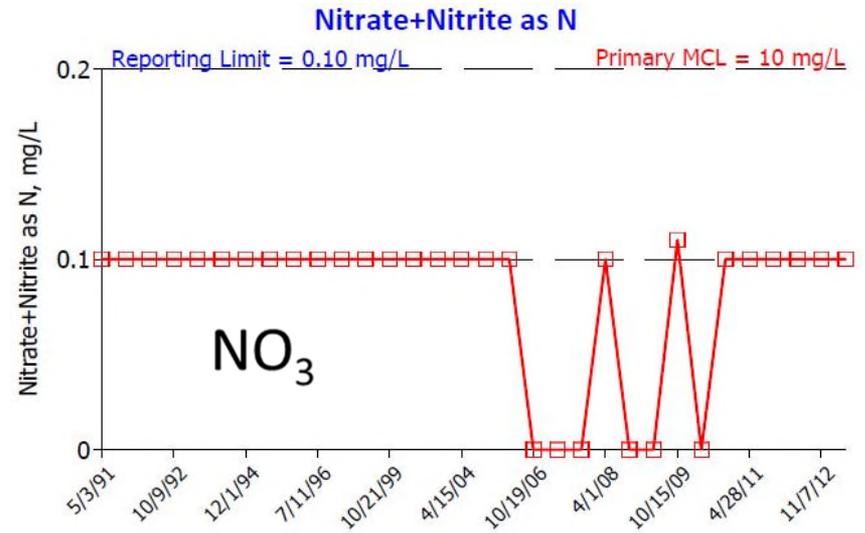
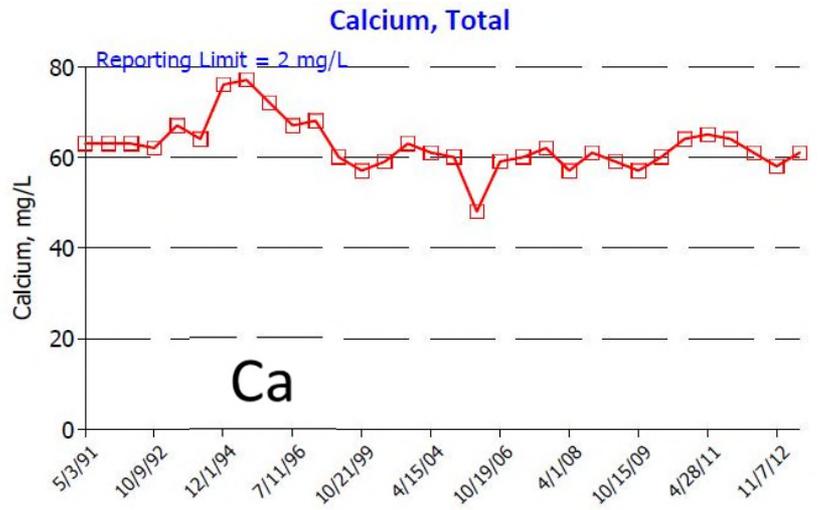
Site	Date	Cl mg/L	Br µg/L	Cl/Br
Camden (peak)	10/28/2010	370	108	3426
Cygnet (peak)	10/14/2010	788	4810	164
Cygnet (last)	5/9/2013	96.1	457	210
Gratis	11/17/2012	25.4	23	1104



Chloride-Chloride/Bromide Ratio

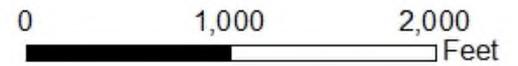


Heath, Central Ohio Sand & Gravel Well; 230' deep, 182' casing

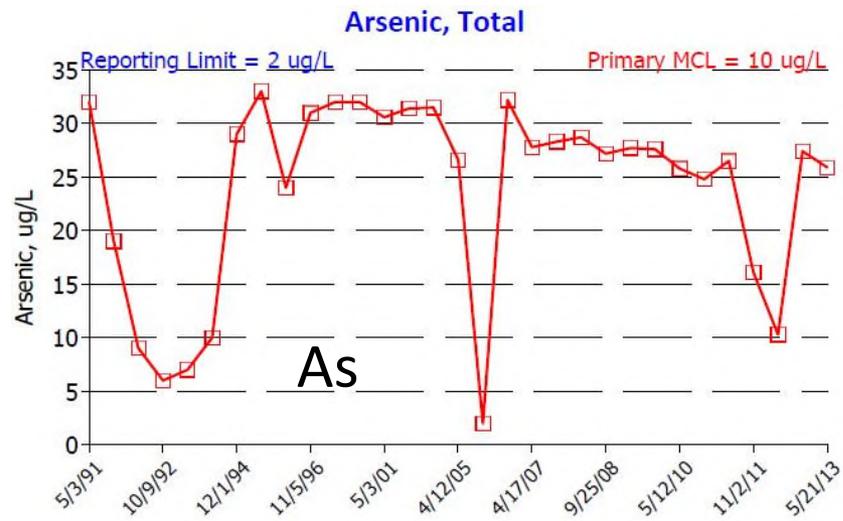
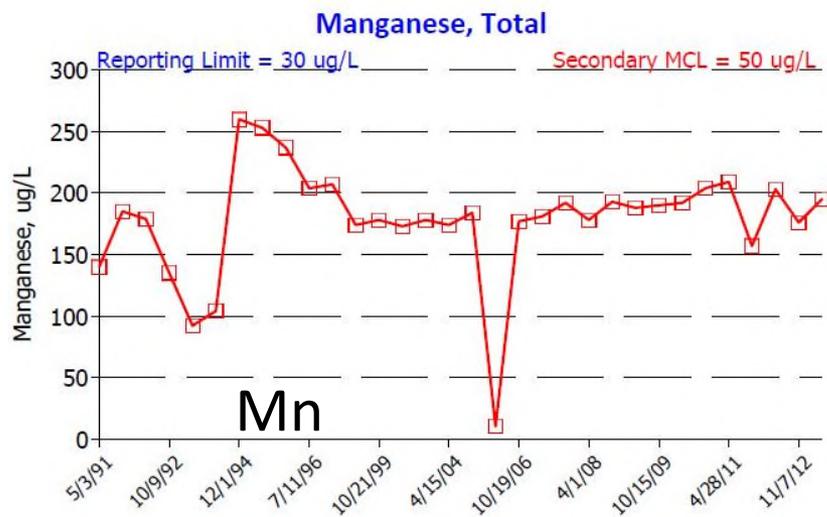
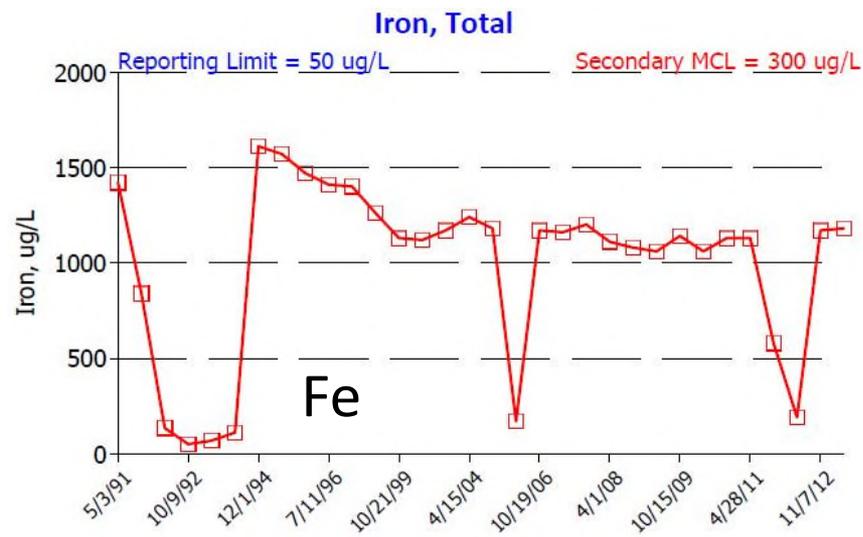
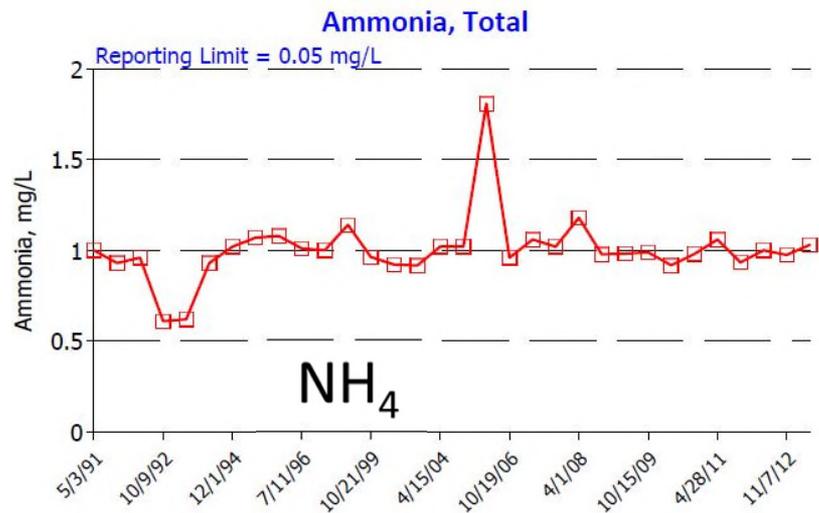




Licking County - Heath Well 5



Heath, Central Ohio Sand & Gravel Well; 230' deep, 182' casing



Conclusions

- PWS wells sensitive to local land use;
- Documented loss of well fields;
- Abandoned well fields:
 - Lost monitoring point;
 - Out of site, out of mind;
- Sustainability issues.



Data & Acknowledgments

- Data Available on Ohio EPA Web Page:

<http://www.epa.state.oh.us/ddagw/gwqcp.aspx>

- PWS Operators
- Ohio EPA District staff & DES staff
- Linda Slattery, Michael Slattery, and Jeff Patzke

