

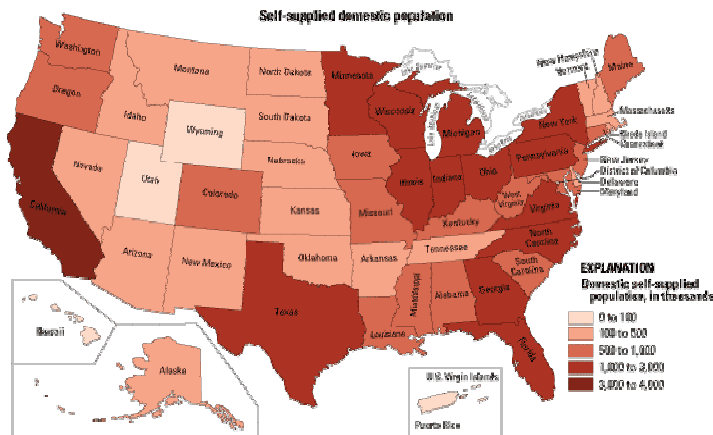
Nutrients and pesticides in ground water supplying domestic wells within a regional aquifer system, northern United States

Objectives: Determine frequency and occurrence of nutrients, selected pesticides, and their relations with selected chemical and physical parameters in domestic supply wells. **Assess the relation between source and receptors within the glacial aquifer by comparing recharge water quality to domestic and public-water supply quality.** Compare results with Cambrian-Ordovician and New England Crystalline aquifer data.

Timeline and Personnel

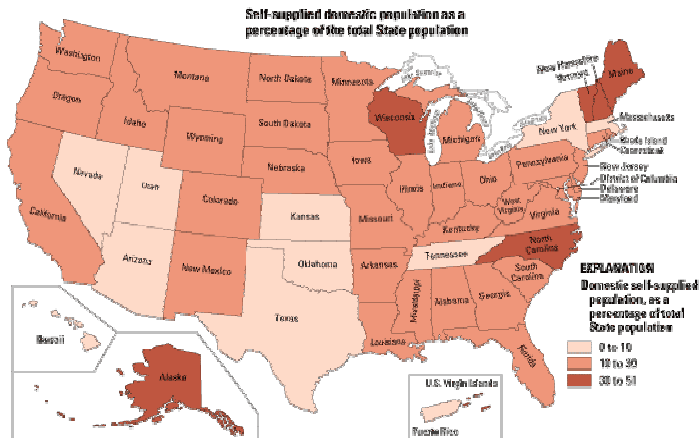
	FY04	FY05	FY06	FY07
Report #1 Domestic wells				
Warner	14%	35%	35%	17%
Morrow	12%	26%	25%	5%
Arnold	15%	14%	6%	5%
Total FTE per year	41%	75%	66%	27%

Task 1	FY04	FY04	FY04	FY04	FY05	FY05	FY05	FY05	FY06	FY06	FY06	FY06	FY07	FY07	FY07	FY07
Nutrients and pesticides in drinking water from confined and unconfined aquifers supplying domestic wells within the glaciated area of the United States	O-D, 2003	J-M, 2004	A-J, 2004	J-S, 2004	O-D, 2004	J-M, 2005	A-J, 2005	J-S, 2005	O-D, 2005	J-M, 2006	A-J, 2006	J-S, 2006	O-D, 2006	J-M, 2007	A-J, 2007	J-S, 2007
Last Updated: 03/17/04																
Travel (air fare, motel, per diem, etc) for developing reports plan, if needed																
Prelim annotated report outline (specifies purpose and scope of report)																
Data compilation																
Data analysis																
Final annotated report outline																
Data interpretation																
Report writing																
First draft																
Colleague review																
Director's approval																
Other task																
Other task																
Publication																



Relevancy

- CDC
- State Agency data collection
- National Rural Water Association



Data Changes

Additional public supply NAWQA data to be used if available by 2005

- SWQA
- TANC

Table 2. Source <http://www.cdc.gov/nceh/emergency/WellWater/WellResults.htm>

The percentage of water samples that tested positive for coliform bacteria and for *E. coli* and the percentage with nitrate or atrazine concentrations above the maximum contamination level for public water supplies, 1994 Midwest Well Water Survey

State	Analytes				
	Coliform Bacteria	<i>E. coli</i>	Nitrate > 10 mg/L	Atrazine > 3 ppb	N
Illinois	45.9	15.4	15.3	0	540
Iowa	58.6	20.5	20.6	0.4	526
Kansas	48.7	16.3	24.3	0.6	716
Minnesota	27.3	4.5	5.8	0.1	718
Missouri	57.4	22.6	9.7	0	632
Nebraska	37.3	2.5	14.7	0.2	598
North Dakota	35.5	8.2	13.5	not tested	673
South Dakota	40.1	8.4	10.4	0	583
Wisconsin	22.8	2.6	6.6	0.2	534
Total	41.3	11.1	13.4	0.2	5,520

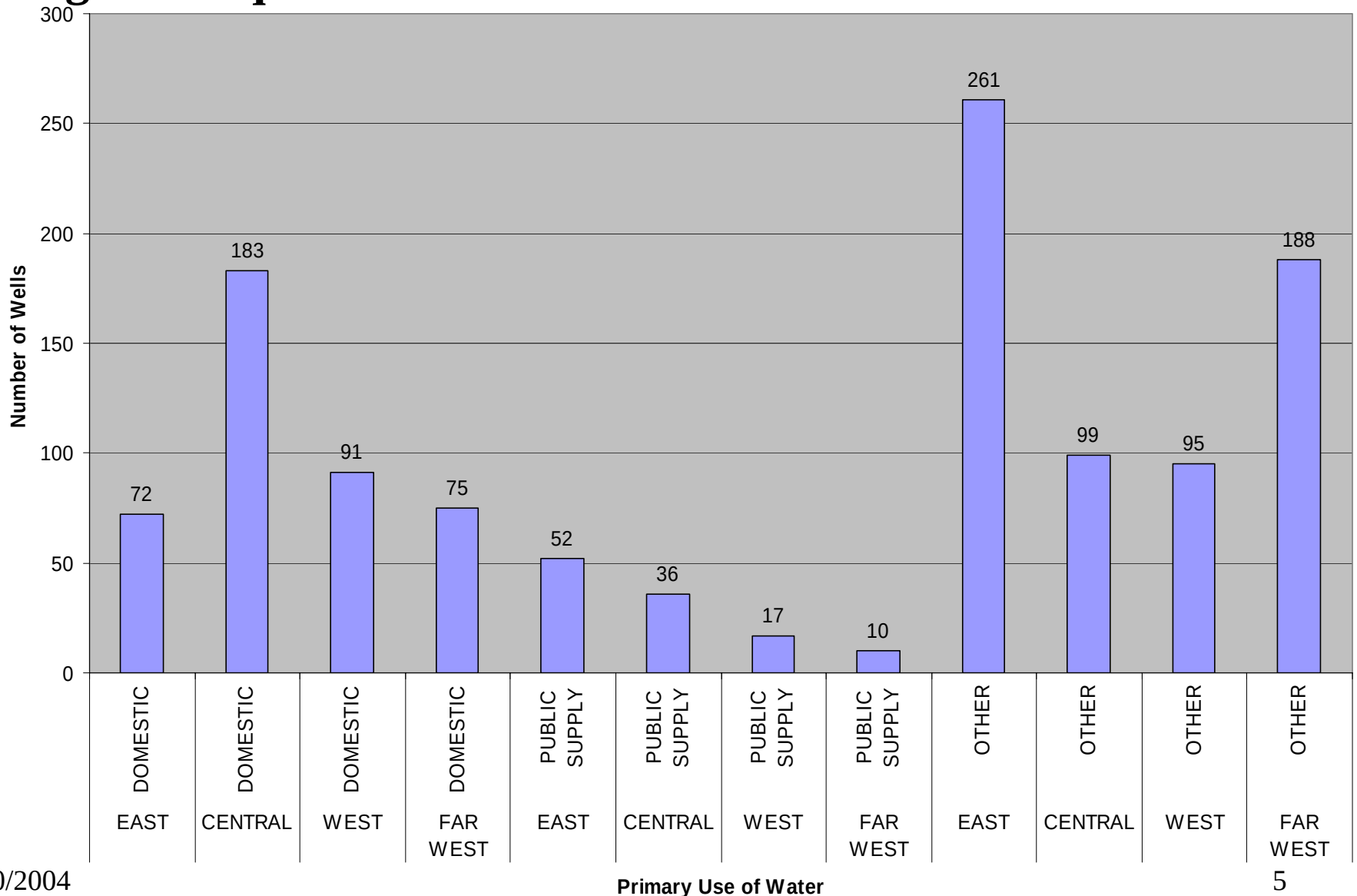
CDC data and NAWQA Domestic Well data

- NAWQA 38% nitrate
CDC 13%nitrate
- NAWQA <1% atrazine
CDC <1% atrazine

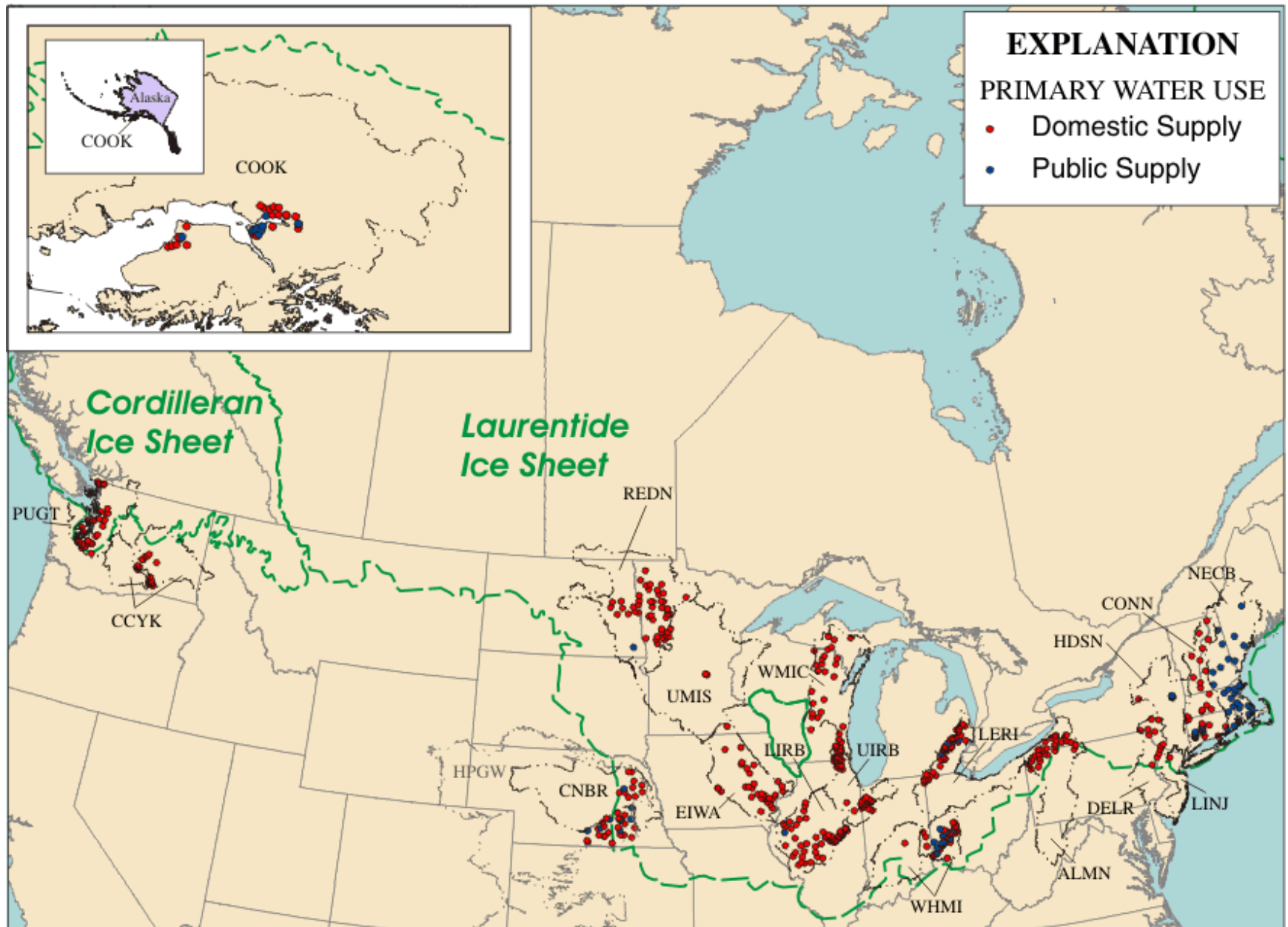
	NAWQA Nitrate >= 10 mg/L	NAWQA Atrazine > 3 ppb	NAWQA N for nitrate	NAWQA N for atrazin
Glacial	38.43%	0.06%	445	444
CO				
Nexxline				
Glacial Stratification	Number of Nitrate Concentrations >=10mg/L	Percent nitrate >=10 mg/L		
East -Glacial	15	8.8%		
Central- Glacial	47	27.5%		
West-Glacial	67	39.2%		
Far West-Glacial	42	24.6%		

Additional plans to compare to State water-quality publications

How much NAWQA ground-water-quality data is available from domestic, public-supply, and monitoring wells in the glacial aquifer?



Distribution of data

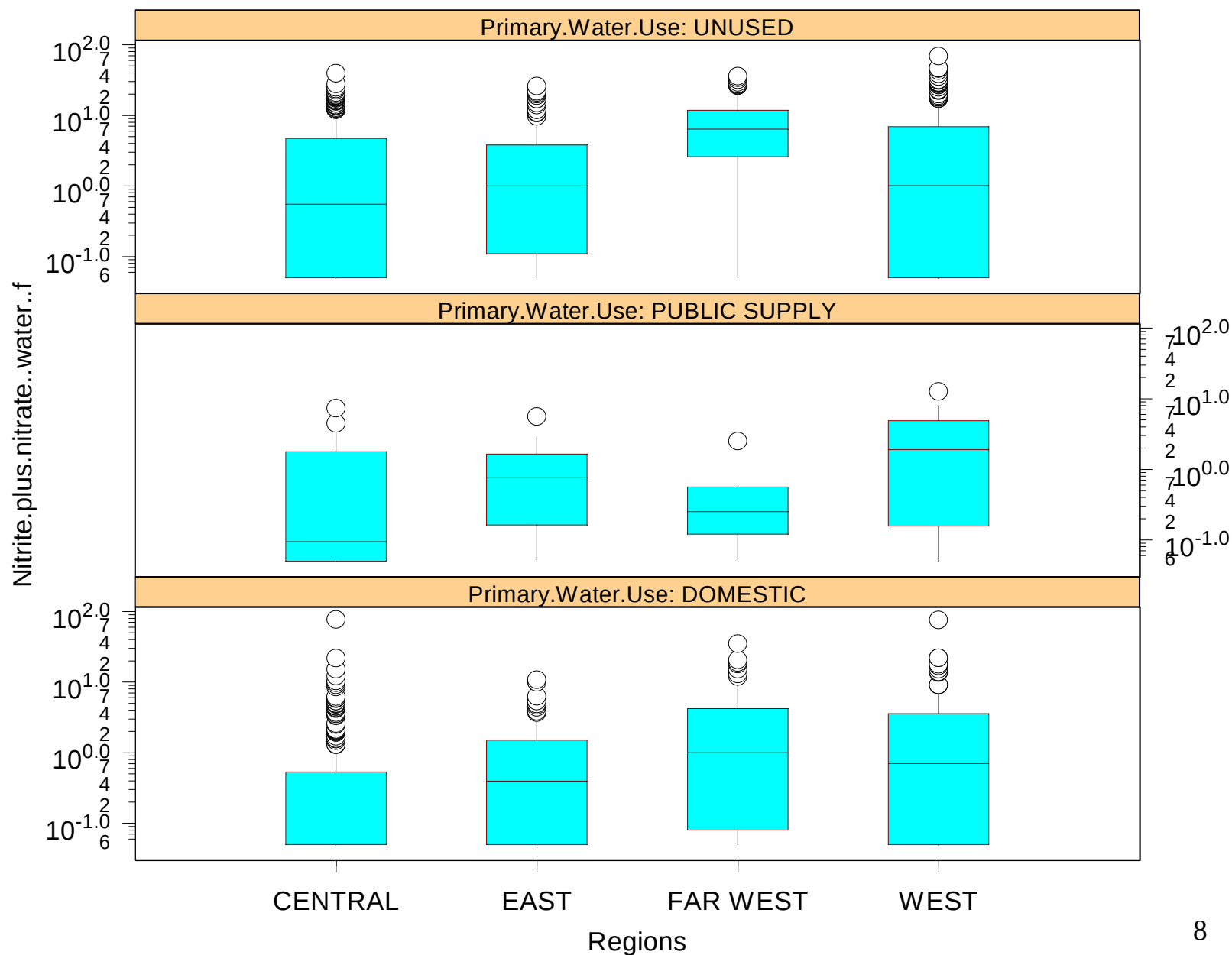


Major pesticide detections

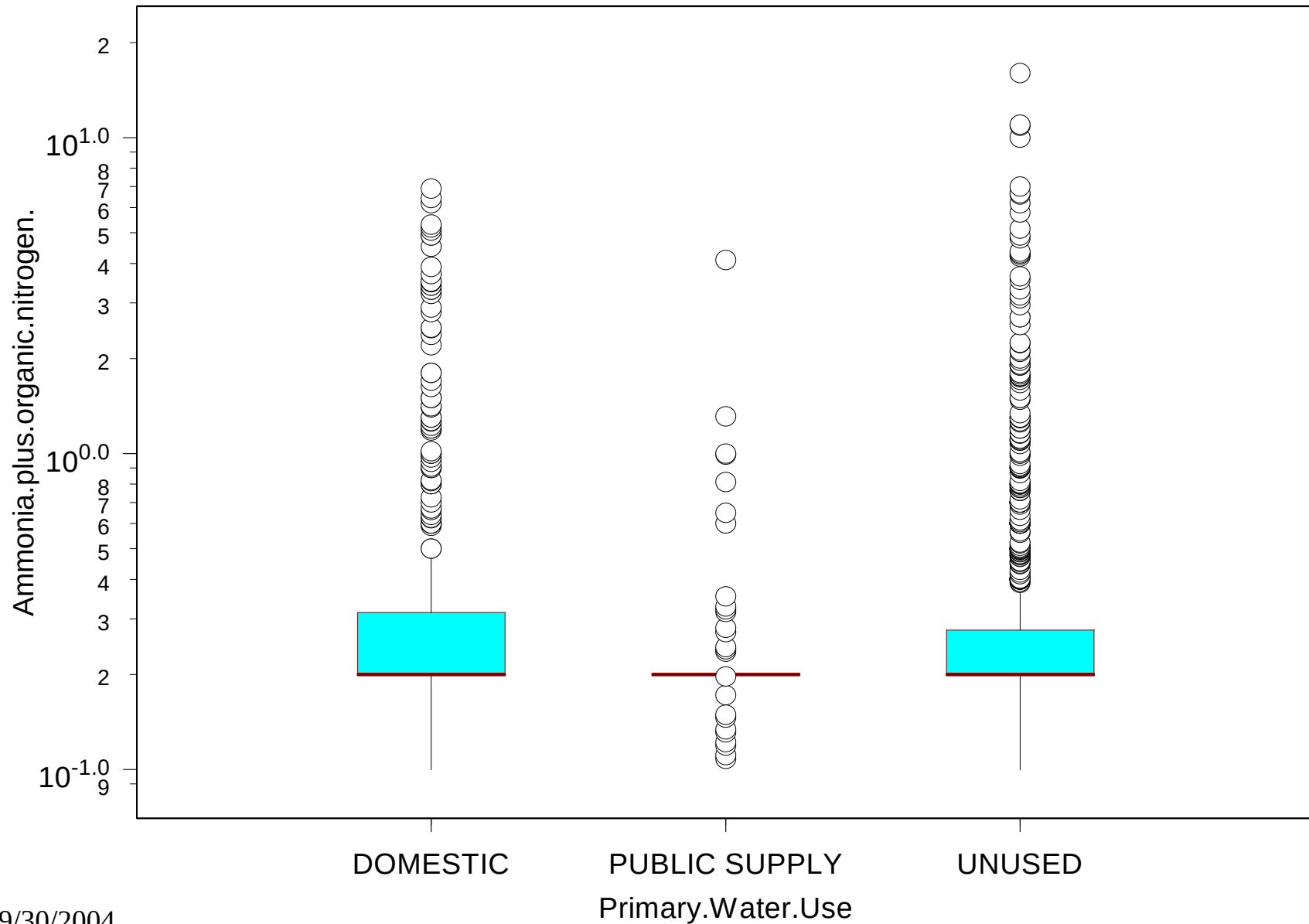
Schedule 2001 LCAA Glacial Aquifer Domestic Supplies

Parameter Code	Parameter Name	Number of Detects	Number of Samples	Percent detection
61043	Metolachlor ethanesulfonic acid	159	392	40.6%
50009	Alachlor ethanesulfonic acid	122	392	31.1%
61044	Metolachlor oxanilic acid	65	392	16.6%
61029	Acetochlor ethanesulfonic acid	25	392	6.4%
61030	Acetochlor oxanilic acid	16	392	4.1%
61625	3_4-Dichloroaniline	2	106	1.9%
61596	Metalaxyl	2	106	1.9%
61605	Sulfotepp	1	76	1.3%
61620	2-Ethyl-6-methylaniline	1	106	0.9%
61594	Isofenphos	1	106	0.9%
62169	Desulfinylfipronil amide	1	150	0.7%
62168	Fipronil sulfone	1	150	0.7%
62166	Fipronil	1	150	0.7%
46342	Alachlor	8	1597	0.5%

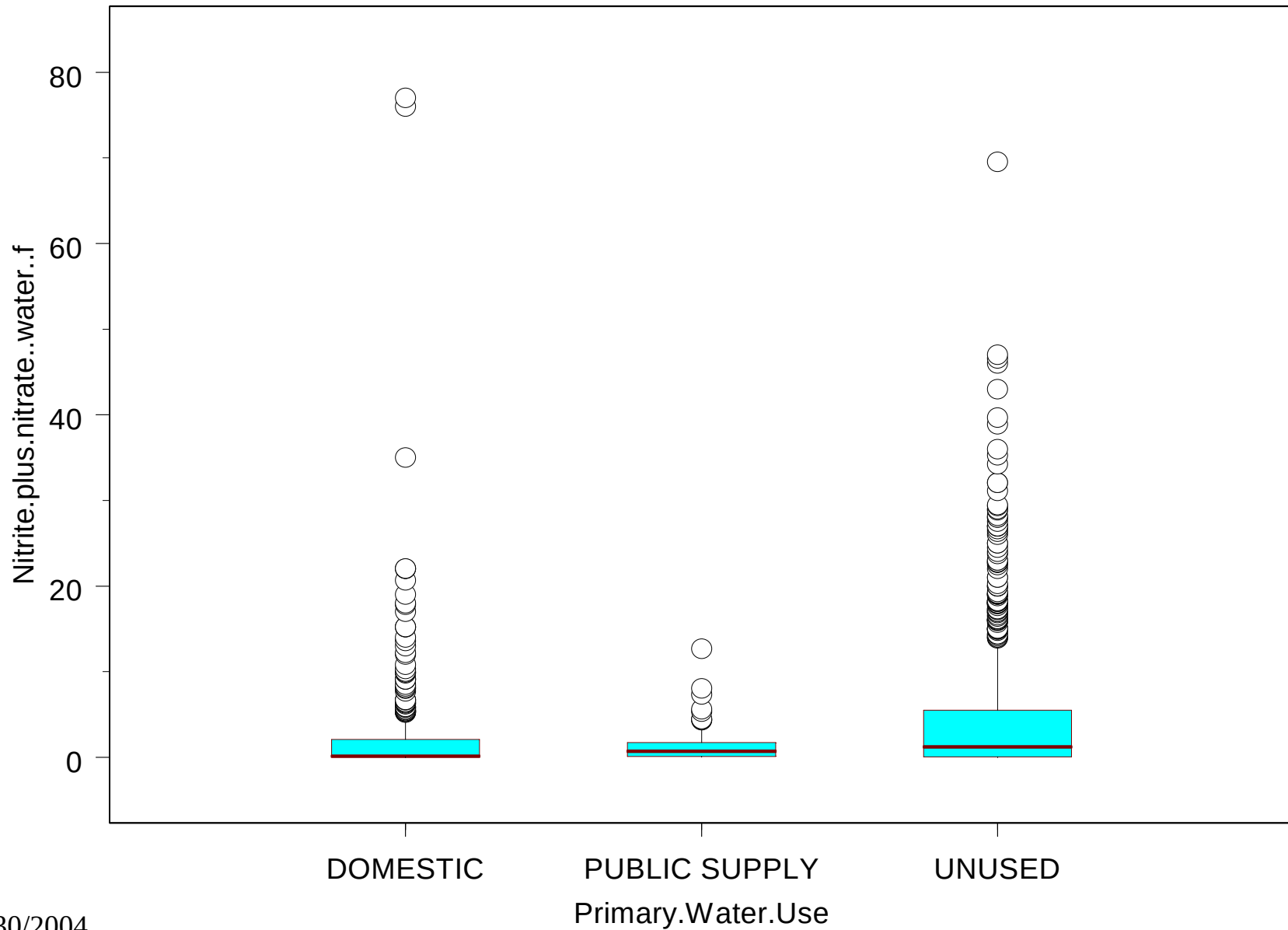
Differences in nitrate by water use and glacial stratification



Water use and ammonia



Water use and nitrate



Analysis is ongoing

Lithology changes by region and depth

SILT AND CLAY
SANDSTONE AND SHALE
SAND, GRAVEL, AND CLAY
SAND AND CLAY
OUTWASH
GRAVEL AND CLAY
COBBLES, SILT, AND CLAY
CLAY
-

Regions: WEST

Regions: FAR WEST

SILT AND CLAY
SANDSTONE AND SHALE
SAND, GRAVEL, AND CLAY
SAND AND CLAY
OUTWASH
GRAVEL AND CLAY
COBBLES, SILT, AND CLAY
CLAY
-

Regions: EAST

SILT AND CLAY
SANDSTONE AND SHALE
SAND, GRAVEL, AND CLAY
SAND AND CLAY
OUTWASH
GRAVEL AND CLAY
COBBLES, SILT, AND CLAY
CLAY
-

Regions: CENTRAL

SILT AND CLAY
SANDSTONE AND SHALE
SAND, GRAVEL, AND CLAY
SAND AND CLAY
OUTWASH
GRAVEL AND CLAY
COBBLES, SILT, AND CLAY
CLAY
-

Well Depth

0 100 200 300 400