New Jersey's Ambient Ground Water Quality Monitoring Network

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NJDEP/New Jersey Geological Survey

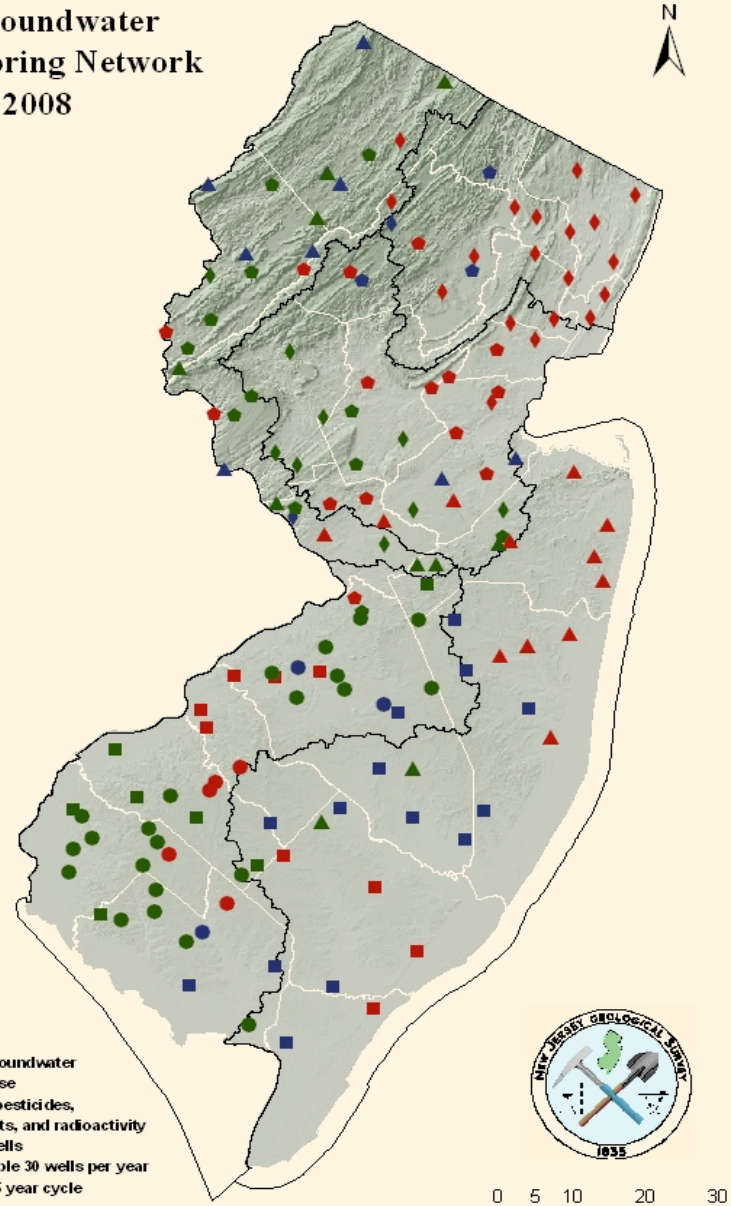
Presented at:

NJ Water Monitoring Council Meeting

May 20, 2009

NJDEP/USGS cooperative network

New Jersey's Ambient Groundwater Quality Monitoring Network 1999 - 2008



-Network examines shallow groundwater quality as a function of land use
-Samples analyzed for VOCs, pesticides, metals, common ions, nutrients, and radioactivity
-NJGS located and installed wells
-NJDEP/BFBM and USGS sample 30 wells per year
-Sampling sets sampled on a 5 year cycle

Contact: Mike Serfes or Raymond Bousenberry
at the New Jersey Geological Survey (609-984-6587)

Southern NJ Field Parameters

Cycle 1	Undeveloped			Agricultural			Urban		
	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
T (Celsius)	12	14.5	18	12	15.5	22.5	15.5	17.3	29
DO (mg/L)	<0.2	4.6	9.3	<0.3	5.4	10.5	<0.2	2.1	8.8
pH	3.7	4.6	5.9	4	5	7.91	3.8	4.6	6.7
TDS (mg/l)	15	25.5	82	59	214	690	57	136.5	455

Cycle 2	Undeveloped			Agricultural			Urban		
	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
T (Celsius)	8.5	12.7	15.3	11.1	14.8	19.9	12.2	14.9	21.8
DO (mg/L)	0.4	5.1	9.1	0.2	3.5	11.2	0.2	3.1	9.1
pH	4.1	4.5	5.8	3.8	4.8	7.9	3.6	4.9	8.1
TDS (mg/l)	16	27	147	45	208	2040	40	221	2310

Northern NJ Field Parameters

Cycle 1	Undeveloped			Agricultural			Urban		
	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
T (Celsius)	10	12	13.9	10.3	13.3	23	6.8	12.8	18.3
DO (mg/L)	0.6	4.2	6.7	0.2	4.3	11	0.2	2.9	6.9
pH	5.8	7	8.1	6.5	7.4	8.1	5.2	6.95	8.4
TDS (mg/l)	167	269	938	22	119	387	208	550	2200

Cycle 2	Undeveloped			Agricultural			Urban		
	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
T (Celsius)	9.2	11.7	14.2	9.9	13	15.9	9.1	13.9	23.4
DO (mg/L)	0.9	6.2	8	0.2	3.6	10.7	0	2.9	6.7
pH	5	7.05	8.5	6.1	7.3	7.9	5.2	6.9	7.7
TDS (mg/l)	23	106	549	129	242	1270	149	480	3530

Southern NJ Major Ions

Cycle 1	Undeveloped			Agricultural			Urban		
(mg/L)	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
Calcium	0.134	0.716	33.98	0.531	18.46	152.35	2.2	12.26	50.64
Sodium	1.163	2.32	22.6	1.51	8.03	180	30.3	18.66	235.12
Chloride	2.11	3.77	37.48	3.06	19.15	414.91	4.71	39.86	448.54
SC (us/cm)	23	52	325	47	320	1360	83	265	1582

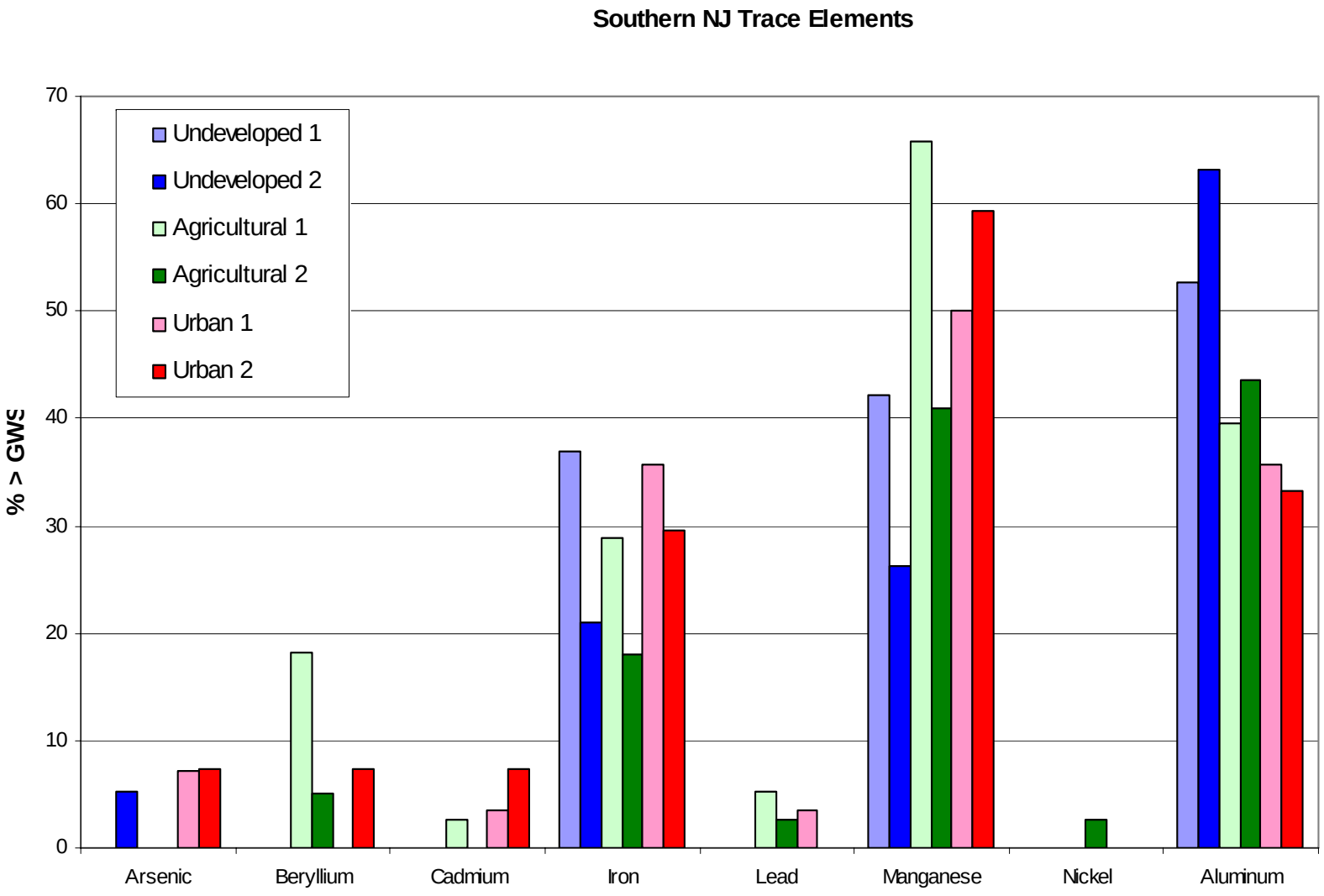
Cycle 2	Undeveloped			Agricultural			Urban		
(mg/L)	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
Calcium	0.08	0.41	4.79	0.5	22.4	68.9	0.82	10.2	141
Sodium	1.23	2.26	17.5	1.75	13.8	580	3.15	38.8	550
Chloride	1.99	4.27	37.48	3.5	32.9	1120	4.97	83.3	1210
SC (us/cm)	20	49	303	559	360	3690	76	416	4100

Northern NJ Major Ions

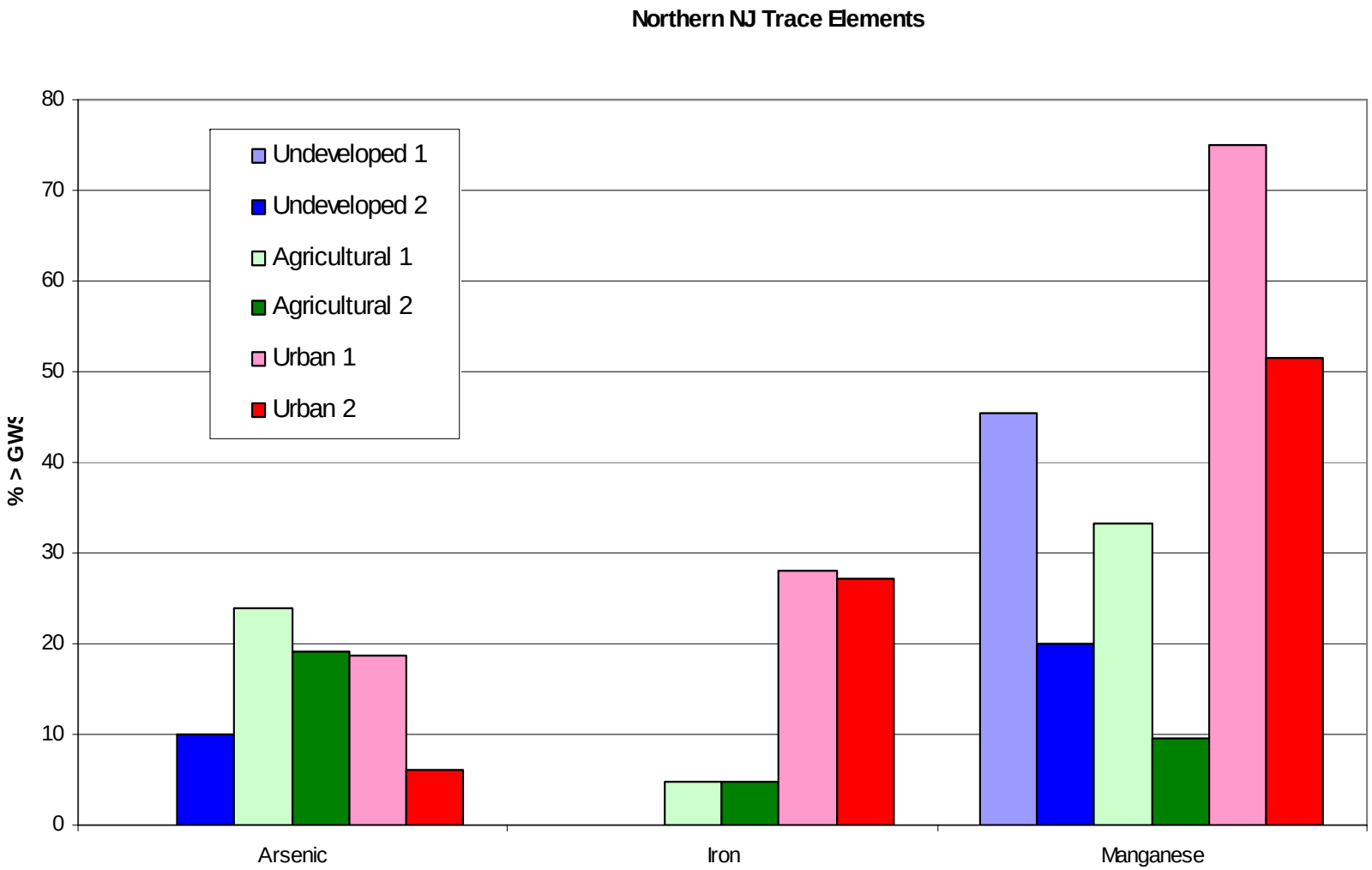
Cycle 1	Undeveloped			Agricultural			Urban		
(mg/L)	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
Calcium	1.86	19.3	96.3	30.4	48.6	113	30.5	76.25	342
Sodium	0.63	3.33	12.2	1.91	13.3	192	11.4	45.3	463
Chloride	0.87	7.86	18.83	3.85	18.32	362	10.5	149.5	960
SC (us/cm)	32	206	819	261	414	1710	320	956.5	3570

Cycle 2	Undeveloped			Agricultural			Urban		
(mg/L)	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
Calcium	1.47	16.2	125	22.6	45.2	126	19	71.9	253
Sodium	0.63	4.56	9.69	2.44	12.4	287	9.24	51	779
Chloride	0.83	2.71	42.8	1.78	23.9	556	2.71	100	1585
SC (us/cm)	30	162.5	916	169	434	2360	209	831	5410

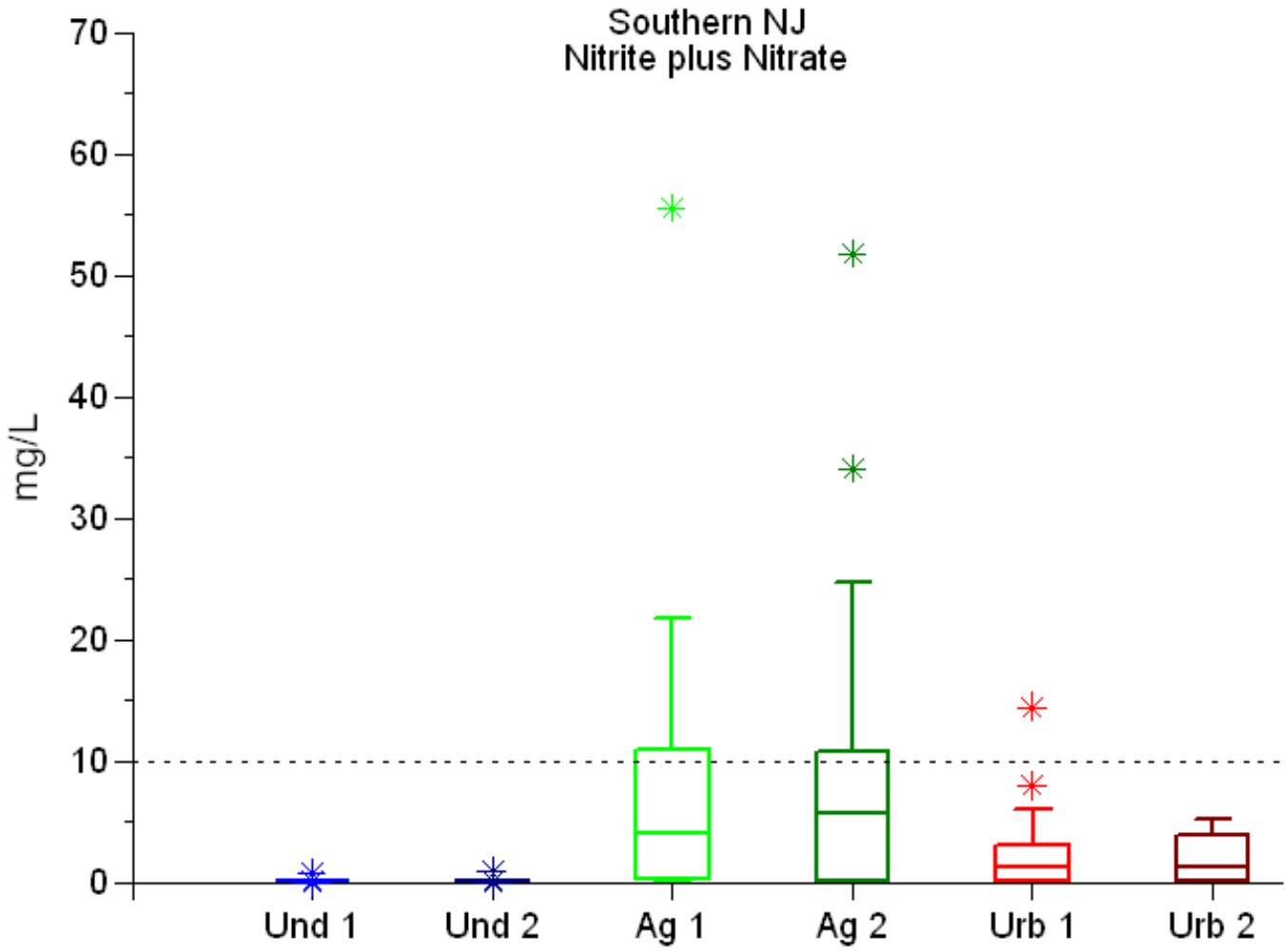
Southern NJ Trace Elements



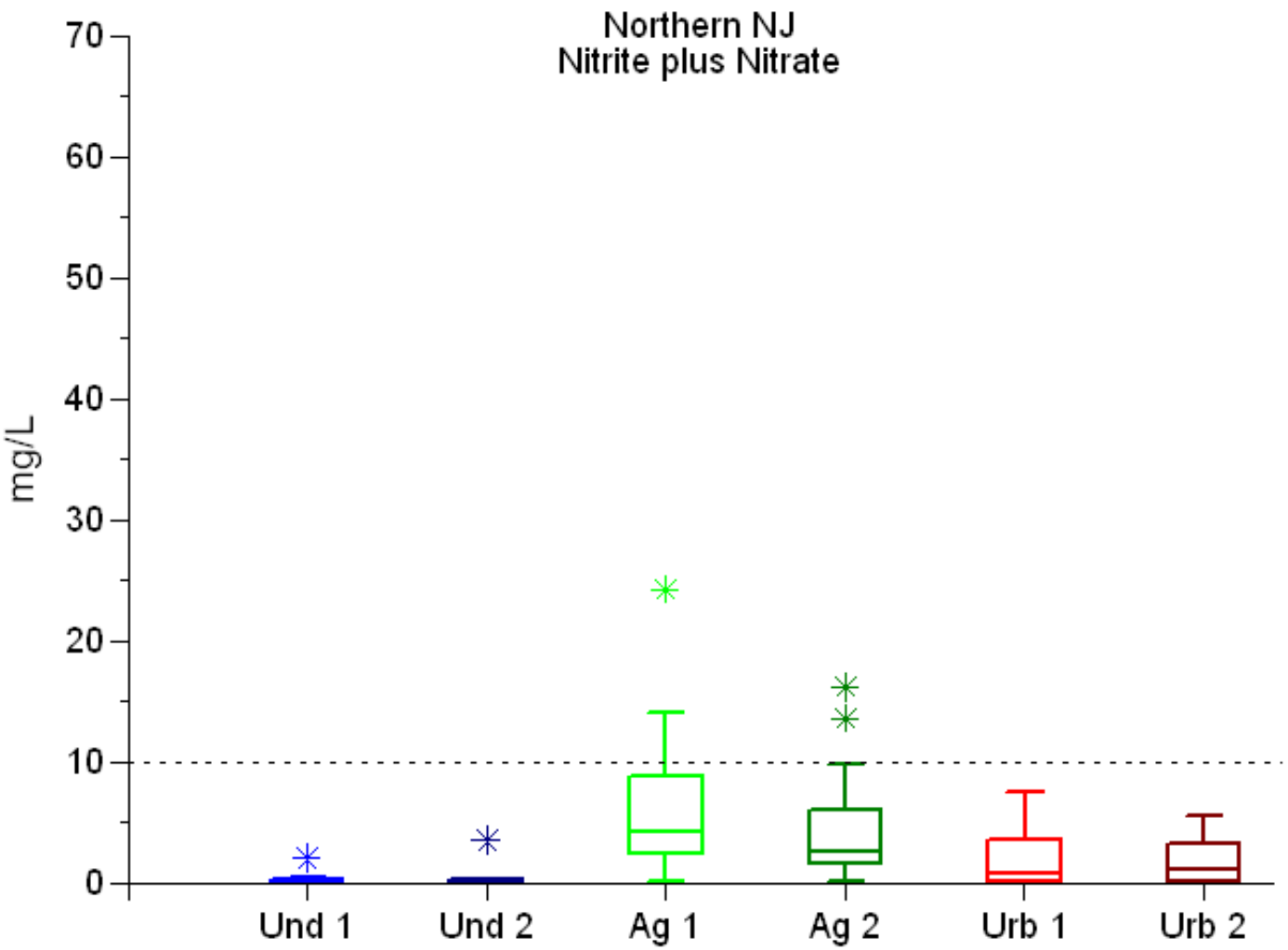
Northern NJ Trace Elements



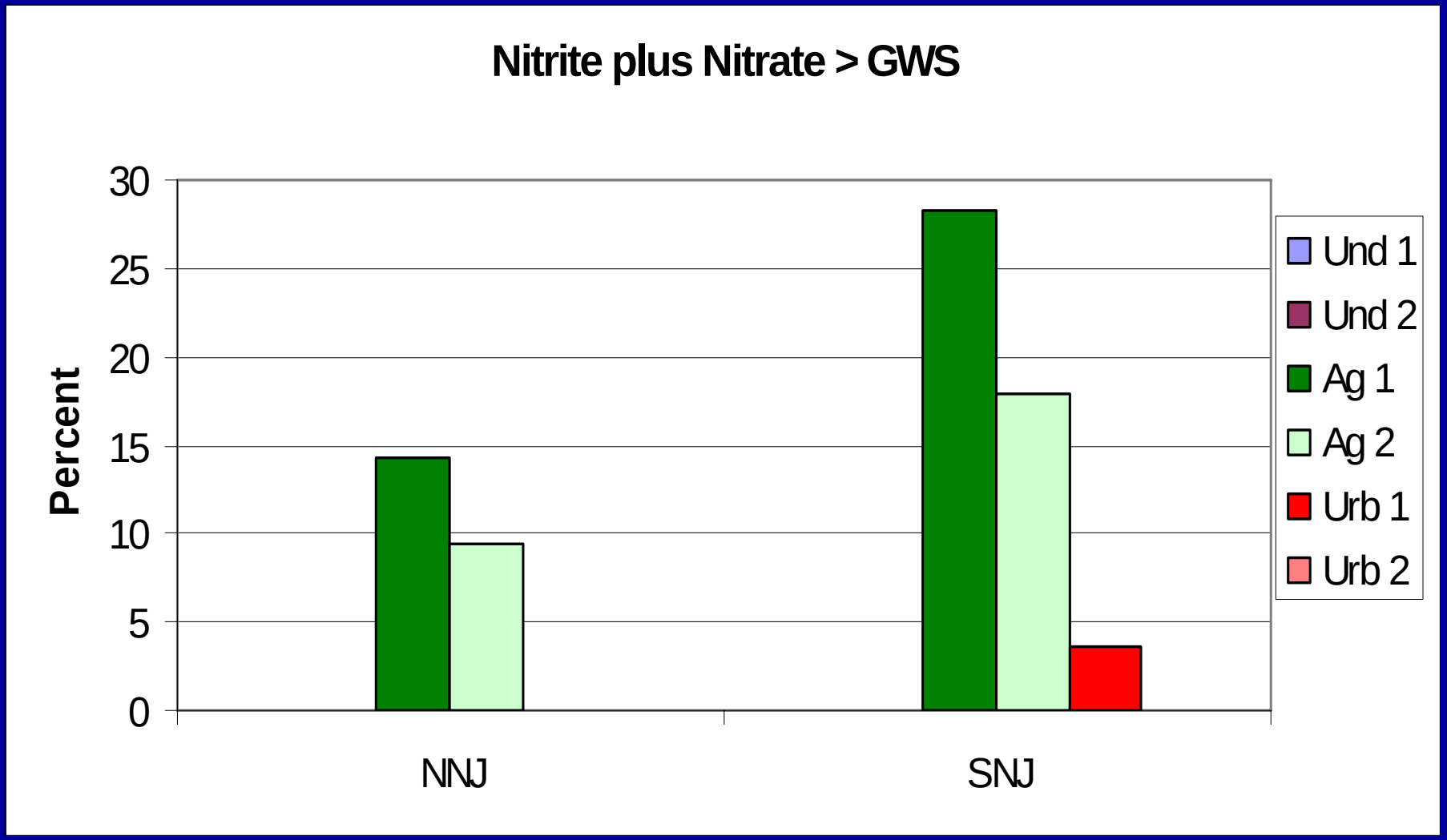
Southern NJ Nitrite + Nitrate

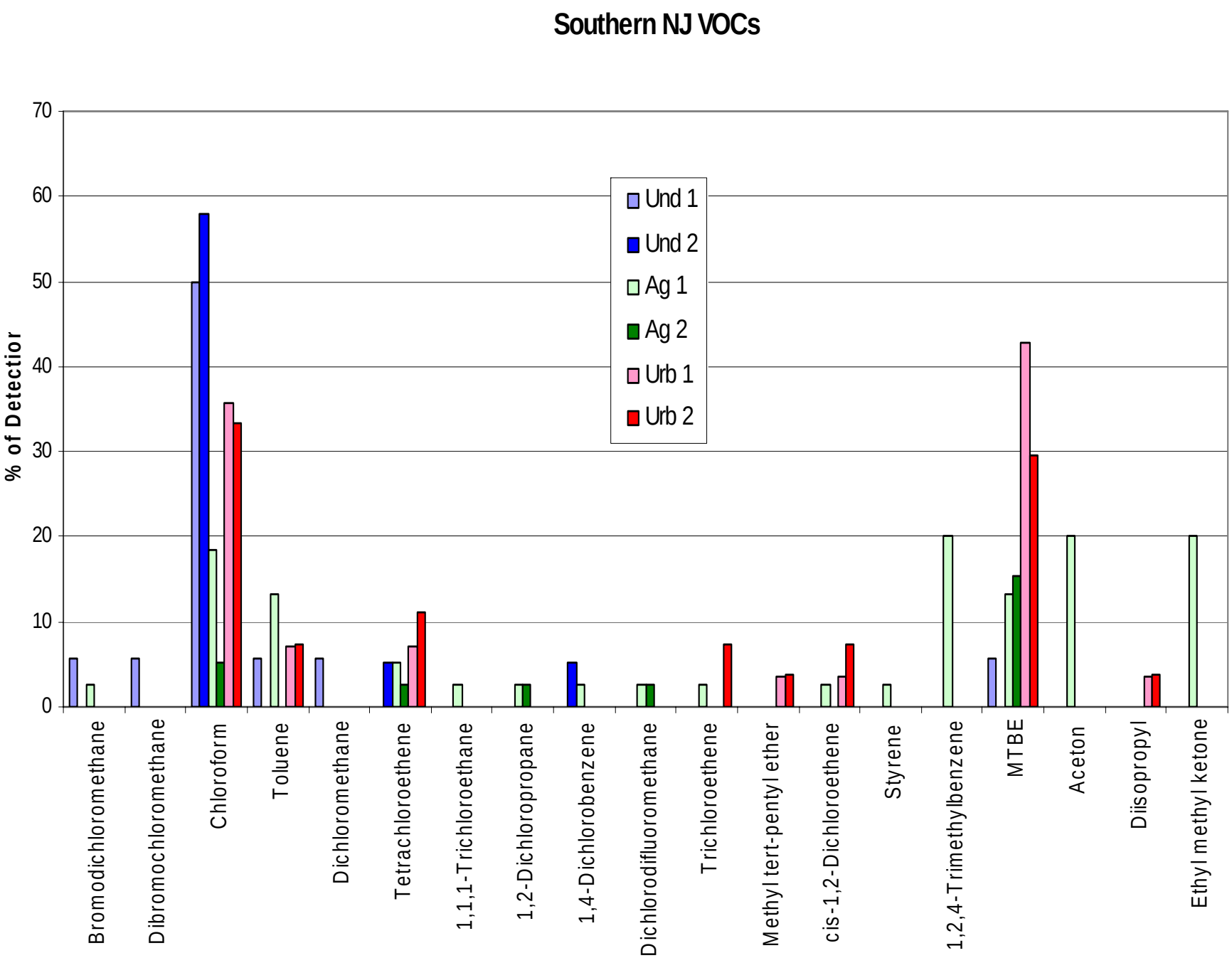


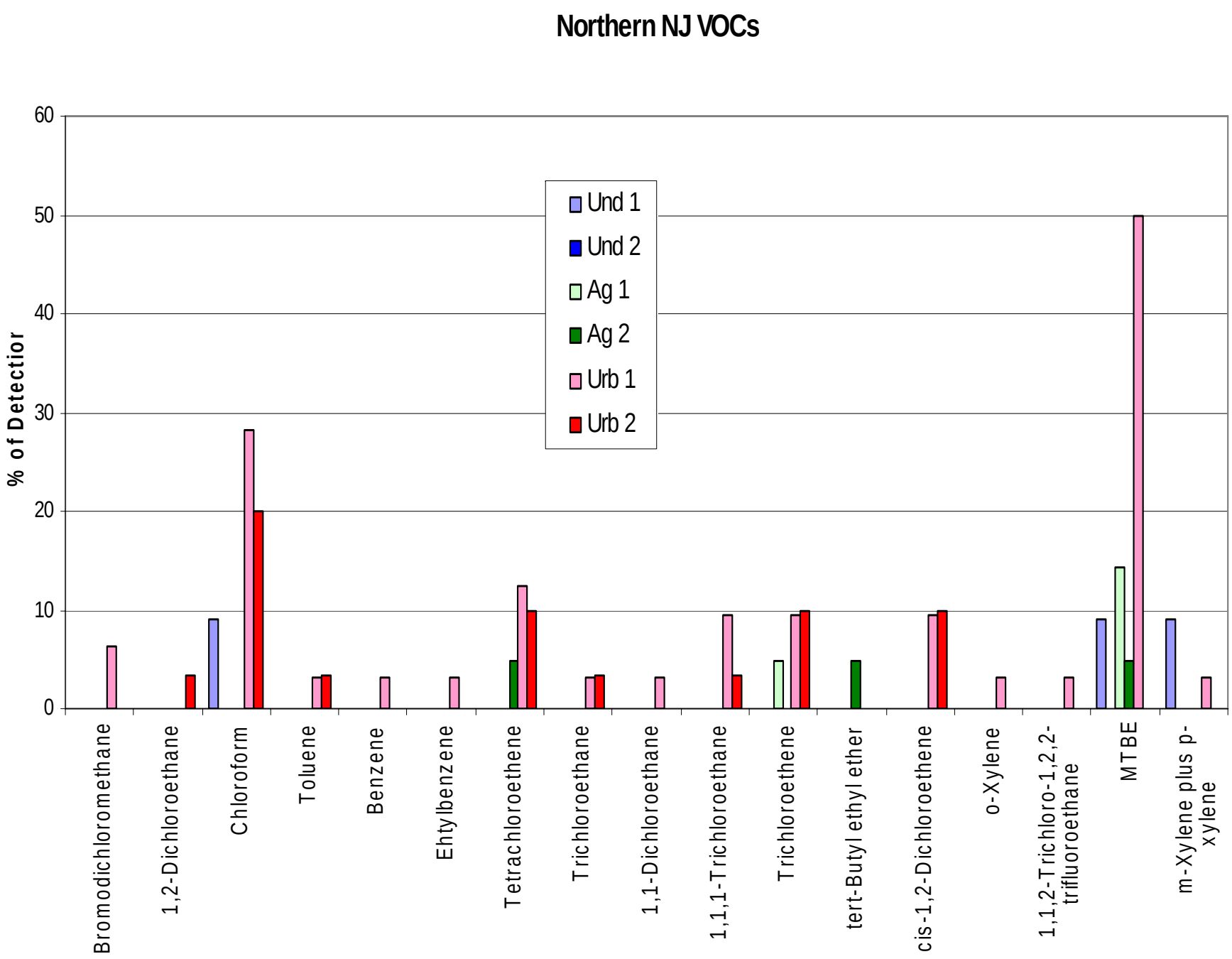
Northern NJ Nitrite + Nitrate

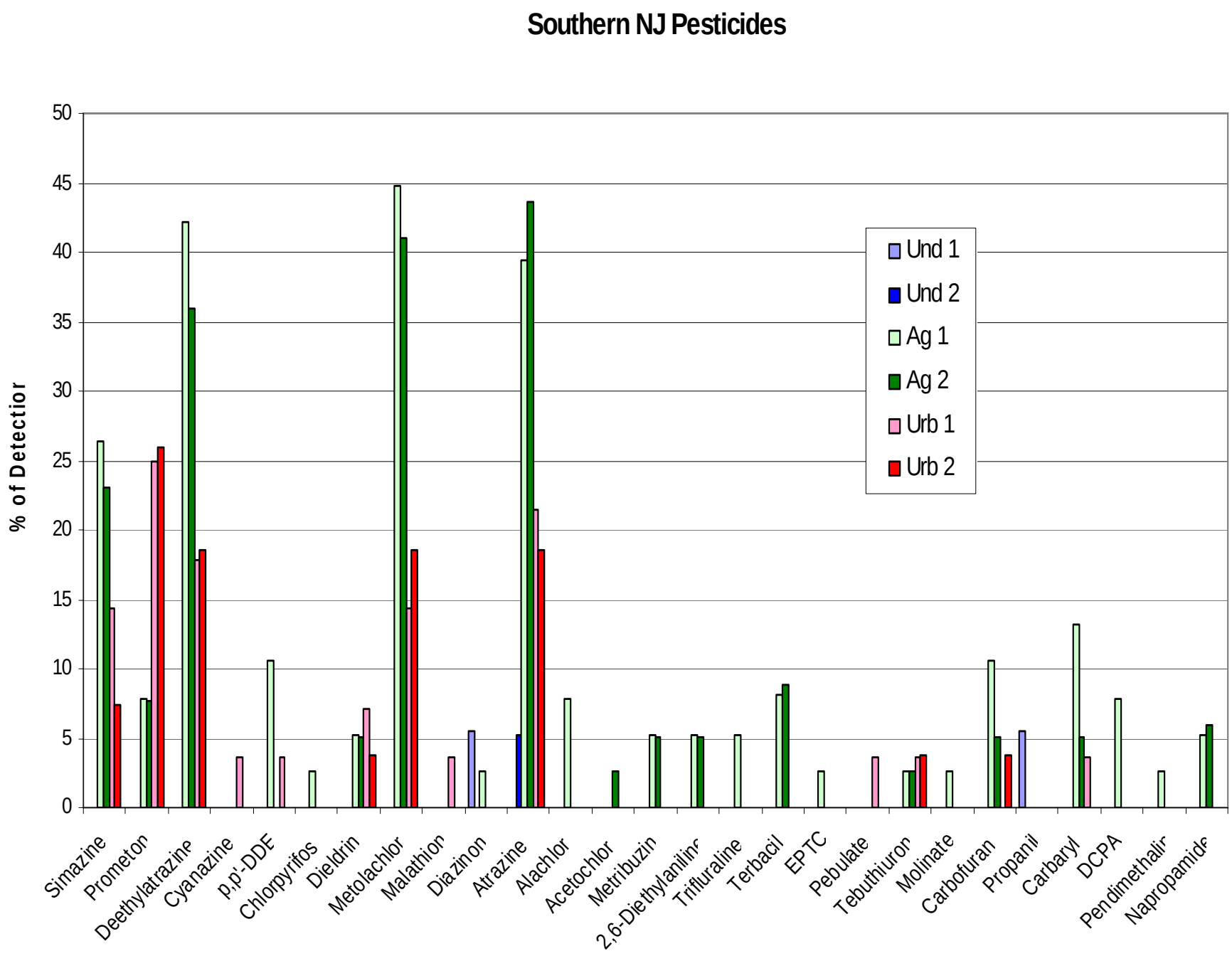


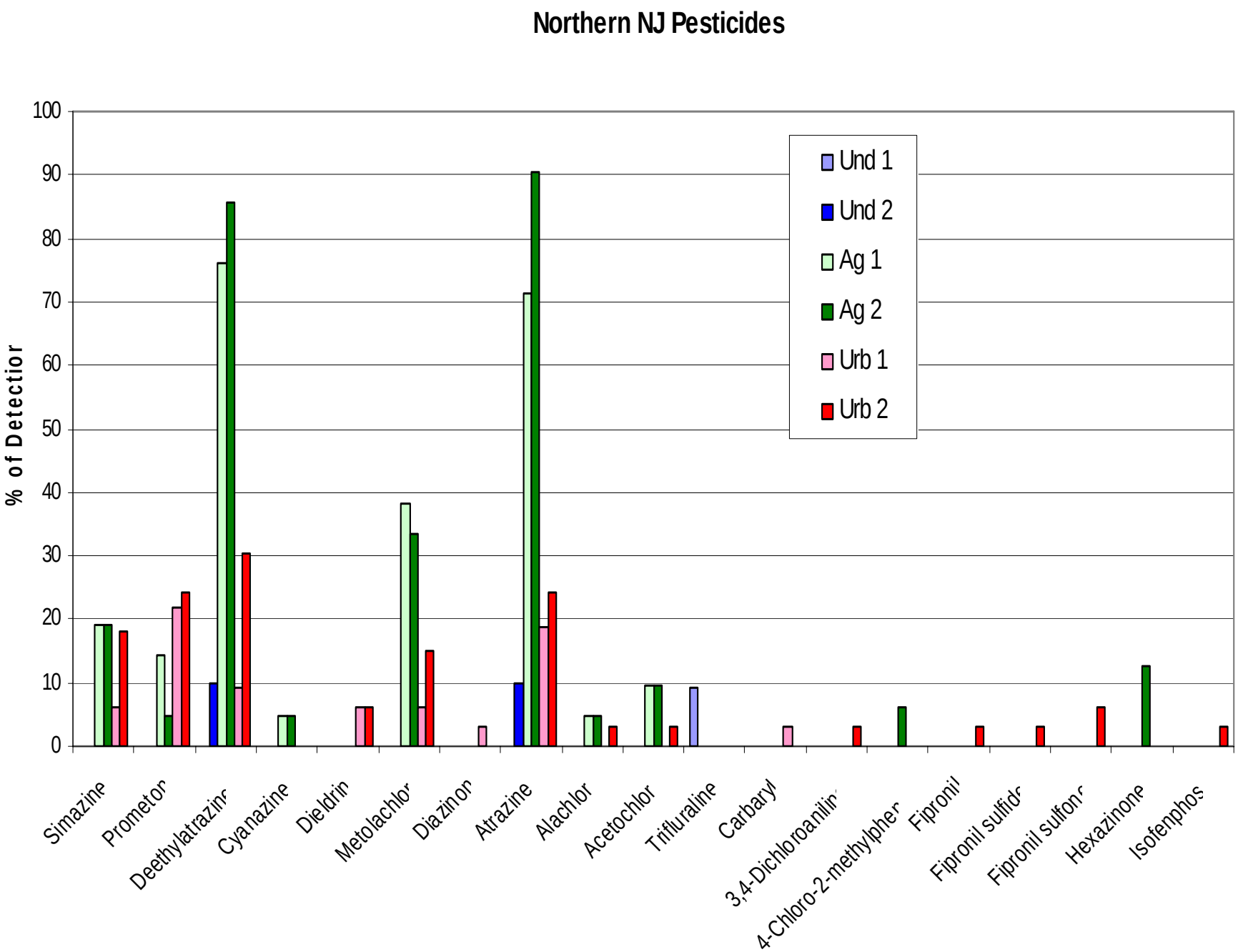
Nitrite + Nitrate > GWS



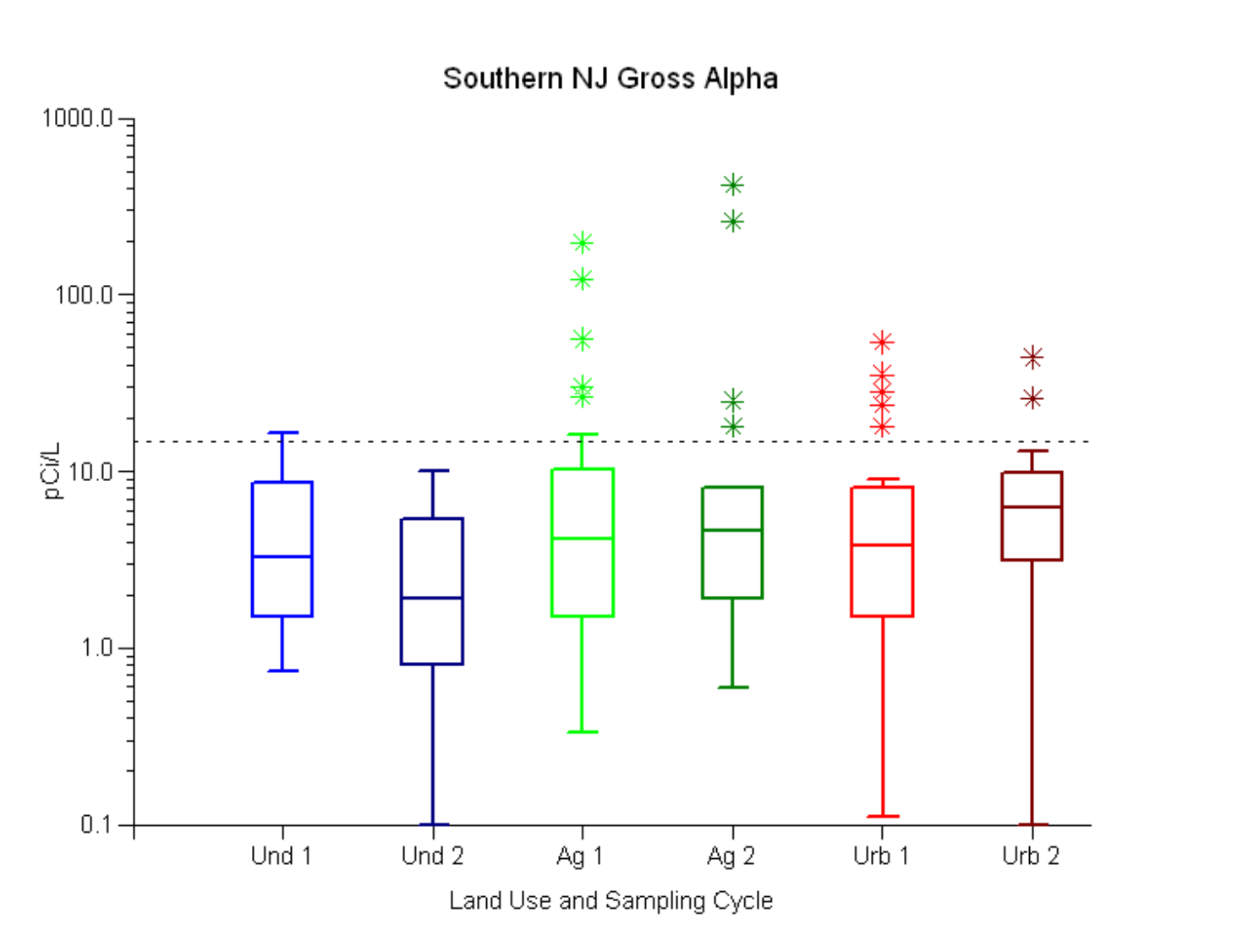

Southern NJ VOCs
% of Detectior
70
60
50
40
30
20
10
0
Und 1
Und 2
Ag 1
Ag 2
Urb 1
Urb 2
Bromodichloromethane
Dibromochloromethane
Chloroform
Toluene
Dichloromethane
Tetrachloroethene
1,1,1-Trichloroethane
1,2-Dichloropropane
1,4-Dichlorobenzene
Dichlorodifluoromethane
Trichloroethene
Methyl tert-pentyl ether
cis-1,2-Dichloroethene
Styrene
1,2,4-Trimethylbenzene
MTBE
Aceton
Diisopropyl
Ethyl methyl ketone


Northern NJ VOCs
% of Detectior
60
50
40
30
20
10
0
Und 1
Und 2
Ag 1
Ag 2
Urb 1
Urb 2
Bromodichloromethane
1,2-Dichloroethane
Chloroform
Toluene
Benzene
Ehtylbenzene
Tetrachloroethene
Trichloroethane
1,1-Dichloroethane
1,1,1-Trichloroethane
Trichloroethene
tert-Butyl ethyl ether
cis-1,2-Dichloroethene
o-Xylene
1,1,2-Trichloro-1,2,2-trifluoroethane
MTBE
m-Xylene plus p-xylene

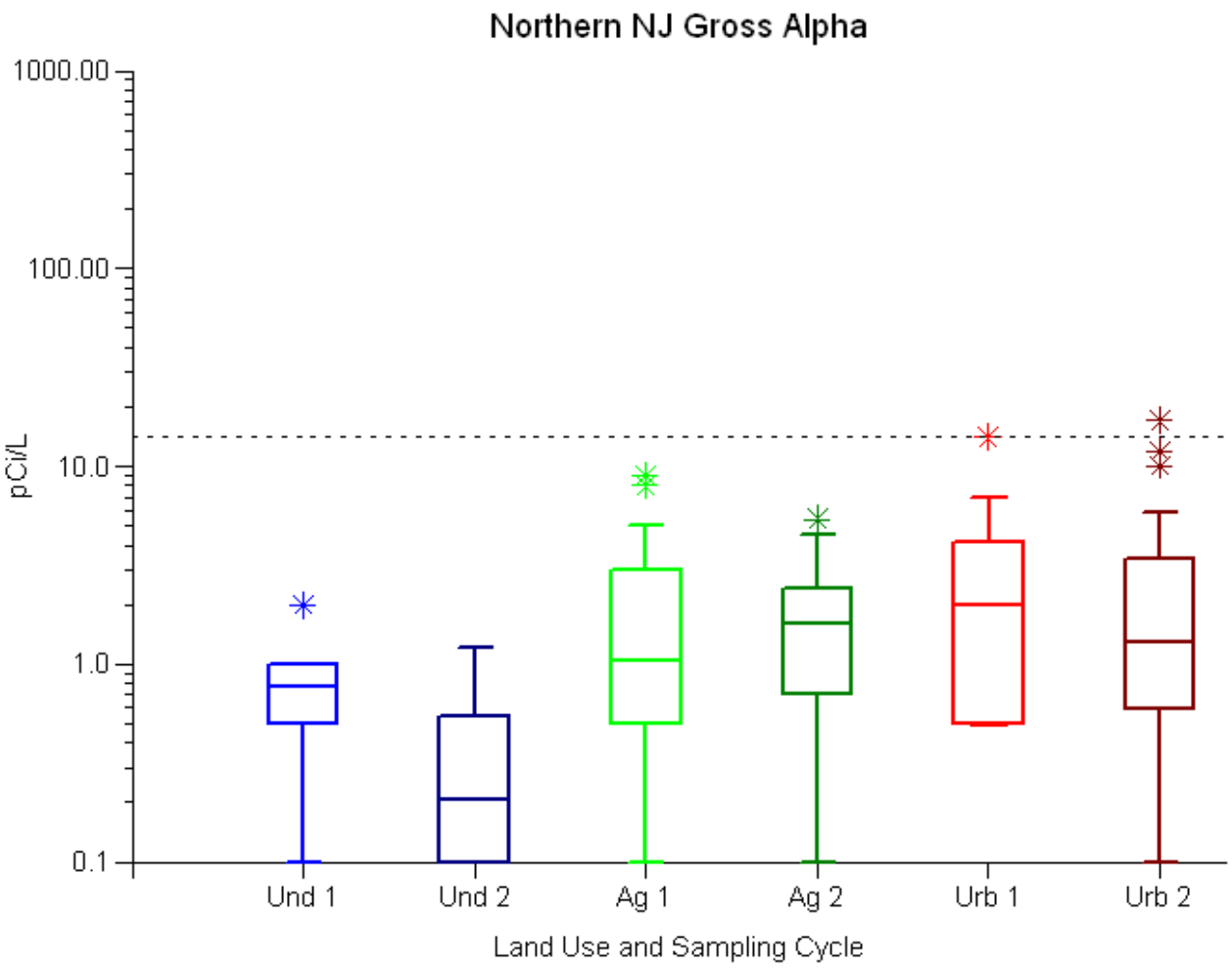

Southern NJ Pesticides
% of Detectior
50
45
40
35
30
25
20
15
10
5
0
Und 1
Und 2
Ag 1
Ag 2
Urb 1
Urb 2
Simazine
Prometon
Deethylatrazine
Cyanazine
p,p'-DDE
Chlorpyrifos
Dieldrin
Metolachlor
Malathion
Diazinon
Atrazine
Alachlor
Acetochlor
Metribuzin
2,6-Diethylaniline
Trifluraline
Terbacil
EPTC
Pebulate
Tebuthiuron
Molinate
Carbofuran
Propanil
Carbaryl
DCPA
Pendimethalin
Napropamide


Northern NJ Pesticides
% of Detectior
100
90
80
70
60
50
40
30
20
10
0
Und 1
Und 2
Ag 1
Ag 2
Urb 1
Urb 2
Simazine
Prometor
Deethylatrazine
Cyanazine
Dieldrin
Metolachlor
Diazinon
Atrazine
Alachlor
Acetochlor
Trifluraline
Carbaryl
3,4-Dichloroaniline
4-Chloro-2-methylphen
Fipronil
Fipronil sulfide
Fipronil sulfone
Hexazinone
Isofenphos

Southern NJ Radioactivity



Northern NJ Radioactivity



Tentative Conclusions

- Too early to draw any true conclusions or state any trends.
- The frequency of Nitrite plus Nitrate concentrations exceeding GWS has decreased state wide between sampling periods.
- The variety of VOCs detected in SNJ and NNJ decreased between sampling periods.
- There was an overall decrease in the frequency of MTBE detections state wide.
- Atrazine, deethylatrazine, metolachlor, prometon, and simazine are still the most frequently detected pesticides state wide.
- The increase in radioactivity in SNJ, in agricultural and urban land uses, and in NNJ, in agricultural land use, is most likely due to agrochemicals and lawn chemicals.