

# **Private Well Testing Act (PWTA) Program Overview and 2008 Data Report**

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# New Jersey Private Well Testing Act - Summary of Rules

- ◆ **September 14, 2002** - Effective Date of Law
- ◆ Requires testing of private well water quality prior to the sale of real estate and leasing of real estate
- ◆ Buyer & Seller must certify in writing that they have received and reviewed the water test results at closing of title of sale.
- ◆ Results valid for 1 year (6 mo. for coliform), 5 years for rental properties
- ◆ Confidentiality : PWTA requires details such as owner name, address, location, results, etc. be kept **CONFIDENTIAL**, results are only to be used as “compilations” by municipality/county or by geographic region.

# PWTA Sample Collection Requirements

- ◆ Samples must be collected and preserved in accordance with N.J.A.C. 7:18 (OQA Regulations.)
- ◆ RAW (untreated) well water from cold water, non-aerated spigot or tap if no water treatment exists.
- ◆ Well water samples must be collected either by a NJ Certified Laboratory, or by the laboratory's "authorized representative".
- ◆ Lead RAW water sample must be a flushed for at least 2 minutes (until temperature changes).
- ◆ All results must be submitted by the reporting lab electronically to DEP via E2/Compass Database System.



# **Summary of New Jersey's Private Well Test Act Data Results**

**September 2002 - April 2007**

# PWTA Drinking Water Contaminants

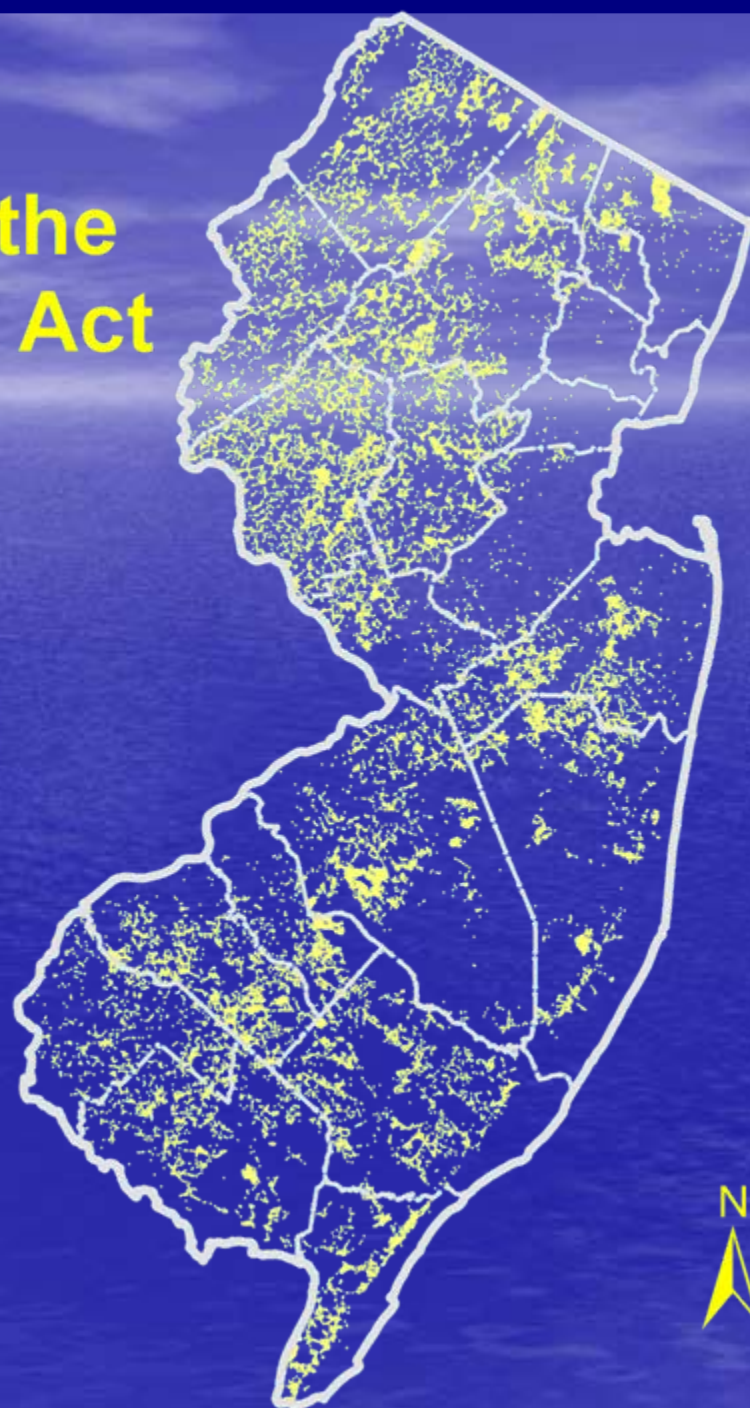
- ◆ Total Coliform - Fecal coliform/E. coli (If total coliform is positive)
- ◆ Nitrate
- ◆ Arsenic - in 12 northern counties
- ◆ Mercury - in 9 southern counties
- ◆ Lead
- ◆ Gross Alpha – phased in for 12 Southern and Central Counties
- ◆ Volatile Organic Chemicals (26 with MCLs)
- ◆ Secondary Parameters (Iron, Manganese & pH)

# Wells Sampled for the Private Well Testing Act

Sept. 2002 to April 2007  
50,882 Wells Sampled

- Location of Wells

0 20 40 Miles



# Total Coliform / Fecal Coliform

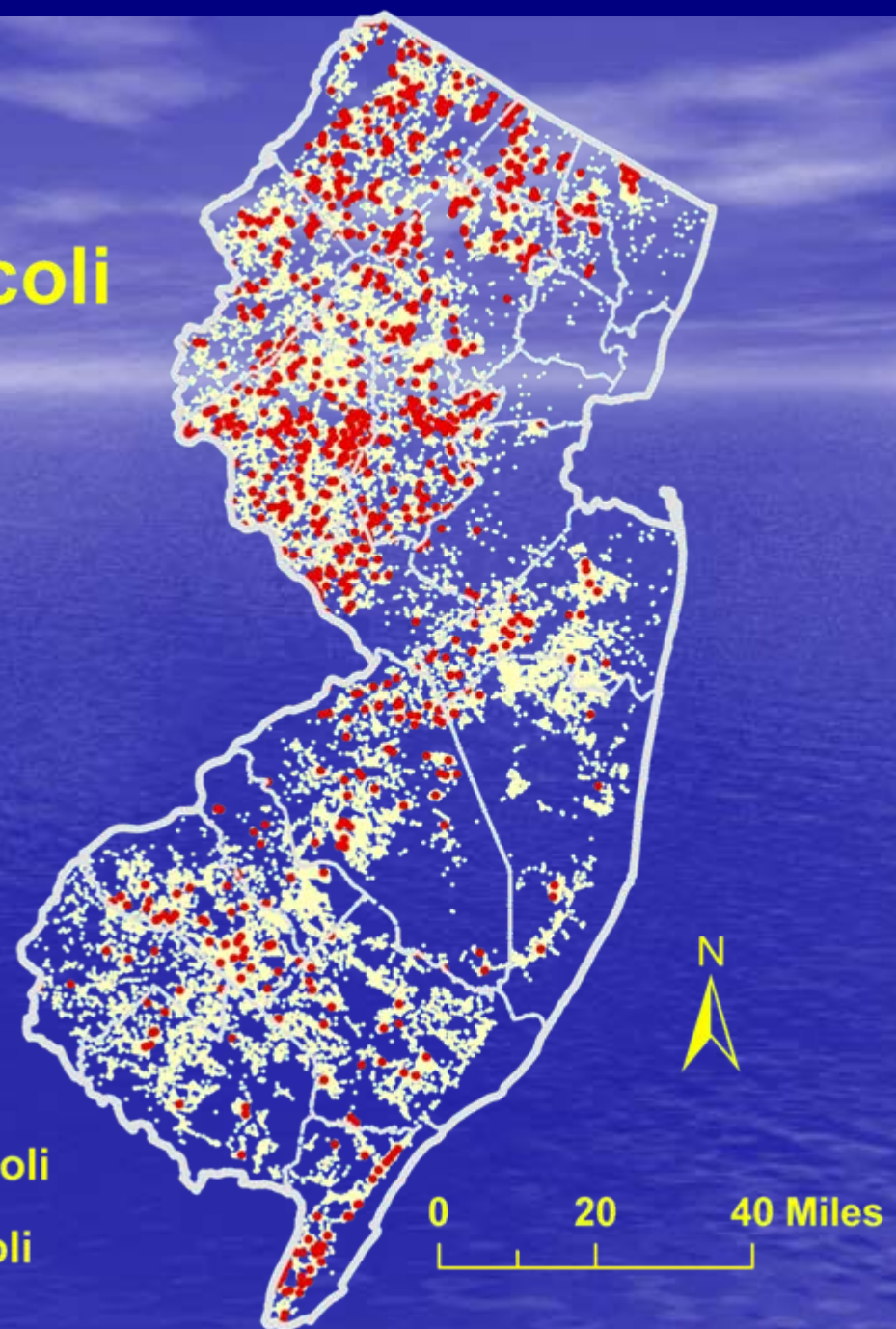
- Total coliform tested in all NJ counties.
- 7,035 of 50,882 wells (13 %) tested positive for total coliform.
- 1,136 of 50,882 wells (2.2 %) tested positive for either fecal coliform or E.coli .
- Occurrence of fecal coliform or E coli in northern counties was 3.5 %, southern counties was 1.0 %.

# Fecal Coliform/E.coli

Private Well Testing Act  
50,882 Wells

## Fecal Coliform/E.coli

- Negative Fecal Coliform/E. coli
- positive Fecal Coliform/E. coli



# Arsenic

- Arsenic originally tested in 10 Northern counties (Piedmont region).
- Method 200.7 was initially allowed. Its MDL = 8 ug/l.
- In January 2006, the MCL for arsenic was reduced to 5 ug/l.
- 1,445 of 11,763 wells (12 %) had concentration of arsenic above the State MCL (5 ug/l). (Excludes wells tested with Method 200.7 or about 35 % of the samples.)
- Arsenic exceedances most commonly found in Hunterdon (18 %), Mercer (20 %) and Somerset Counties (17 %).

# Arsenic

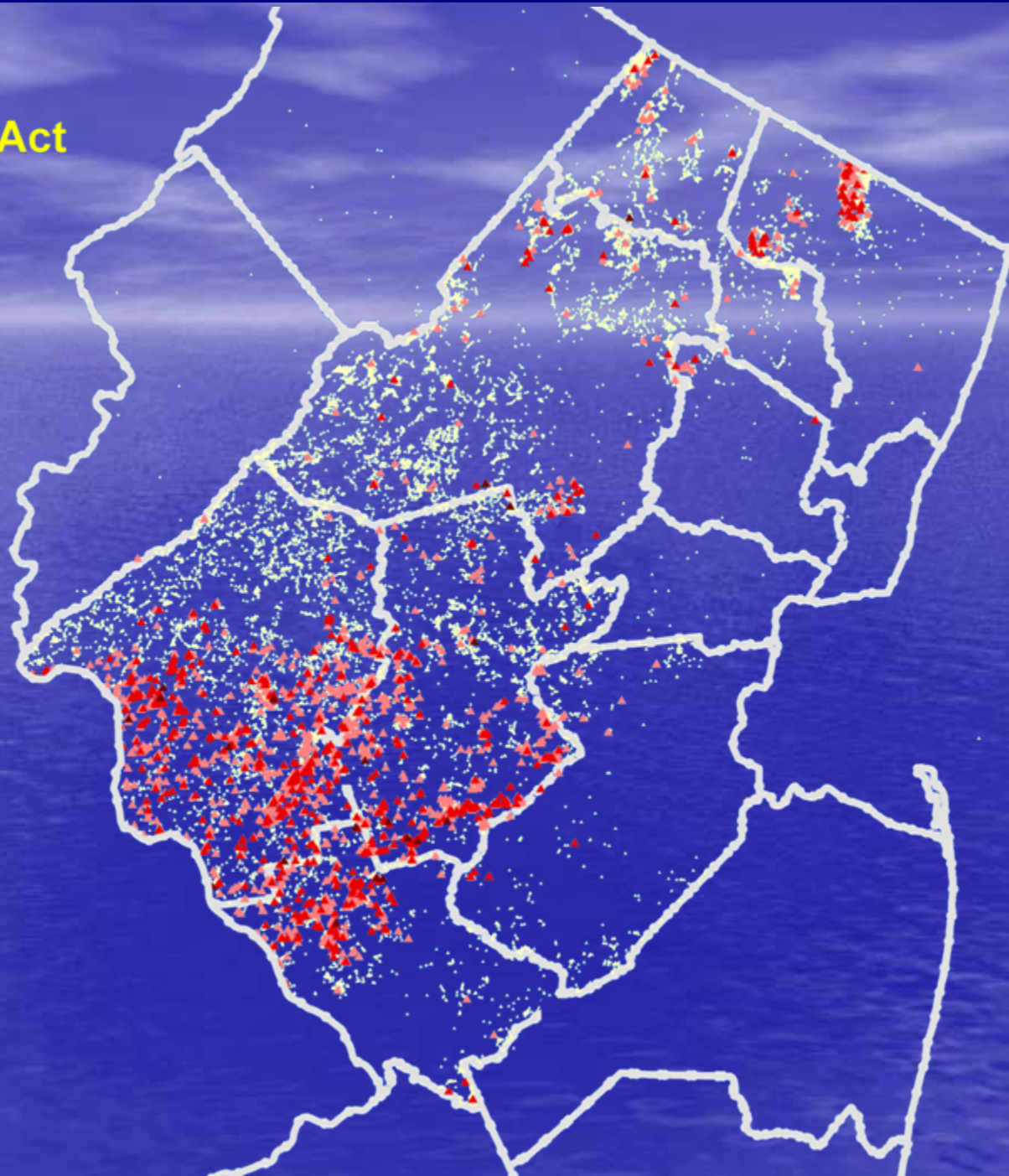
Private Well Testing Act  
11,763 Wells

Arsenic  
MCL = 5.0 ug/l

- ▲ < 5 ug/l
- ▲ > 5 - 10 ug/l
- ▲ > 10 - 50 ug/l
- ▲ > 50 - 254 ug/l



0 10 20 Miles



# Additional Arsenic Requirements

- In March 2008, testing for Arsenic was required in two additional counties – Sussex and Warren.

# Arsenic Sussex and Warren Co.

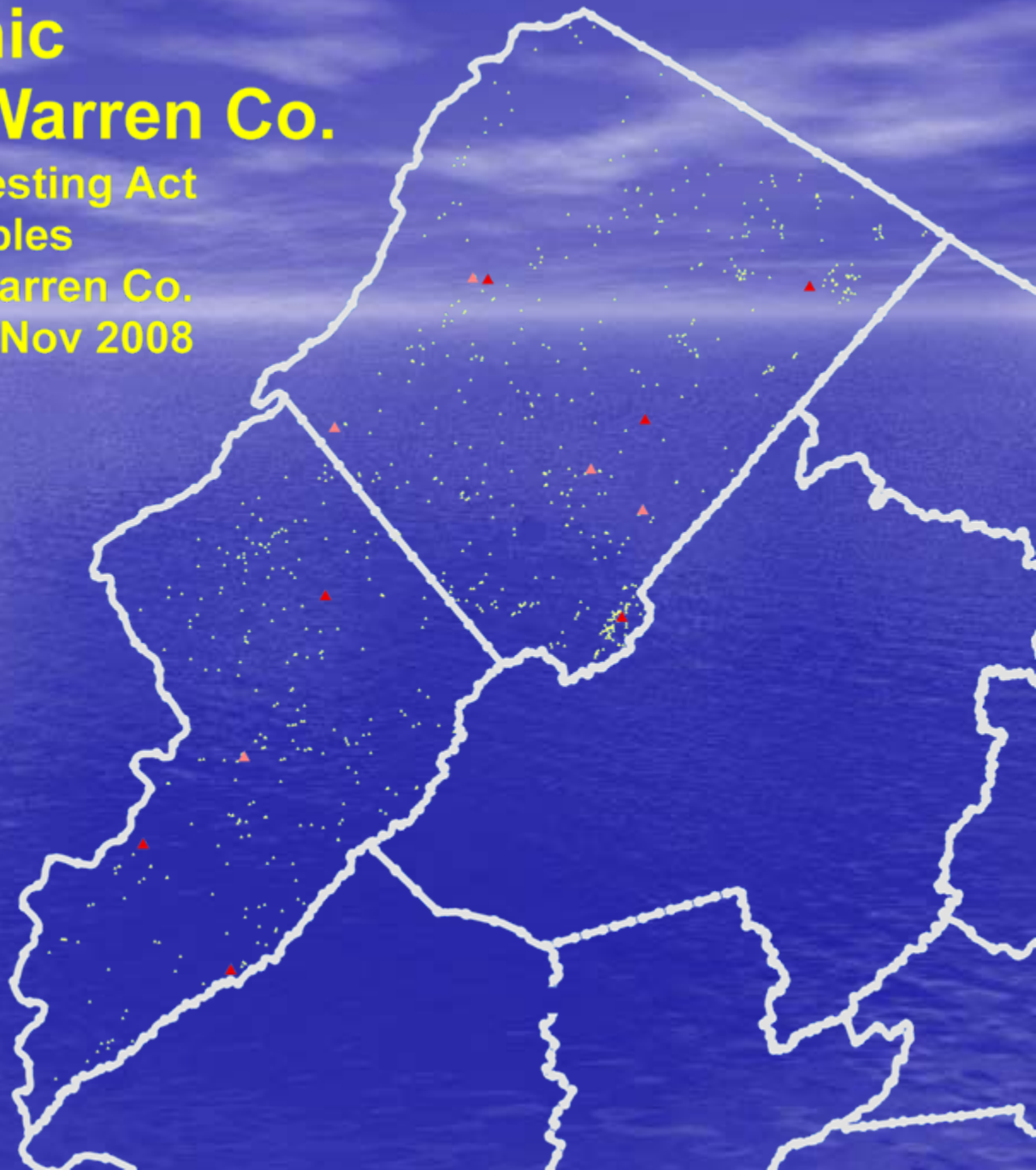
Private Well Testing Act  
733 Samples  
Sussex and Warren Co.  
Mar 2008 thru Nov 2008

Arsenic Results  
MCL = 5 ug/l

- ▲ < 5
- ▲ >5 - 10
- ▲ >10 - 35.7



0 7.5 15 Miles



# Nitrate

- Nitrate tested in all counties.
- 1,399 of 50,882 wells (2.7 %) had concentration of nitrate above the MCL (10 mg/l).
- Two counties had very high exceedances: Cumberland (11 %) and Salem (9 %).

# Nitrates

Private Well Testing Act  
50,882 Wells

## Nitrate Samples

MCL = 10 mg/l

- ▲ < 10 mg/l
- ▲ >10 to 20 mg/l
- ▲ >20 to 100 mg/l
- ▲ >100 to 153 mg/l



# Mercury

- Mercury tested in 9 Southern NJ counties.
- 250 of 25,183 wells (1.0 %) had concentration of mercury above the MCL (2 ug/l).
- Three counties had relatively high exceedances: Camden (2.4 %), Gloucester (1.8 %) and Cumberland (1.7 %).

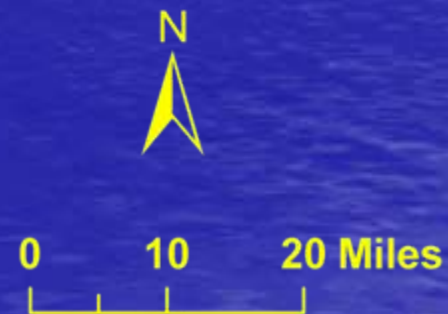
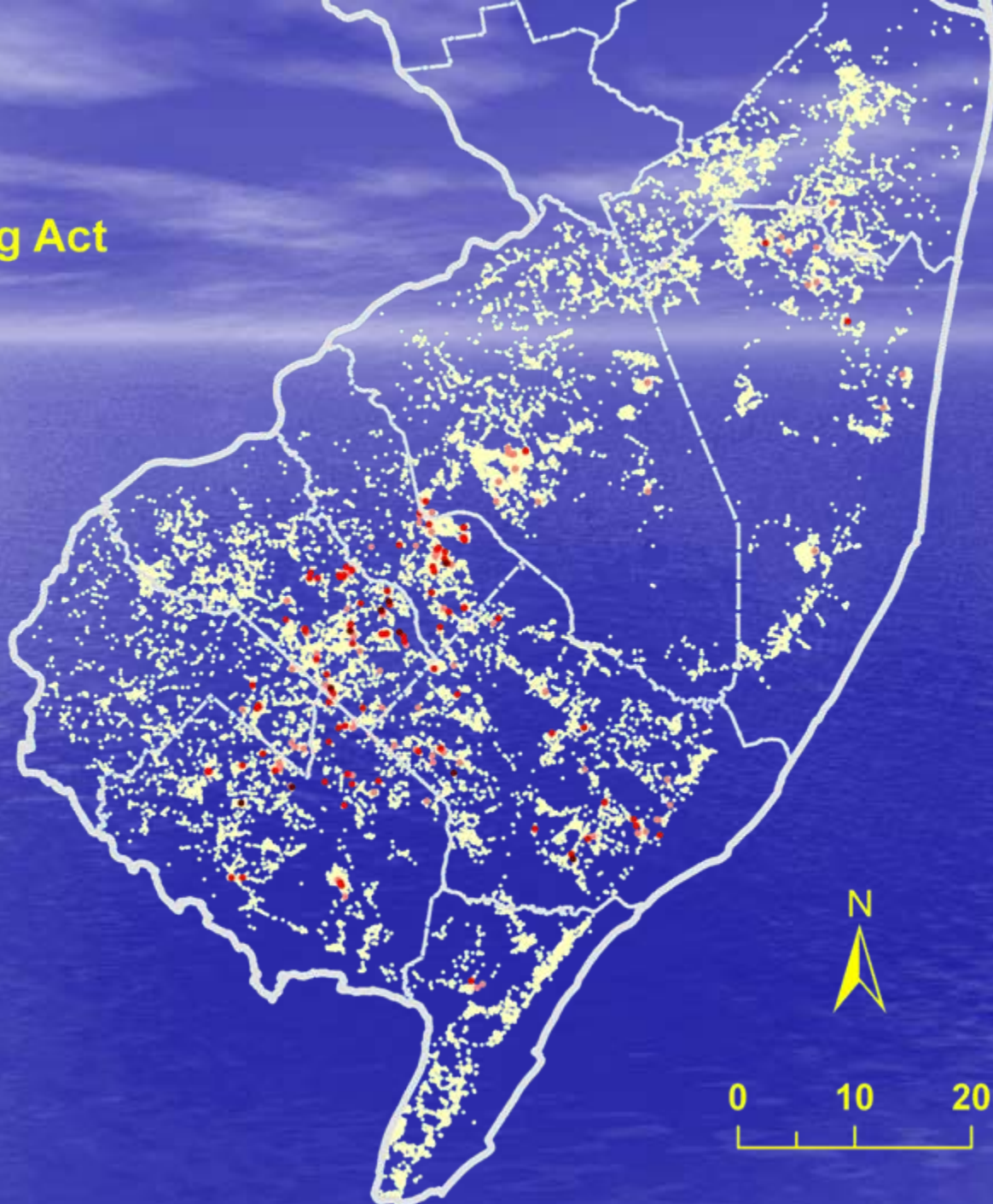
# Mercury

Private Well Testing Act  
25,183 Wells

## Mercury Results

MCL = 2 ug/l

- 0.0 - 2.0
- 2.1 - 4.0
- 4.1 - 20.0
- 20.1 - 114.2



# The New Jersey 48 Hr. Gross Alpha Test

- Gross alpha readings in southern NJ where Radium-226 and Radium-228 were known to occur were not reproducible.
- It was found that the variation was due to Radium-224, a short-lived radionuclide.
- New Jersey developed and certified a new rapid method gross alpha test.

# Gross Alpha

- Gross alpha tested in 12 Central and Southern NJ counties.
- 2,209 of 22,808 wells (9.7%) had concentration of gross alpha above the MCL (15 pCi/l).
- Four counties had relatively high exceedance rates: Camden (33%), Cumberland (25%), Salem (14%), and Gloucester (11%).

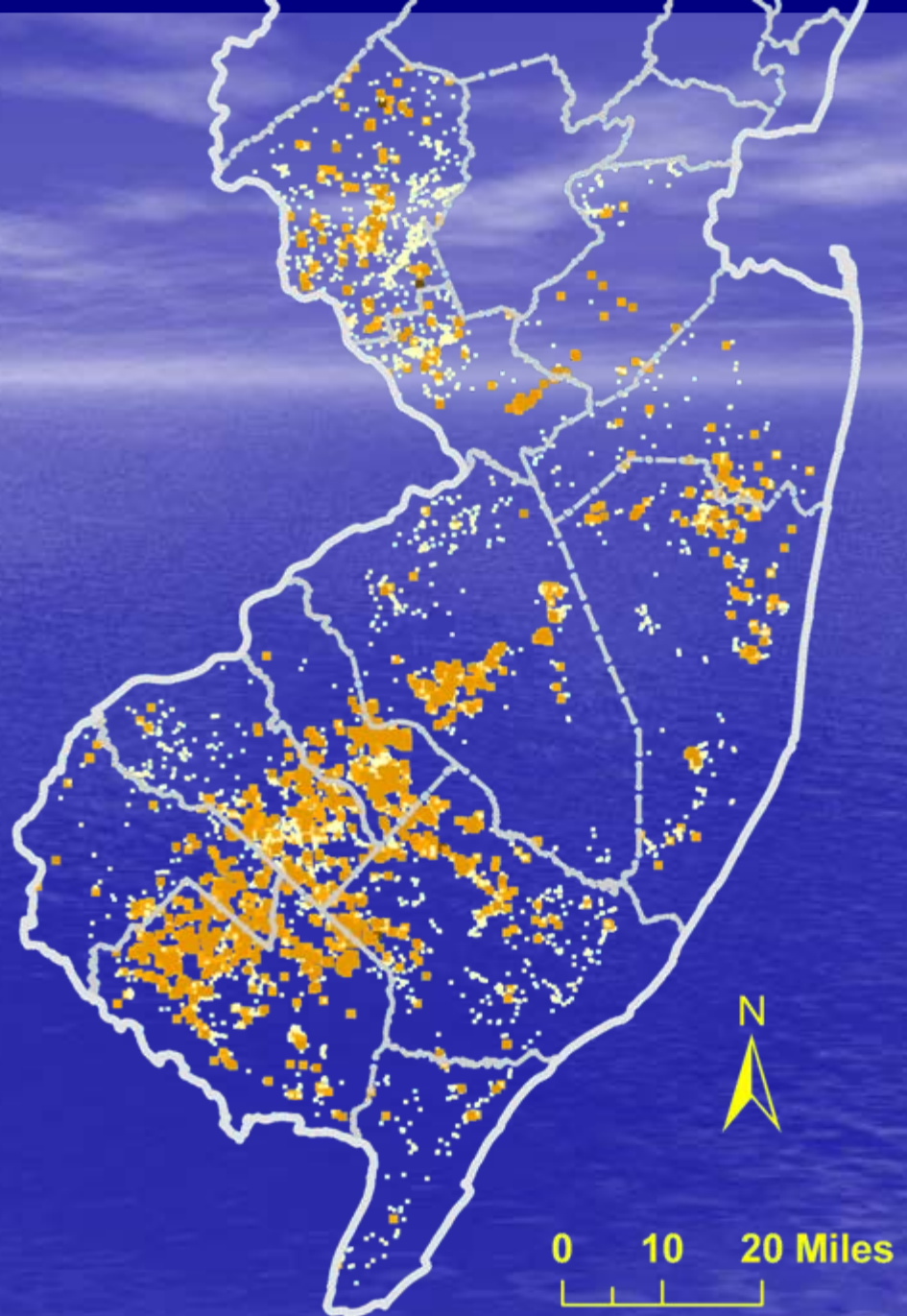
# Gross Alpha

Private Well Testing Act  
22,808 Wells

## Gross Alpha Final

MCL = 15 pCi/l

- < 15 pCi/l
- >15 - 30 pCi/l
- >30 - 150 pCi/l
- >150 - 481 pCi/l



# Interpreting Gross Alpha Data

- The limit of 15 pCi/l for gross alpha assumes that the contribution of uranium and radon is subtracted.
- This raises the question about interpreting gross alpha data in northern NJ where uranium and radon are expected to be the major issues.

# Gross Alpha

Piedmont Physiographic Province

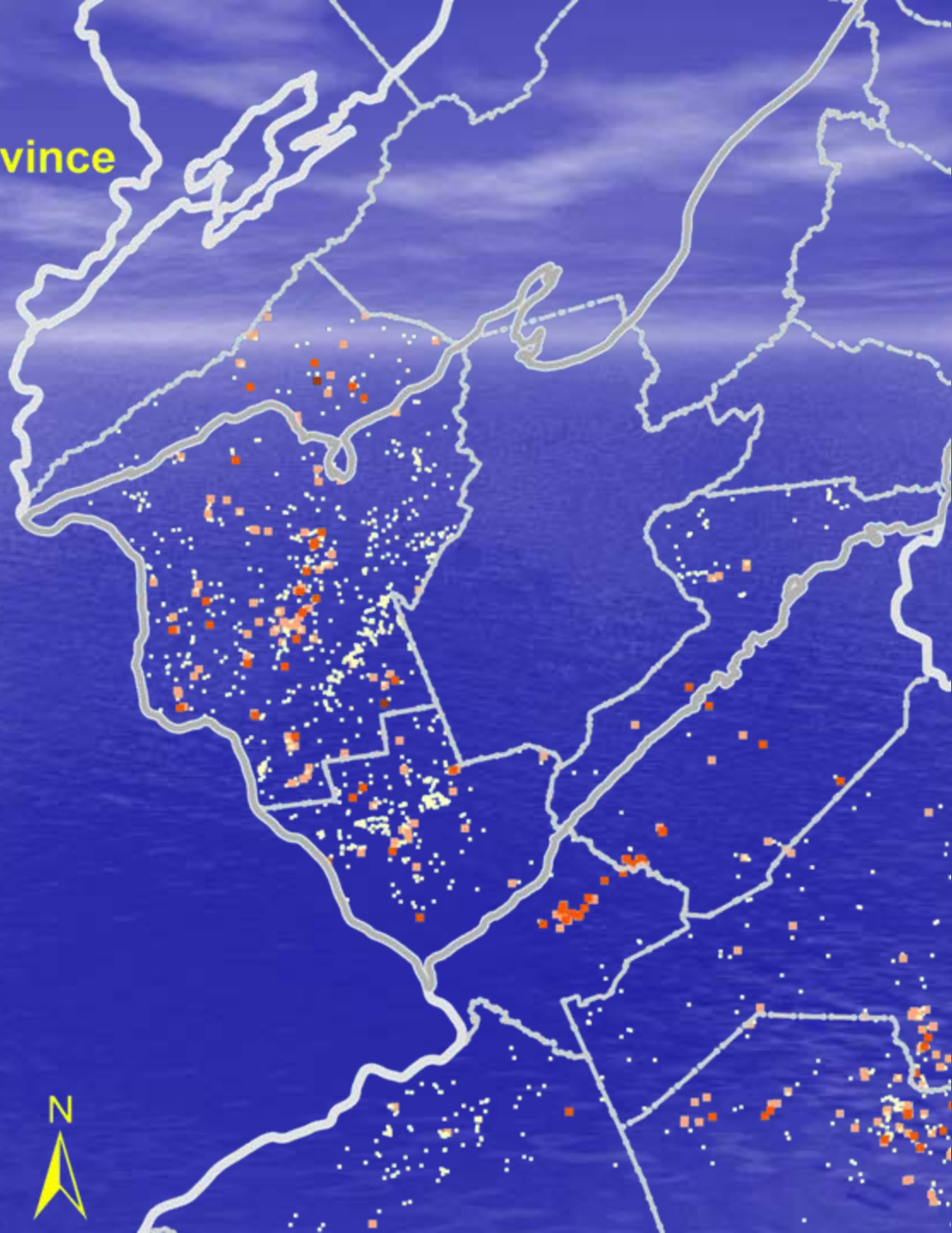
4,127 Wells

Gross Alpha Final

MCL = 15 pCi/l

- < 15 pCi/l
- >15 - 30 pCi/l
- >30 - 150 pCi/l
- >150 - 481 pCi/l

0 5 10 Miles



# Uranium Data from USGS Study

| County    | No. Samples | Gross Alpha<br>pCi/L<br>(Range) | Radium Total<br>pCi/L<br>(Range) | Uranium > 30<br>ug/l<br>(Range) |
|-----------|-------------|---------------------------------|----------------------------------|---------------------------------|
| Hunterdon | 3           | 0.69-12.33                      | ND – 1.72                        | ND – 20.84                      |
| Morris    | 7           | ND – 9.69                       | ND – 4.90                        | ND – 2.26                       |
| Passaic   | 6           | ND – 14.74                      | ND – 2.91                        | ND – 14.4                       |
| Sussex    | 11          | ND – 231.90                     | ND – 19.16                       | ND – 623.4                      |
| Warren    | 4           | 7.42 – 61.26                    | ND – 2.75                        | 5.15 – 100.9                    |

\*Total Radium – Ra224 + Ra226 + Ra228

# Treatment Options

- Radium – Cation Exchange Resin (Water Softener or Reverse Osmosis (RO))
- Uranium – Anionic Exchange Resin or Reverse Osmosis (RO)

# VOCs

- VOCs tested in all 21 NJ counties.
- 702 of 50,882 wells (1.4%) had concentration of one or more VOC above the corresponding MCLs.
- 8 wells exceeded 3 MCLs, 54 wells exceeded 2 MCL

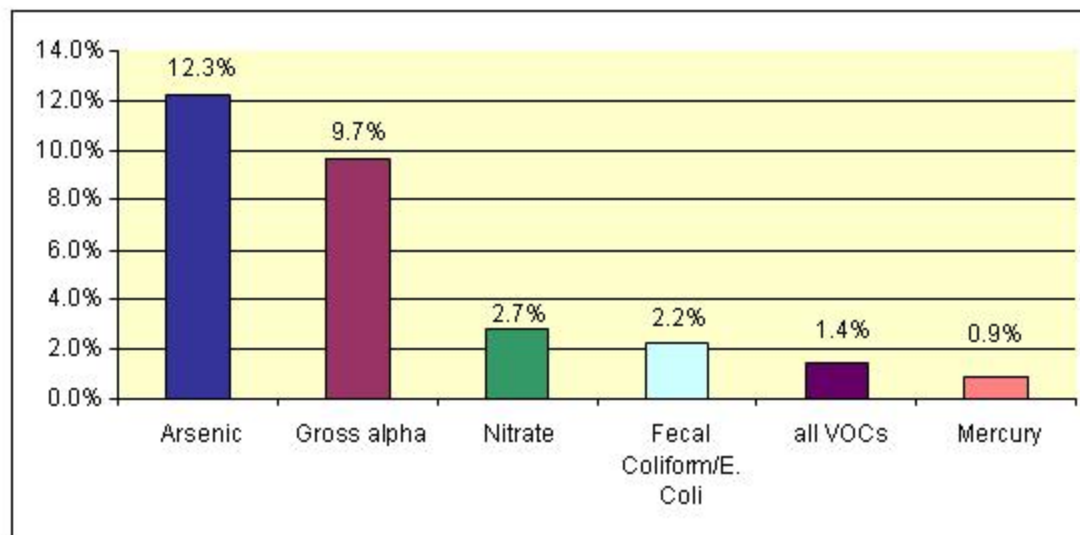
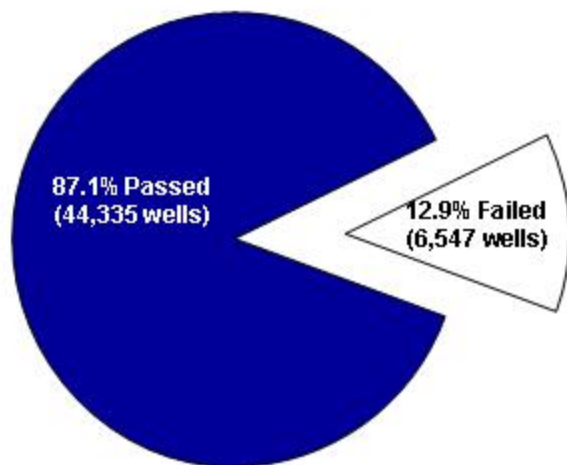
# VOC table

## Number Exceeding MCL

| VOC                  | MCL (ug/l) | Exceed MCL  |
|----------------------|------------|-------------|
| Trichloroethylene    | 1          | 246 (0.48%) |
| Tetrachloroethylene  | 1          | 221 (0.43%) |
| Benzene              | 1          | 66 (0.13%)  |
| Methylene Chloride   | 3          | 44 (0.09%)  |
| MTBE                 | 70         | 38 (0.07%)  |
| Carbon Tetrachloride | 2          | 37 (0.07%)  |

# VOC Detected

| VOC                   | Detected > 0.5 ug/l |
|-----------------------|---------------------|
| MTBE                  | 3,769 (7.42%)       |
| Toluene               | 2,500 (4.91%)       |
| Trichloroethylene     | 422 (0.83%)         |
| Tetrachloroethylene   | 360 (0.71%)         |
| Methylene Chloride    | 323 (0.63%)         |
| 1,1,1-Trichloroethane | 216 (0.42%)         |



- a. Ten counties were required to test for arsenic: Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Morris, Passaic, Somerset and Union. A total of 11,763 wells were test for arsenic using a sensitive analytic method.
- b. Twelve counties were required to test for gross alpha: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Mercer, Middlesex, Monmouth, Ocean and Salem. A total of 22,808 wells were tested for gross alpha.
- c. Nine counties were required to test for mercury: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean and Salem. A total of 25,183 wells were tested for mercury.

# Lead

- Lead tested in all NJ counties.
- 9,368 of 50,882 wells (18.4%) had concentration of lead above the NJ ground quality water standard. (5 ug/l), which is used by PWTa Program as its drinking water standard.
- DEP has determined that lead is seldom found in ground water, and the source of lead is almost always from the home's plumbing system or the well pump.

# Secondary Parameters

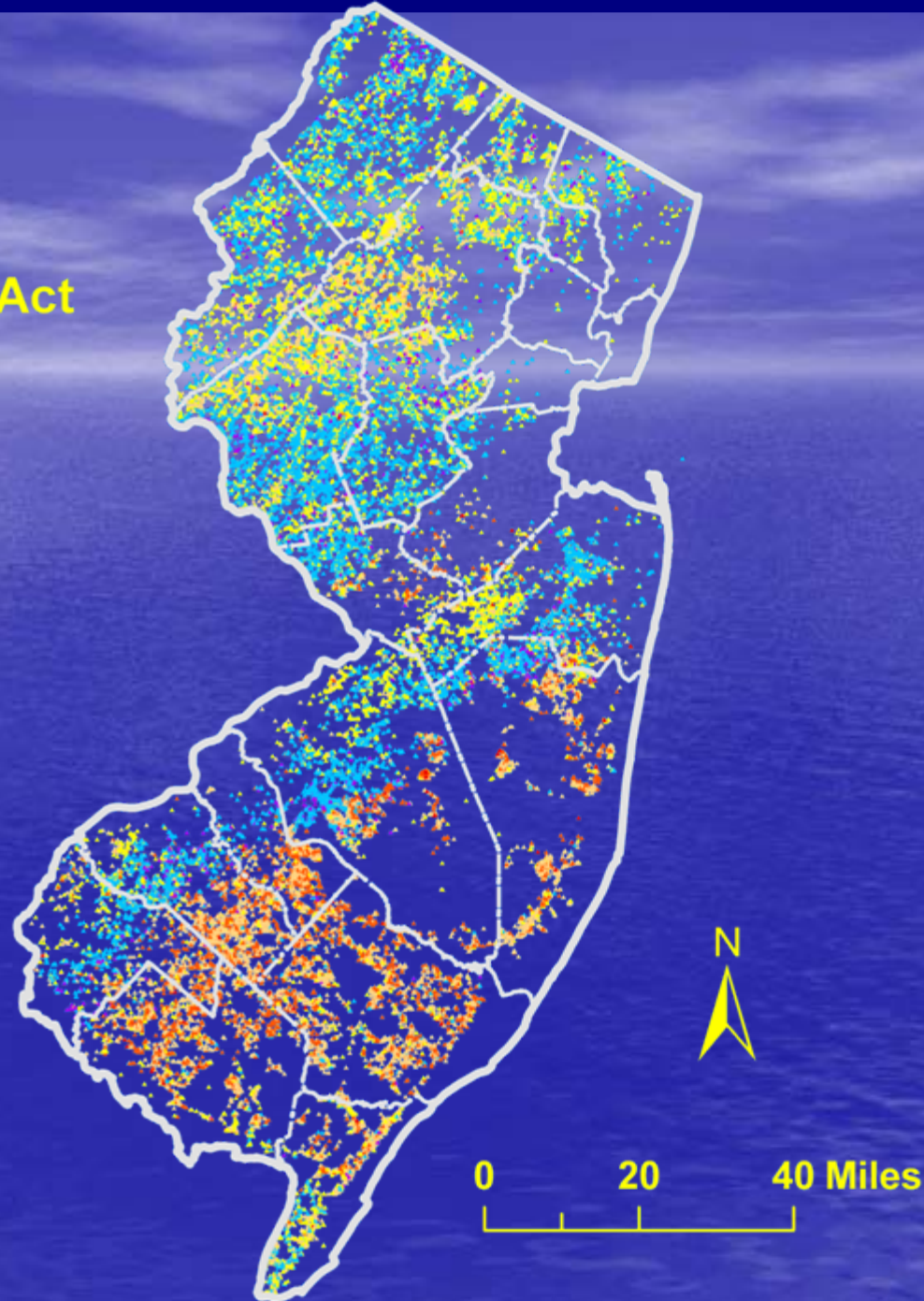
- pH: 22,699 of 50,882 (45 %) wells outside optimum range (6.5 – 8.5)
- Iron: 14,751 of 50,882 (29 %) exceeded the Secondary Standard of 0.3 mg/L
- Manganese: 9,890 of 50,882 (19 %) exceeded the Secondary Standard of 0.05 mg/L

# pH

Private Well Testing Act  
50,882 Wells

pH  
Secondary Standard  
6.5 - 8.5

- ▲ 4 or lower
- ▲ >4 to 5
- ▲ >5 to 6
- ▲ >6 to 7
- ▲ >7 to 8
- ▲ >8 or higher



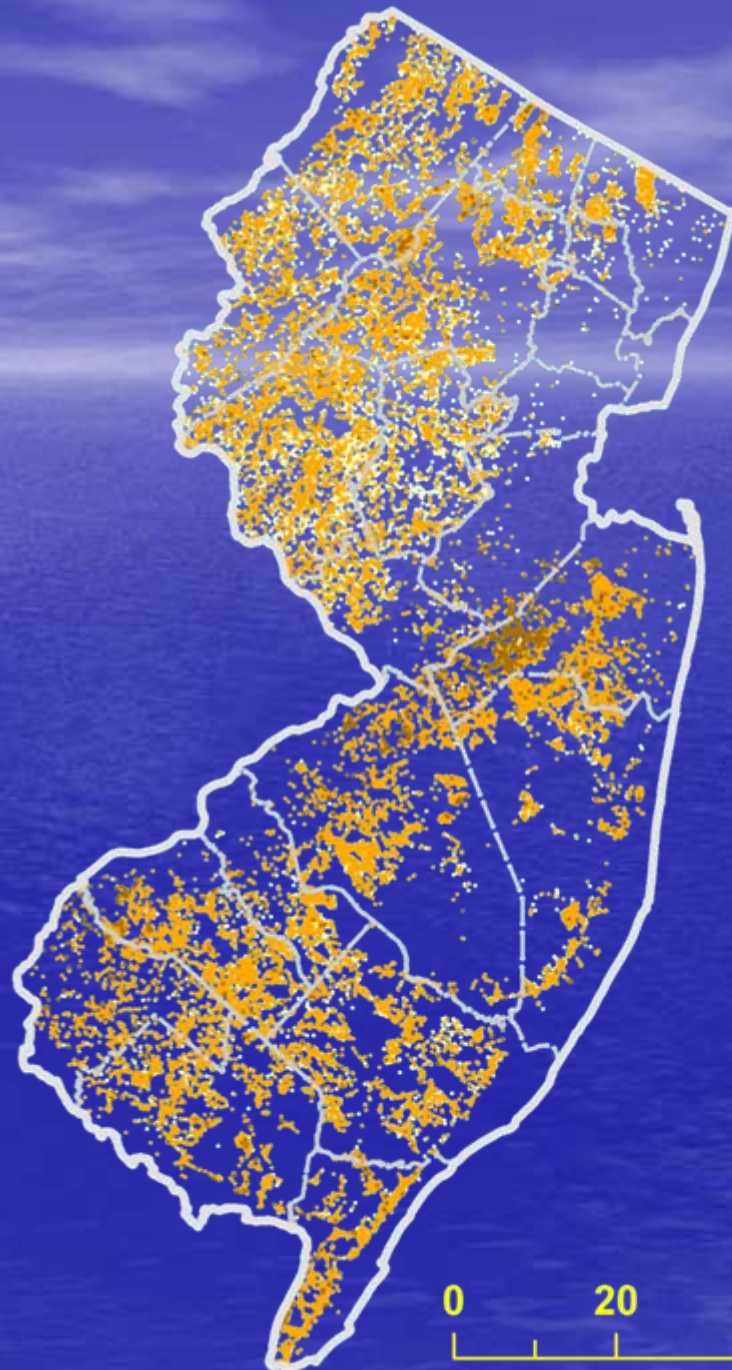
# Iron

Private Well Testing Act  
50,882 Wells

iron

Secondary Standard - 0.3 mg/l

- ◆ > 0.3 mg/l
- ◆ > 0.3 - 3 mg/l
- ◆ > 3 to 30 mg/l
- ◆ > 30 - 219 mg/l

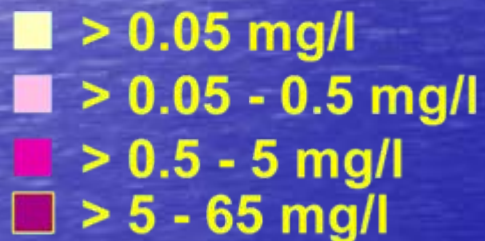


0 20 40 Miles

# Manganese

Private Well Testing Act  
50,882 Wells

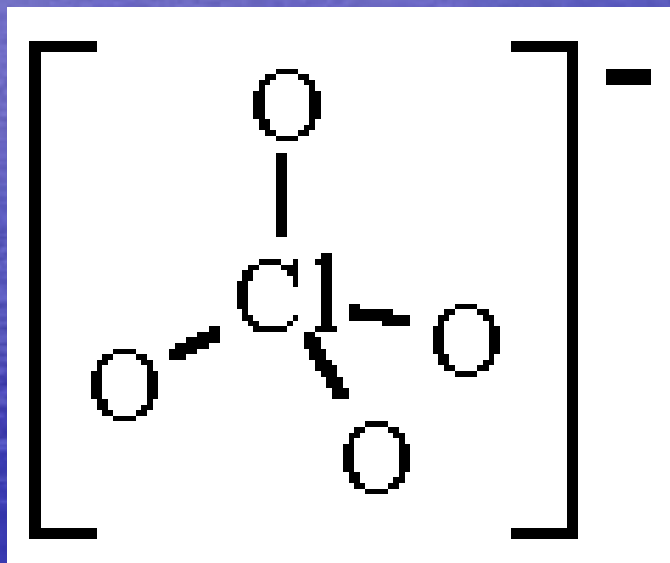
Manganese  
Secondary Standard 0.05 mg/l



# New additions

- Perchlorate
- Radon

# Perchlorate



# Perchlorate

- Chemical (oxidizer) used in the mostly manufacturing of rocket fuel, explosives and fireworks, also found naturally in certain types of fertilizers.
- Inhibits thyroid function
- The New Jersey DWQI recommended an MCL of 5 ppb for perchlorate.

# Perchlorate

- Proposed MCL, expected to be adopted by the fall 2009. Testing will start 90 days after the rule is adopted.
- Acceptable Methods 314.0 (IC), 314.1(IC) and 331.0 (LC). Analysis must be done within 48 hours of sample collection.
- Recommended treatment - Three types of treatment technologies are sufficiently developed and proven for use in public water systems, and could be applied to private wells: Anion Exchange, Granular Activated Carbon, and Membrane filtration technologies.

# Radon MCL

- The DWQI is recommending an MCL for radon of 800 pCi/l
- The question of treatment must be addressed before adding radon to the Private Well Testing requirements.

# Radon Results from USGS Study

| County    | No. Samples | Radon pCi/l  |
|-----------|-------------|--------------|
| Hunterdon | 3           | 2,838-38,264 |
| Morris    | 7           | 209-16,356   |
| Passaic   | 6           | 1,210-17,346 |
| Sussex    | 11          | 660-42,655   |
| Warren    | 4           | 2,836-28,150 |

# Limitations of PWTA Data

- **No Information about well depths**
- **Single Sample**
- **Errors in Municipality, Lot and Block**
- **GPS points (or location) are sometimes incorrect.**

# Summary of PWTA Data Results

- ◆ Data is valuable. The size and geographic extent of the database make it unique. Largest known database of private well water quality in the United States. This makes it an invaluable resource for groundwater studies.
- ◆ The contaminants most frequently reported over the MCL are gross alpha, arsenic, and nitrate.
- ◆ Test data provides a valuable consumer information to seller/buyer and landlord/tenant with regards to drinking water quality

# For Additional Information

- Contact: [judy.louis@dep.state.nj.us](mailto:judy.louis@dep.state.nj.us)  
[john.shevlin@dep.state.nj.us](mailto:john.shevlin@dep.state.nj.us)
- PWTA website:  
<http://www.state.nj.us/dep/pwta>