



# PFAS Occurrence in New Jersey

Sandra M. Goodrow, Ph.D.

*NJ Department of Environmental Protection*

*Division of Science, Research, and Environmental Health*

**Panel 2**- CVP/SRAG Meeting

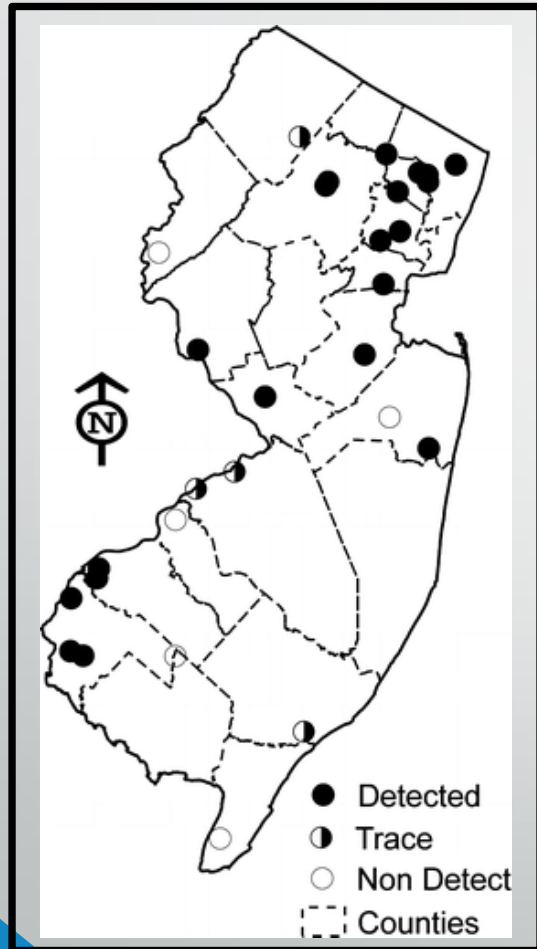
June 2017

## NJ Public Water System (PWS) PFAS Occurrence Data

- New Jersey has more extensive data on occurrence of PFCs in public water systems (PWS) than most or all other states.
- PFOA detection in raw and finished water from a NJ Public Water Systems (PWS) first reported to NJDEP in 2006.
- NJDEP statewide occurrence studies (2006 and 2009).
- USEPA Unregulated Contaminant Monitoring Rule (UCMR<sub>3</sub>) (2013-15):
  - Allows for comparison of NJ PWS data to rest of U.S. on equal basis.
- NJDEP PFC database:
  - Includes NJDEP studies, as well as other data reported to NJDEP by PWS and other parties.

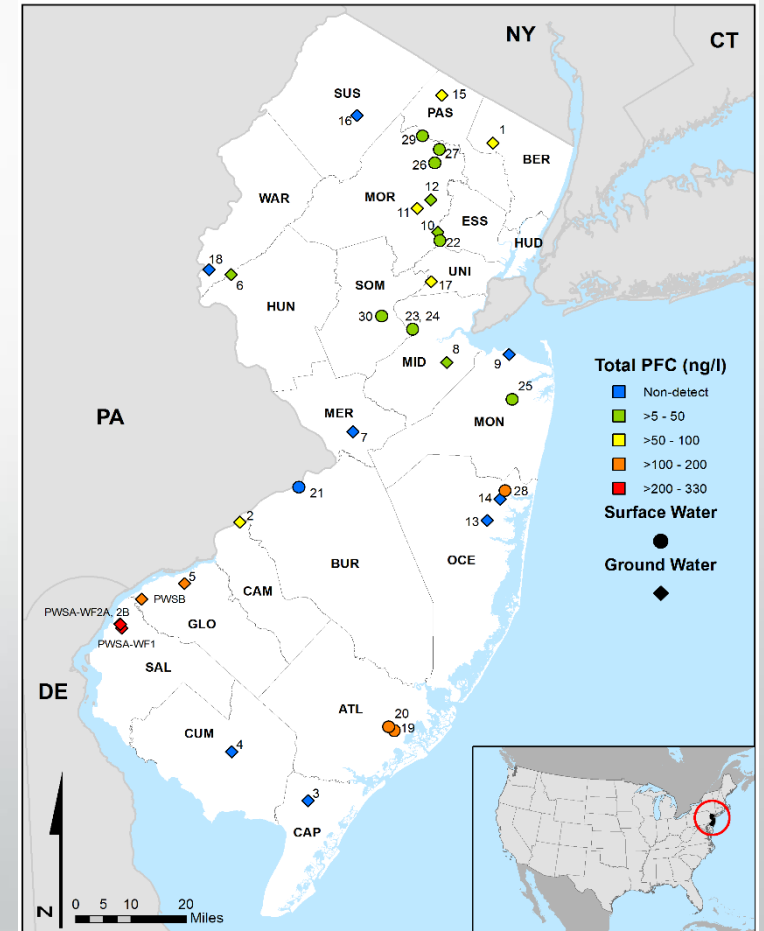
# NJDEP Studies of PFAS in NJ PWS

## PFOA Detections in 2006 Study (PFOA & PFOS - 23 PWS)

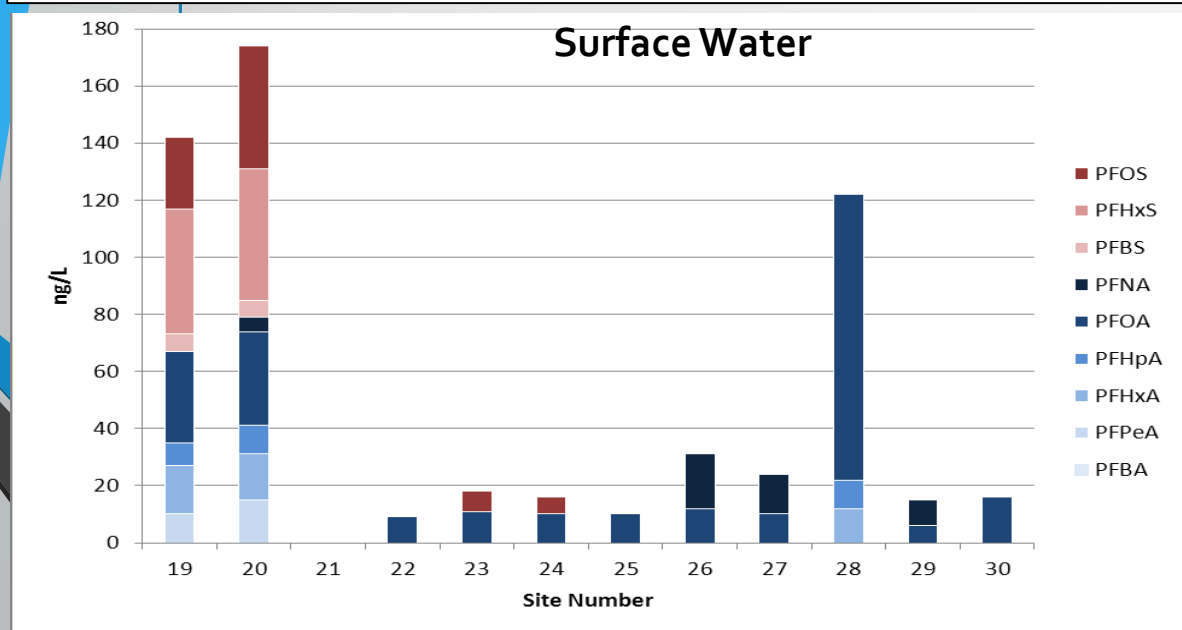
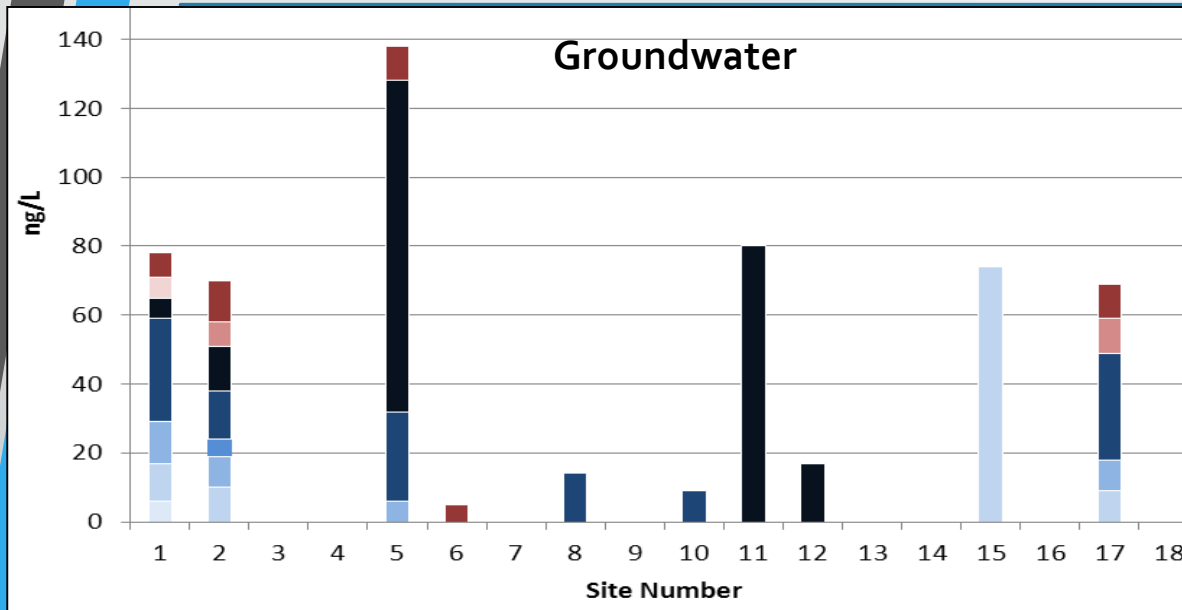


- Low levels of multiple PFCs commonly found in NJ PWS.
- Potential sources identified at some sites and unknown at others.
- *2006 study:*  
**PFOA – 65%;**  
**PFOS - 30%**  
**(≥ 4.0 ng/L).**
- *2010 study:*  
PFOA & PFOS results similar to 2006.

## PFC Detections in 2009-10 Study (10 PFCs - 31 PWS)



## Results of 2009-10 NJDEP Study of 10 PFCs in NJ PWS



- Between **1 and 8 PFASs** in 70% of PWS.
- **Total PFASs:** 9 – 174 ng/L.
- **PFOA:** Most frequently detected (57%); up to 100 ng/L.
- **PFOS:** 30%; up to 43 ng/L.
- **PFDA (C<sub>10</sub>):** Not detected.
- **Other PFASs:** 3% to 23% of PWS.
- **PFNA (C<sub>9</sub>):** Up to 96 ng/L
  - Higher than reported in drinking water elsewhere in the world.
- Potential sources identified at some sites, but not at others.

# USEPA Unregulated Contaminated Monitoring Rule (UCMR<sub>3</sub>)



- Required monitoring of finished water from U.S. PWS
  - Sampling in 2013-15.
  - All large (>10,000 customers) and a few small PWS.
  - 6 PFAS, as well as other unregulated contaminants.
- New Jersey public water systems participating:
  - All 165 large community systems.
  - 13 of ~435 small community and 8 of ~700 non-transient non-community systems.
- **Higher Reporting Levels than for most other NJ PFC drinking water data from certified laboratories.**
  - **Allows for comparison of NJ data to rest of U.S. on same basis.**
  - **Lower % occurrence than in other NJ data with lower RLs.**

## NJ versus National PFC Detections in UCMR<sub>3</sub>

- **PFOA and PFNA - much more frequent in NJ than nationally.**
  - *PFNA – Gloucester and Camden Counties*
  - *PFOA – Various locations*
- **Other PFCs - occurrence similar in NJ and nationally.**

<i>Compound</i>	<i>Reporting Level (ng/L)</i>	<i>New Jersey PWS</i>		<i>National PWS</i>	
		<i># Detects*</i>	<i>% Detects</i>	<i># Detects (other than NJ)**</i>	<i>% Detects (other than NJ)</i>
<b>PFOA (C8)</b>	20	<b>18/175</b>	<b>10.2%</b>	<b>90/4734</b>	<b>1.9%</b>
<b>PFNA (C9)</b>	20	<b>4/175</b>	<b>2.3%</b>	<b>10/4734</b>	<b>0.2%</b>
<b>PFOS (C8-S)</b>	40	6/175	3.4%	89/4734	1.9%
<b>PFHxS (C6-S)</b>	30	2/175	1.1%	53/4734	1.1%
<b>PFBS (C4-S)</b>	90	0/175	0%	8/4734	0.2%
<b>PFHpA (C7)</b>	10	6/175	3.4%	79/4734	1.7%

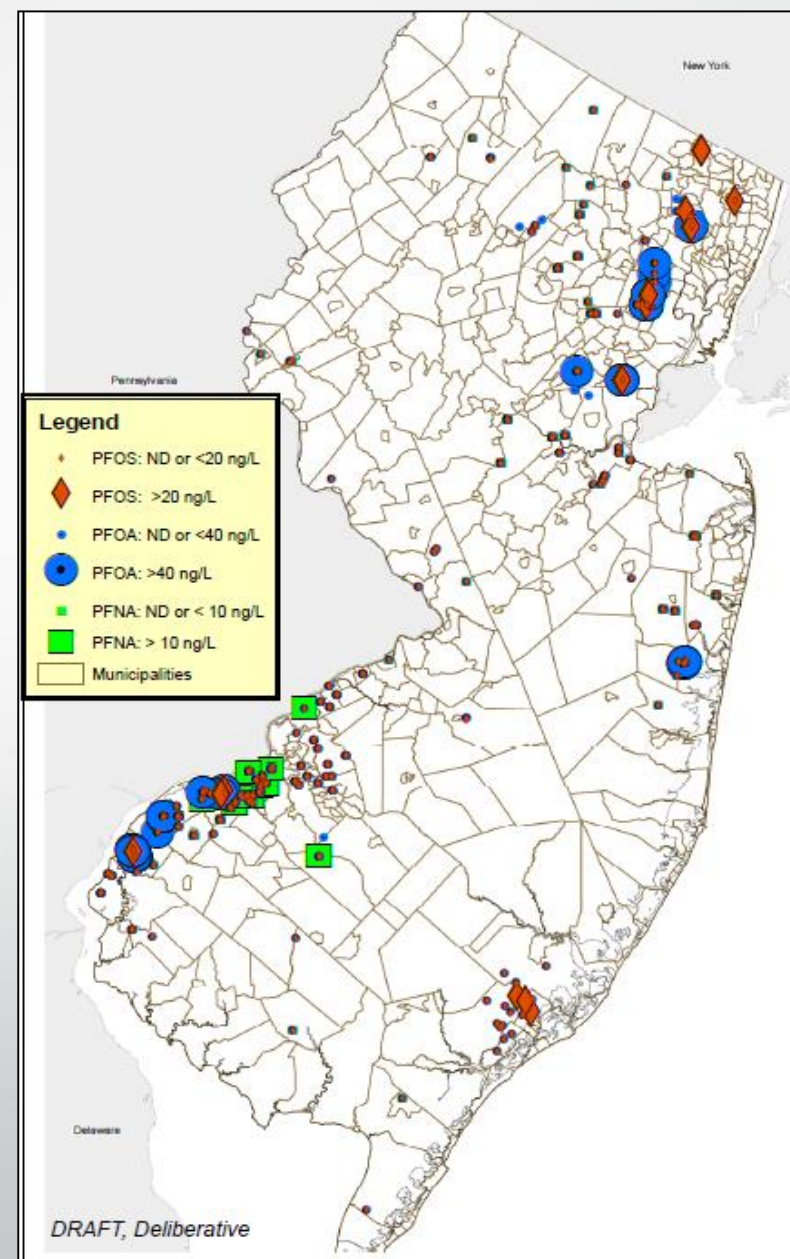
\* New Jersey data as of 10/14/16. \*\*USEPA data posted online as of 7/16.

# PFAS Distribution in NJ

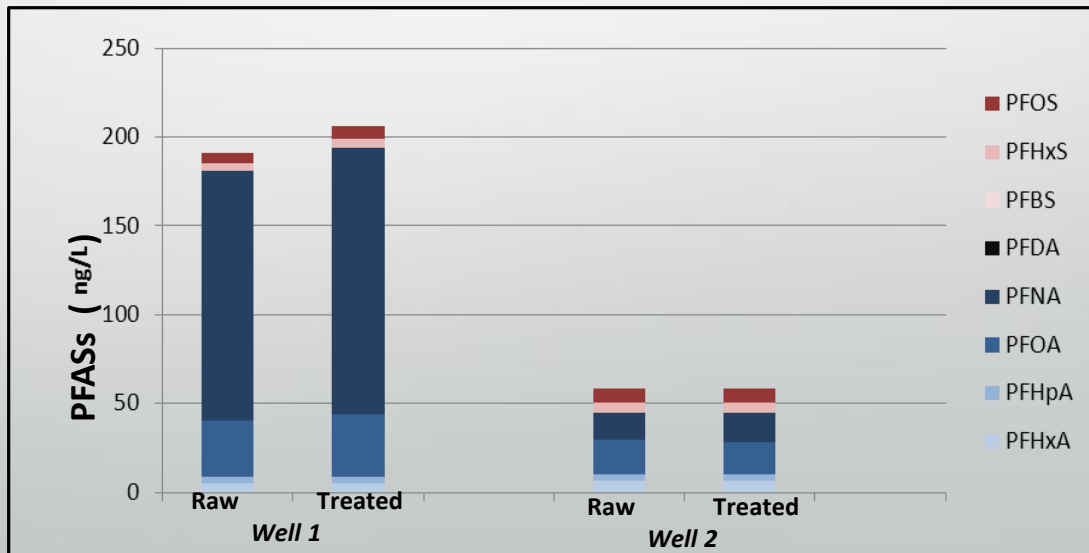
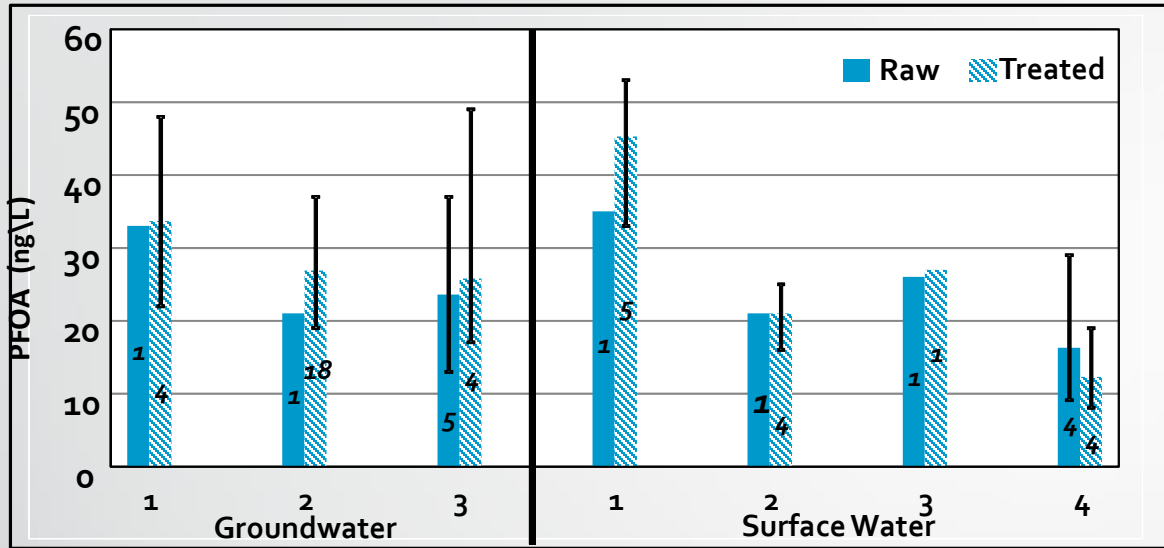
- PFOA in Salem County
- PFNA in Gloucester and Camden Counties
- PFOS and PFHxS in Atlantic County
- PFOA in Ocean County
- PFOA and PFOS in Union, Essex, and Bergen

*Measures taken at many sites to reduce exposure:*

- *Treatment*
- *Shutting off source well*
- *Blending*

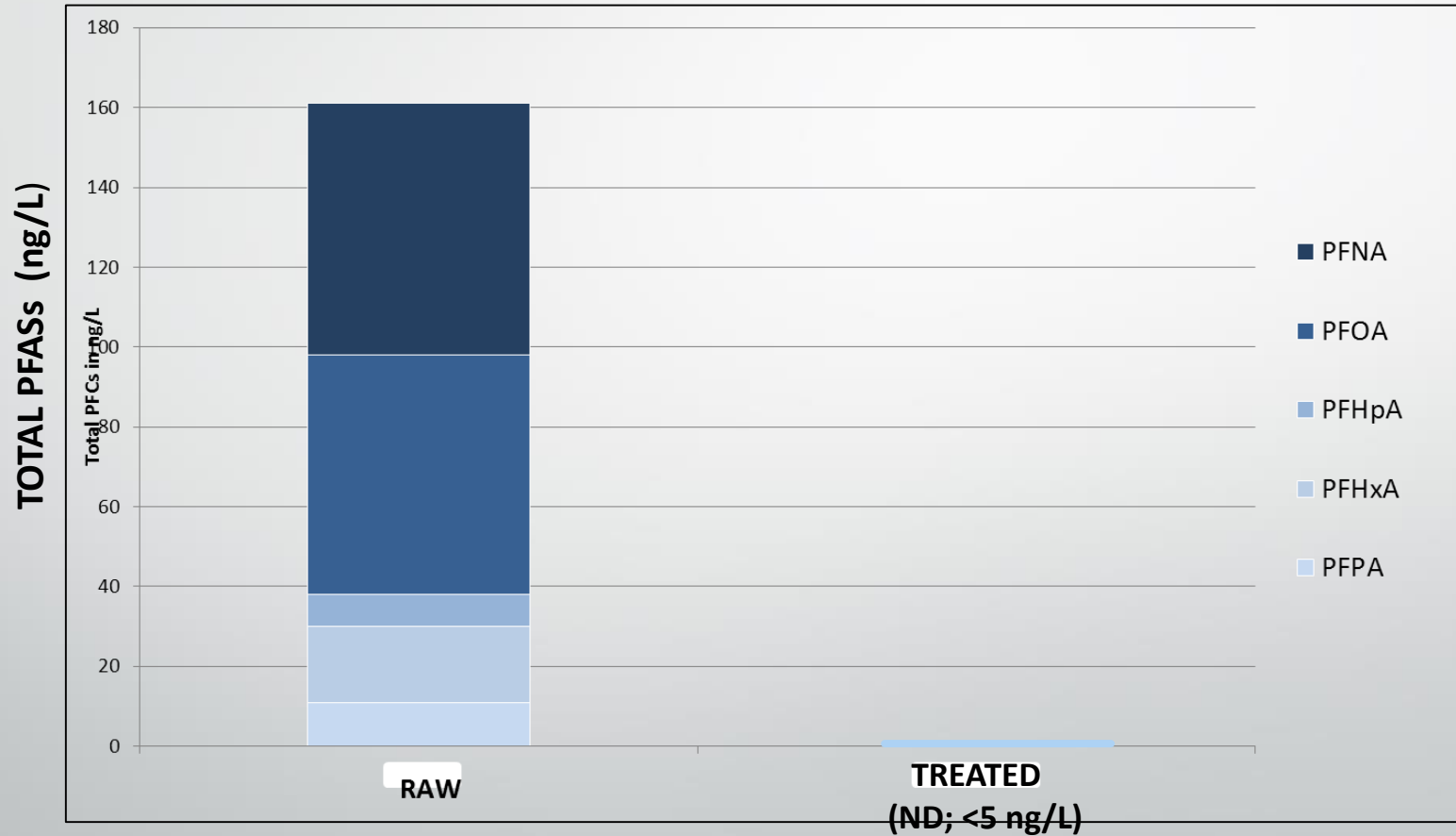


# Raw versus Treated Water in NJ Public Water Systems Without Treatment Designed for PFAS Removal





# Raw versus Treated Groundwater at NJ Public Water System with Granular Activated Carbon Designed for PFAS Removal





*For Questions or More Information:*

**Sandra Goodrow, Ph.D.**  
NJDEP, Division of Science, Research  
and Environmental Health

[Sandra.Goodrow@dep.nj.gov](mailto:Sandra.Goodrow@dep.nj.gov)



# NJDEP Track Down and LSRP Role

Stephen E. Maybury

NJ Department of Environmental Protection

June 2017



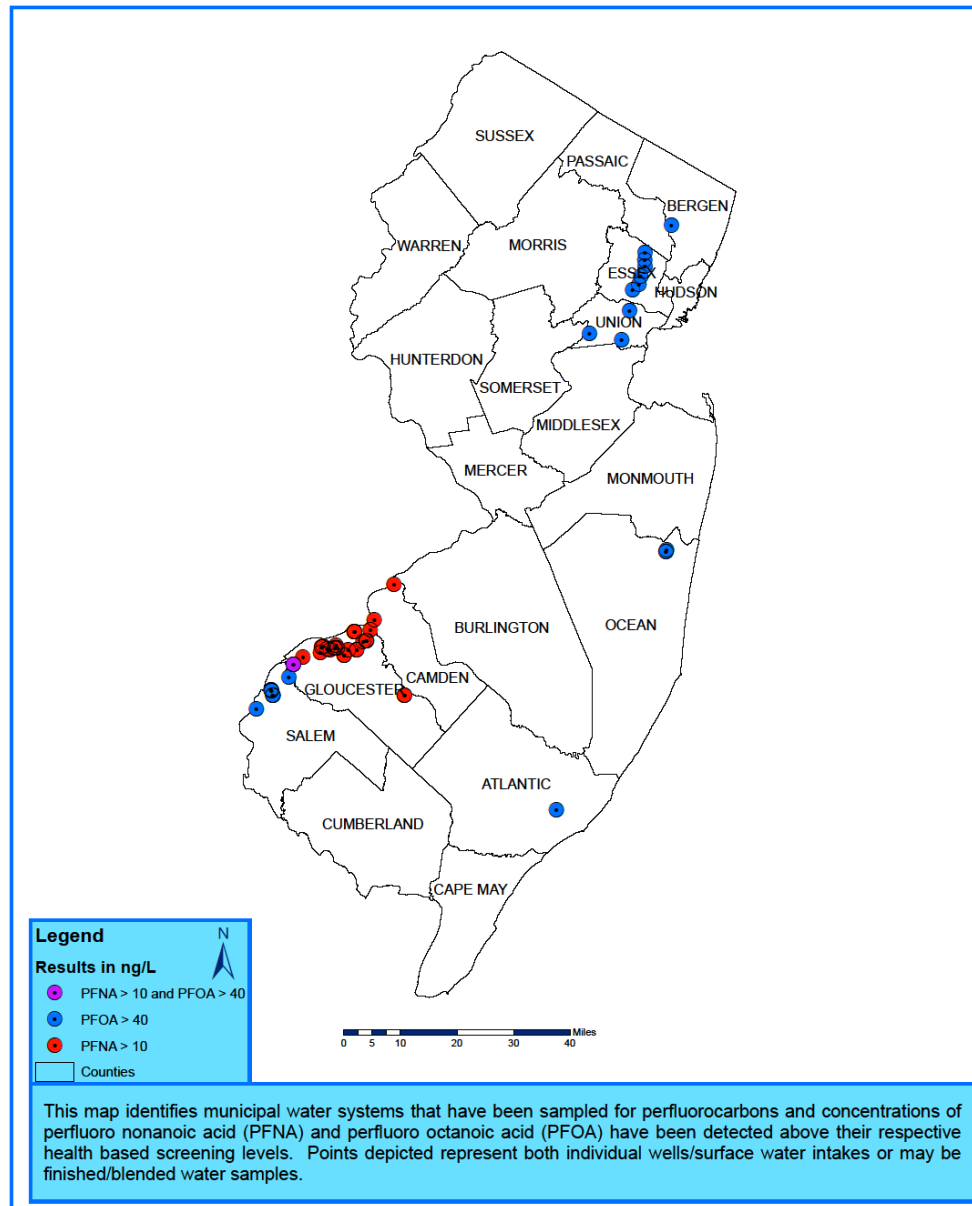


# NJDEP PFAS Strategy

- Continue to evaluate and address receptors
- Expand regulatory authority
  - Develop and promulgate standards
  - Hazardous Substance Listing
- Identify potential sources



## PFNA and PFOA Exceedances Detected in NJ Public Water Supply Systems





# Confirmed NJ PFAS Source Sites

- Five Industrial Sites
  - 4 primary manufactures of PFAS
  - 1 manufacturer used PFAS in process
  
- Four Federal Facility AFFF Sites





# PFAS Issues

- Migration pathways/fate and transport
- Exposure and/or remediation standards
- Regulatory authority and funding
- PFAS are used in many industrial uses and consumer products and the universe of potential sources unknown





# NJDEP- Initial Track down

- Technical assistance provided to water purveyor to backtrack and identify a specific source of PFOA in a surface water intake. A facility was confirmed as a major source site and is currently under investigation by an LSRP.
- Requests for Information sent to > 50 facilities based on:
  - NAICs consistent with PFAS contaminated manufacturing sites
  - Facilities with operations that may of use PFAS near public supplies detecting contamination.
    - No additional primary fluorochemical manufactures identified to date.
    - No additional sources to the impacted public water supplies identified.
    - Sites that used PFAS were advised to evaluate using an LSRP.







# NJDEP- Track down

- Additional GIS and NAICs based information requests of potential sources based on impacted public water supply locations.
  - Evaluating coating mills as next NAICs evaluation
- As additional sites are identified NJDEP will be continuing to send information requests to RPs & LSRPs





# LSRPs Role

- **Technical Regulations definitions 7:26E-1.8**
- "Contamination" or "contaminant" means any discharged hazardous substance as defined pursuant to N.J.S.A. 58:10-23.11b, hazardous waste as defined pursuant to N.J.S.A. 13:1E-38, **or pollutant** as defined pursuant to N.J.S.A. 58:10A-3.
- "Discharge" means any intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying or dumping of a hazardous substance, hazardous waste **or pollutant** into the waters or onto the lands of the State, or into waters outside the jurisdiction of the State when damage may result to the lands, waters, or natural resources within the jurisdiction of the State.
- "Response action outcome" or "RAO" means a written determination by a licensed site remediation professional that the site was remediated in accordance with all applicable statutes, rules and guidance, and based upon an evaluation of the historical use of the site, or of any area of concern at that site, as applicable, and any other investigation or action the Department deems necessary, there are **no contaminants** present at the site, at the area of concern or areas of concern, or at any other site to which a discharge originating at the site has migrated, or that **any contaminants** present at the site or that have migrated from the site have been remediated in accordance with applicable remediation statutes, rules and guidance and all applicable permits and authorizations have been obtained.





# What are expectations?

- During remediation LSRPs should evaluate operations and AOCs for potential PFAS discharges.
- If sites of concern are identified, NJDEP will continue to reach out to the Parties and LSRPs to address the potential concern for PFAS discharges.





# NJDEP PFAS Contact

Steve Maybury

[steve.maybury@dep.nj.gov](mailto:steve.maybury@dep.nj.gov)

(609) 633-1455

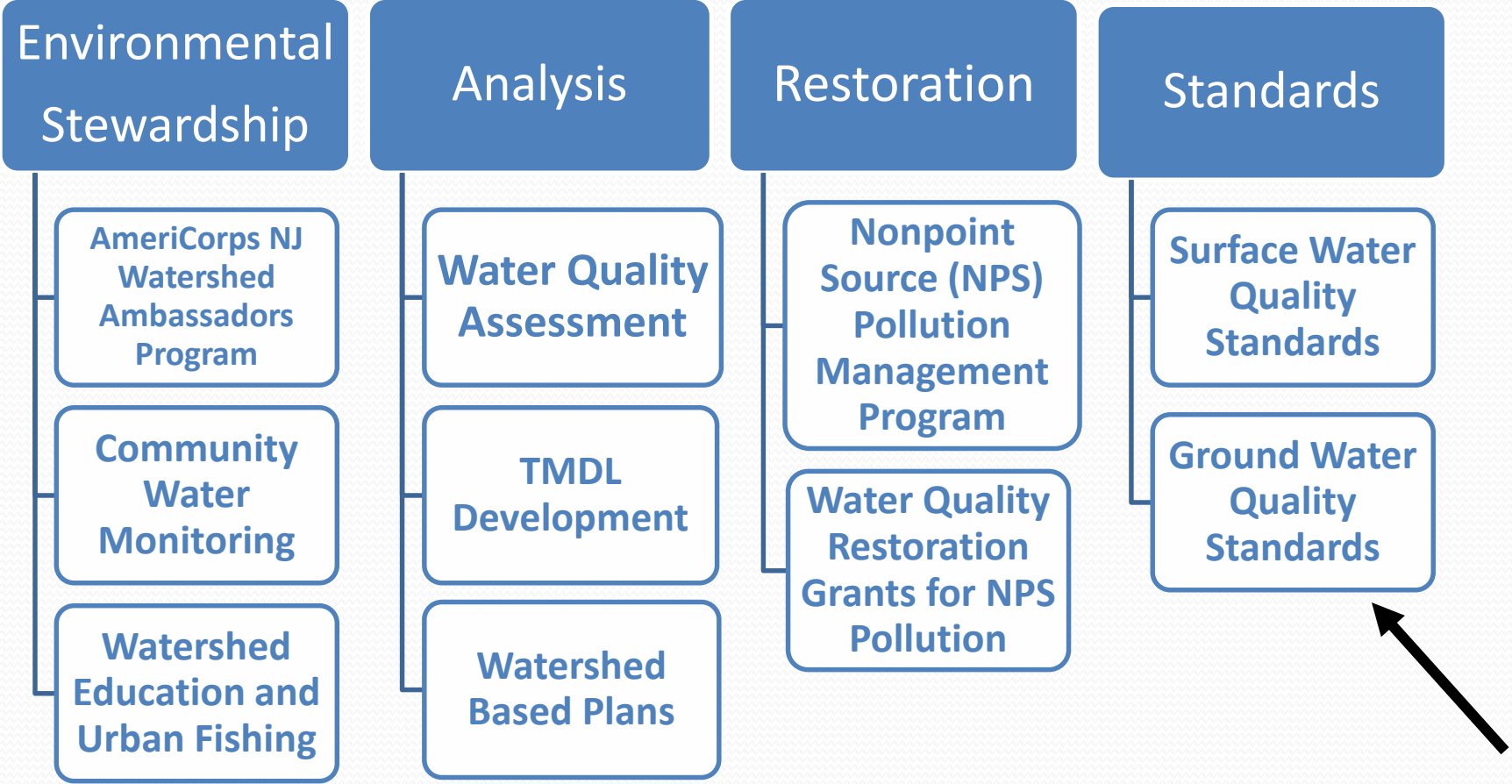


# New Jersey Ground Water Quality Standards Regulatory Update

Sandra Cohen, Research Scientist 1  
Bureau of Environmental Analysis, Restoration and Standards (BEARS)  
Division of Water Monitoring and Standards (WMS)  
New Jersey Department of Environmental Protection (NJDEP)

June 14, 2017

# BEARS




# Ground Water Quality Standards


- <http://www.state.nj.us/dep/wms/bears/gwqs.htm>

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DIVISION OF WATER MONITORING AND STANDARDS



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Bureau of Environmental Analysis, Restoration and Standards

Surface Water Quality Standards (SWQS)

Ground Water Quality Standards (GWQS)

Water Quality Assessment

Total Maximum Daily Loads (TMDLs)

Nonpoint Source (NPS) Pollution Management Program

Watershed Based

*Bureau of Environmental Analysis, Restoration and Standards*

## Ground Water Quality Standards

New Jersey's Ground Water Quality Standards are established in the [Ground Water Quality Standards \(GWQS\) rules at N.J.A.C 7:9C](#). The GWQS rules establish classes of ground water according to the hydrogeologic characteristics of the ground water resource and the designated use(s) which are to be maintained, restored and enhanced within the classification area. Designated uses include maintenance of special ecological resources, provision of and conversion to potable water (drinking water), agricultural and industrial water supply, and other reasonable uses. Maps are available that identify the geographic boundaries of Class I-PL, Class III-A and Class III-B ground water (see [Ground Water Classification Maps](#)). The GWQS rules also establish the water quality criteria and antidegradation policies applicable to each classification and designed to ensure that the designated uses can be adequately protected. The actual ground water classification, criteria and constituent standards that apply to a proposed activity (e.g., new/expanded discharge to ground water or remediation of a contaminated sit) are determined on a case-by-case, site-specific basis pursuant to the applicable regulatory program ([Site Remediation](#) and [NJPDES](#)). The Department has developed [Frequently Asked Questions \(FAQ\) on the GWQS](#) to answer general questions about implementation of the GWQS. Questions concerning the application of the GWQS to a specific NJPDES permit or contaminated site should be directed to the permit writer or case manager assigned to the site.

### Ground Water Classifications and Criteria

The GWQS rules establish three major classes of ground water: Class I Ground Water of Special Ecological Significance, Class II Ground Water for Potable Water Supply, and Class III Ground Water with Uses Other Than Potable Water Supply. The GWQS rules establish the ground water quality criteria that are applicable to the different classes of ground water.

# GWQS Rules, N.J.A.C. 7:9C

1.1: Scope

1.2: Policies

1.3: Construction

1.4: Definitions

1.5: Ground Water Classification System and Designated Uses

1.6: Exceptions to the Classification System

1.7: Ground Water Quality Criteria

1.8: Antidegradation Policy

1.9: Constituent Standard Modifications and PQLs

1.10: Procedures for Reclassification of Ground Water

1.11: Severability

Appendix Table 1: Class II-A Specific Ground Water Quality  
Criteria and PQLs

Appendix Table 2: Interim Generic Criteria-SOCs

Figures 1 – 5: Classification System Maps



# Classification System and Designated Uses

- Classifications are based on hydrogeologic characteristics of the ground water resource and the designated use(s) to be maintained, restored and enhanced within the classification area.
- Designated Uses:
  - Class I: Ground Water of Special Ecological Significance
  - Class II: Ground Water for Potable Water Supply
  - Class III: Ground Water for Uses Other Than Potable Water Supply

# Ground Water Quality Criteria

- Narrative (Class I and III)
- Numeric (Class II):
  - Specific (Appendix Table 1 of the GWQS rules)
  - Interim Specific (posted at [http://www.state.nj.us/dep/wms/bears/gwqs\\_interim\\_criteria\\_table.htm](http://www.state.nj.us/dep/wms/bears/gwqs_interim_criteria_table.htm))
  - Interim Generic (Appendix Table 2 of the GWQS rules)
- Note: If an MCL has been promulgated, the health-based MCL serves as the ground water quality criterion for that constituent in Class II ground waters (see N.J.A.C. 7:9C-1.7(c)3i.)

# Constituent Standard for Class II Ground Waters

- Constituent Standard
  - = Higher of the specific or interim specific Ground Water Quality Criterion and the Practical Quantitation Level (PQL)
  - = Ground Water Quality Standard
  - = Ground Water Remediation Standard  
(see N.J.A.C. 7:26D-2.2(a))

# Proposed Amendments

- Amend N.J.A.C. 7:9C-1.7 and Appendix Table 1:
  - Replace 23 existing interim specific GWQS with specific GWQS, including updates to 3: caprolactam, dinitro-o-cresol, and 2-hexanone
  - Allow use of alternative values or modified equations in the derivation of criteria when necessary to reflect best available science and protect human health.
- Amend N.J.A.C. 7:1E Appendix A:
  - Add perfluorononanoic acid (PFNA) to the List of Hazardous Substances under the Discharges of Petroleum and Other Hazardous Substances Rules.

# Proposed Amendments, cont'd

- Published April 3, 2017
- Public Hearing: May 5, 2017
- Close of Public Comment Period: June 2, 2017
- Status: Comments Under Review
- See <http://www.nj.gov/dep/rules/notices.html>

## Proposals with Comment Period Closed

Publication Date	Proposal Name	Close of Comment Period	Public Hearing Scheduled?	Document Links	Proposal Status
4/3/2017	<a href="#">Ground Water Quality Standards rules, N.J.A.C. 7:9C-1.7 and Appendix Table 1; and Discharges of Petroleum and Other Hazardous Substances Rules, N.J.A.C. 7:1E Appendix A List of Hazardous Substances</a>	6/2/2017	Yes	<a href="#">Notice</a> <a href="#">Proposal</a> ✖ <a href="#">Basis and Background</a> ✖	Pending Adoption

# Stakeholder Process

- Comprehensive Amendments to the GWQS Rules
- Convened April 11, 2016
- Key Issues Under Consideration:
  1. Update numeric ground water quality criteria and PQLs
  2. Changes to designated uses, classification areas, and/or classification area maps
  3. Clarify, simplify and streamline the rules and their implementation
- Three stakeholder workgroups:
  - Ground Water Quality Criteria Work Group
  - PQL Work Group
  - Use and Classifications Work Group

## GWQS Rules Stakeholder Process Information

- [Stakeholder Invitation \(pdf\)](#)
- [Information Packet \(pdf\)](#)

## Upcoming Meetings

All meetings are held at 401 East State Street, Trenton, NJ 08625 unless otherwise noted

- **[08/22/2017 - Ground Water Quality Standards Rules Stakeholder Meeting-PQL Workgroup - Invitation Only](#)**

August 22, 2017 10:00:00 am

Meeting will be held in the 4th Floor Large Conference Room (4E002)

## Past Meetings

- **[05/25/2017 - Ground Water Quality Standards Rules Stakeholder Meeting-Criteria Workgroup-Invitation Only](#)**

Thu, 25 May 2017 10:00:00 -0400

Meeting will be held in the 5th Floor Conference Room (5E002)

[Agenda \(pdf\)](#)

[Attendance List \(pdf\)](#)

[Handout \(pdf\)](#)

[Presentation \(pdf\)](#)

- **[05/11/2017 - Ground Water Quality Standards Rules Stakeholder Meeting-Ground Water Classifications and Designated Uses Workgroup-Invitation Only](#)**

Thu, 11 May 2017 10:00:00 -0400

Meeting will be held in the 6th Floor Conference Room (6E002)

[Agenda \(pdf\)](#)

[Attendance List \(pdf\)](#)

[Handout 1 \(pdf\)](#)

[Handout 2 \(pdf\)](#)

# Ground Water Quality Standards

Subscribe to WMS Listserv for GWQS rules at

<http://www.nj.gov/dep/wms/subscribe.htm>

STATE OF NEW JERSEY  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DIVISION OF WATER MONITORING AND STANDARDS  
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### SUBSCRIBING TO WATER MONITORING & STANDARDS E-MAIL LISTS

Water Monitoring and Standards offers nine e-mail "mailing lists" (Listservs) to the public. These lists allow us to quickly notify subscribers of important news, events, rule changes or other matters related to water monitoring, water quality standards, and water quality assessment. You may subscribe to as many of the lists below as you choose. There is no fee to subscribe and you may "unsubscribe" at any time.

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Select the Listserv subscription(s) you would like to receive:

- Ground Water Quality Standard rules (N.J.A.C. 7:9C)
- Shellfish Classifications
- Surface Water Quality Standards/Assessment/303(d)/TMDLs
- Ambient Water Quality Data/Information Availability
- NJ's Water Quality Data Exchange System
- Beach Monitoring
- Local/Volunteer Monitoring
- NJ Water Monitoring Council
- Americorps/NJ Watershed Ambassador Program

Please enter your e-mail address below and click the "Submit" button to subscribe to the selected Listserv(s):

Information on how to "unsubscribe" will be included in all messages you receive; the Unsubscribe page may also be used.



# Additional Information

- GWQS Website  
<http://www.state.nj.us/dep/wms/bears/gwqs.htm>
- Information about prior rule amendments and readoptions  
[http://www.state.nj.us/dep/wms/bears/support\\_docs.htm#gwqs](http://www.state.nj.us/dep/wms/bears/support_docs.htm#gwqs)
- Current Interim Specific Ground Water Quality Criteria  
[http://www.state.nj.us/dep/wms/bears/gwqs\\_interim\\_criteria\\_table.htm](http://www.state.nj.us/dep/wms/bears/gwqs_interim_criteria_table.htm)
- GWQS Rules Stakeholder Process  
<http://www.nj.gov/dep/workgroups/>
- Ground Water Remediation Standards  
<http://www.nj.gov/dep/srp/>
- NJPDES DGW Permits  
[http://www.nj.gov/dep/dwq/dgw\\_home.htm](http://www.nj.gov/dep/dwq/dgw_home.htm)

# Additional Information, cont'd

## Site Remediation Program

► SRP Rules & Regulations ► GWQS

### Frequently Asked Questions on the Ground Water Quality Standards and the Ground Water Remediation Standards

Rev. 24 Aug 2006 (minor update 25 April 2007)

#### The Questions:

1. How do I know if the Ground Water Quality Standards apply to my project/activity?  
[Answer ►](#)
2. What is the relationship between the Ground Water Remediation Standards at N.J.A.C. 7:26E-1.13(b) and the Ground Water Quality Standards at N.J.A.C. 7:9C?  
[Answer ►](#)
3. What Ground Water Remediation Standards are applied at remediation sites?  
[Answer ►](#)
4. Whom should I call if I have a question about remediation standards or a contaminated site?  
[Answer ►](#)
5. What are practical quantitation levels and how do they relate to the Ground Water Quality Standards?  
[Answer ►](#)
6. How were the practical quantitation levels in the Ground Water Quality Standards established?  
[Answer ►](#)
7. When conducting a remediation, how do I know which constituents to sample for in ground water?  
[Answer ►](#)
8. What analytical methods should I use to determine compliance with the Ground Water Remediation Standards?  
[Answer ►](#)
9. Are there circumstances when a less sensitive analytical method can be used at a known contaminated site?  
[Answer ►](#)
10. What Ground Water Remediation Standards should be applied to sites after the Ground Water Quality Standards were readopted on November 7, 2005?  
[Answer ►](#)

[Adobe Acrobat Vi](#)

#### Related Link

- [The C  
Docu  
Stanc](#)

- See <http://www.nj.gov/dep/srp/regs/gwqs/gwqsfaq.htm>

# Contact Information

NJDEP

Division of Water Monitoring and Standards

Bureau of Environmental Analysis, Restoration and  
Standards

PO Box 420, Mail Code 401-041  
401 East State Street, 3<sup>rd</sup> floor  
Trenton, New Jersey 08625-0420

609-633-1441

<http://www.state.nj.us/dep/wms/bears/index.html>

**PFNA MCL**  
**Safe Drinking Water Act**  
**N.J.A.C. 7:10**

June 14, 2017



# Perfluorononanoic Acid

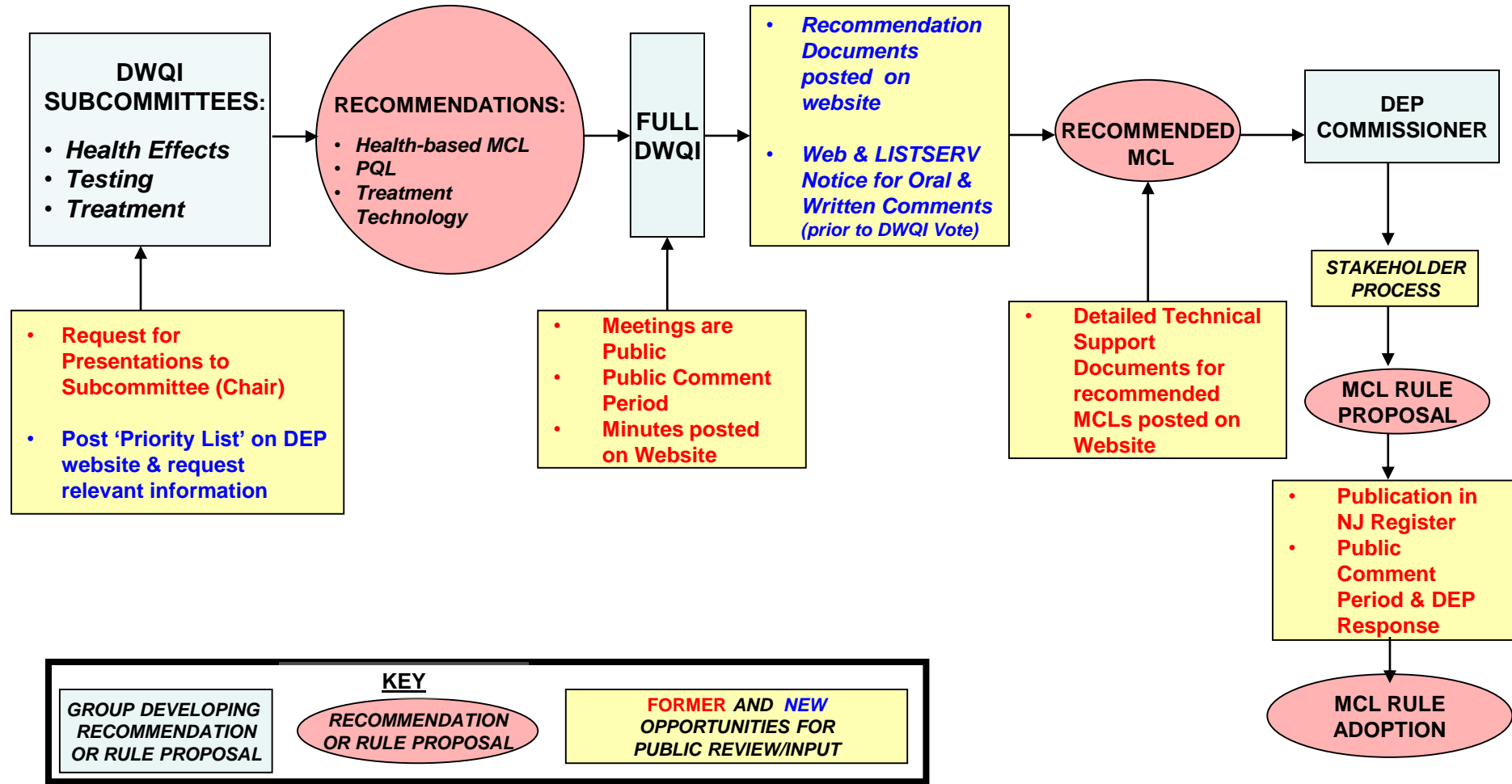
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- ◆ Detected in sampling pursuant to the third Unregulated Contaminant Monitoring Rule in NJ:
  - ◆ Detected in 7/1456 samples (0.5%); 4/175 systems (2%)
  - ◆ EPA MRL = 20 ng/L
- ◆ No Federal Maximum Contaminant Level
- ◆ Commissioner asked the Drinking Water Quality Institute to recommend an MCL

# **MCL DEVELOPMENT**

**Perfluorononanoic Acid**

# PUBLIC PARTICIPATION IN MCL DEVELOPMENT PROCESS



# Drinking Water Quality Institute (DWQI)

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- Established under 1984 SDWA and charged with recommending MCLs
- Testing, Treatment & Health Subcommittees
- Meeting information including agendas at:  
[http://www.nj.gov/dep/watersupply/g\\_boards\\_dwqi.html](http://www.nj.gov/dep/watersupply/g_boards_dwqi.html)



# DWQI

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- Solicited technical input
- Presented draft subcommittee reports
- Accepted public comments – oral and written
- In 2015, recommended a Health-based MCL of **13 ng/L (ppt)**

# New Jersey Rule Process

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- 💧 Stakeholder process
- 💧 Draft rule proposal
- 💧 Proposal published in NJ Register
- 💧 Public hearings and comment period
- 💧 Adoption within one year
- 💧 Effective date noted upon publication

# Potential SDWA Amendments

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- Perfluorononanoic Acid (PFNA) MCL
- 1,2,3-Trichloropropane (1,2,3-TCP) MCL
- Application of radiological contaminants to non-transient non-community water systems

# **MONITORING FRAMEWORK**

## **Perfluorononanoic Acid**

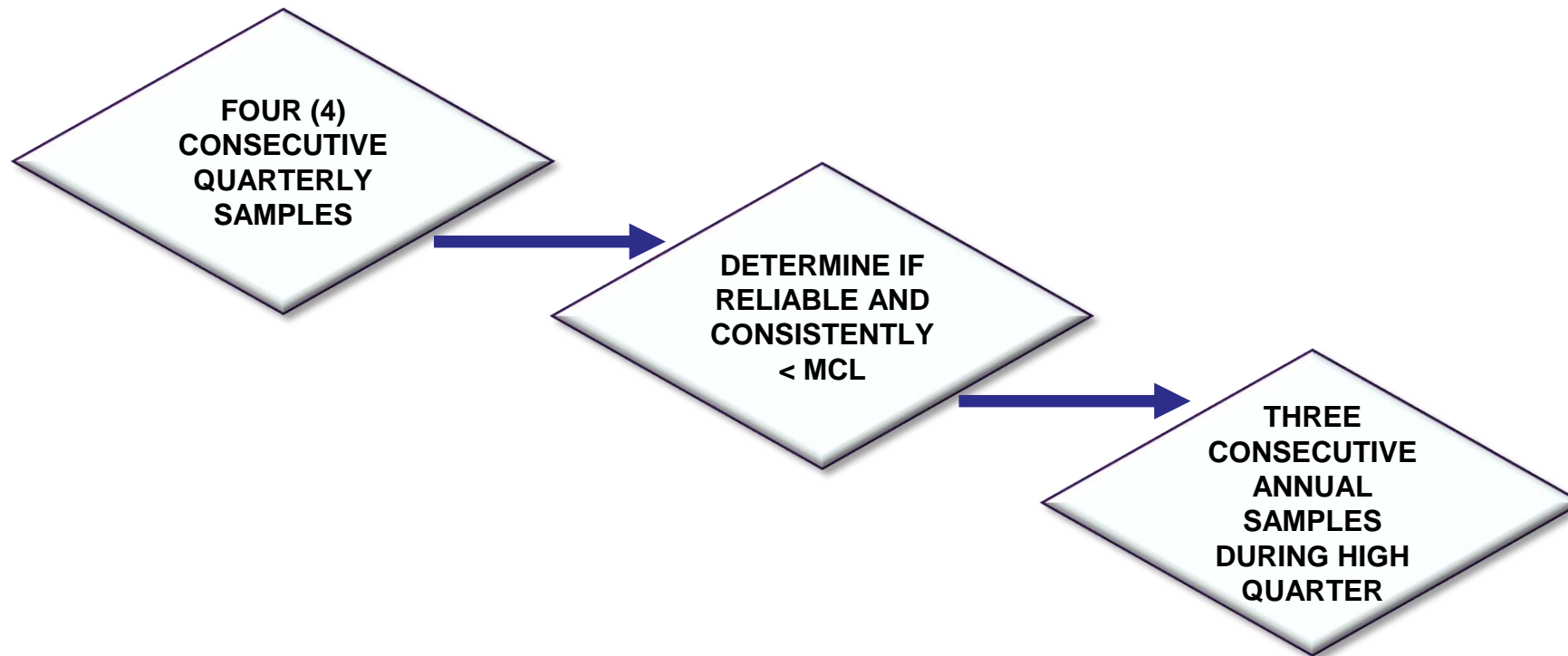
# Perfluorononanoic Acid

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- Monitoring required at:
  - All Community Water Systems
  - All Non-Transient Non-Community Water Systems
- Monitoring not required at:
  - Transient Water Systems
  - Private Wells under PWTA

# VOC Monitoring Framework

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# Monitoring Framework

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- If three consecutive annual samples have no detections system can be placed on triennial monitoring
- Monitoring period in the three year cycle is determined by population and type of water system (N.J.A.C. 7:10-5.2(a)7)

Any Questions?

[watersupply@dep.nj.gov](mailto:watersupply@dep.nj.gov)