

# Contaminants of Emerging Concern in the Delaware River Basin

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*DE-AWRA PPCP Roundtable*

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# How do PPCP get into waters?

- All of us! (medicines pass through body, flushing of meds, personal care products down the drain)
- Health care institutions – flushing of meds
- Manufacturing facilities
- Animal feedlots
- Aquaculture

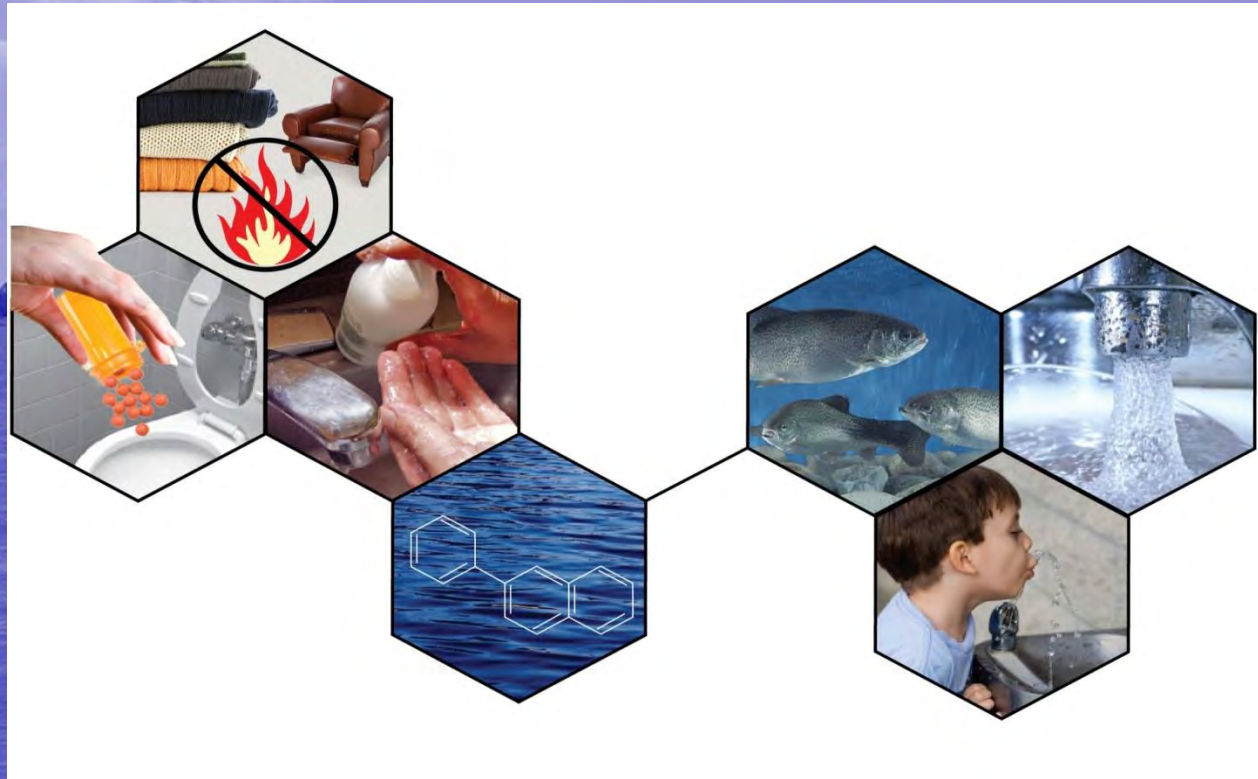


# Why are PPCP of concern?

- Biological effects (diclofenac, triclocarban)
- Resistant to degradation (carbamazepine)
- Widespread and increasing use (ibuprofen, metformin)
- Wastewater treatment plants are not designed to remove (trimethoprim, erythromycin)
- Effects on aquatic life (hormone EE2)

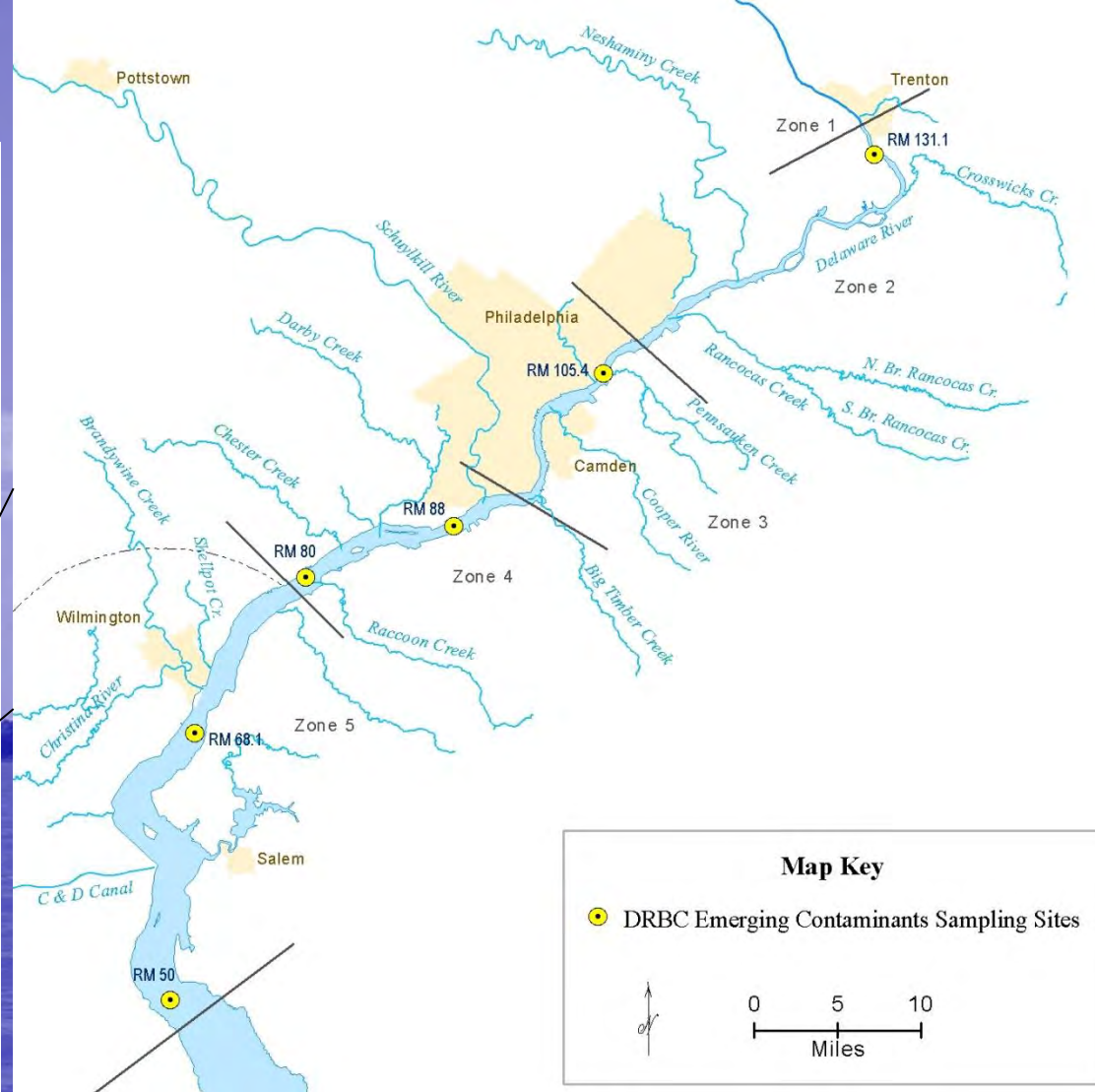
# DRBC 2007 to 2009 CEC Surveys

- Pharmaceuticals and Personal Care Products (PPCP)
- Hormones
- Stain repellants/non-stick surfaces [PFAS]
- Flame Retardants [PBDE]
- Detergents [NP]
- Plasticizers [bis-phenol A]





# Delaware River Basin



2007 to 2009 Ambient Water Sampling  
Zones 2 and 3 use public water supply

# Criteria for Prioritization of PPCP

- Environmental occurrence
- Aquatic toxicity
- Potential human health effects (sensitive populations)
- Analytical feasibility (EPA Method 1694)

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Results are based on filtered surface water samples prior to additional treatment for drinking water.

Human health risk assessment methodologies differ from ecological assessments and may identify other priorities.

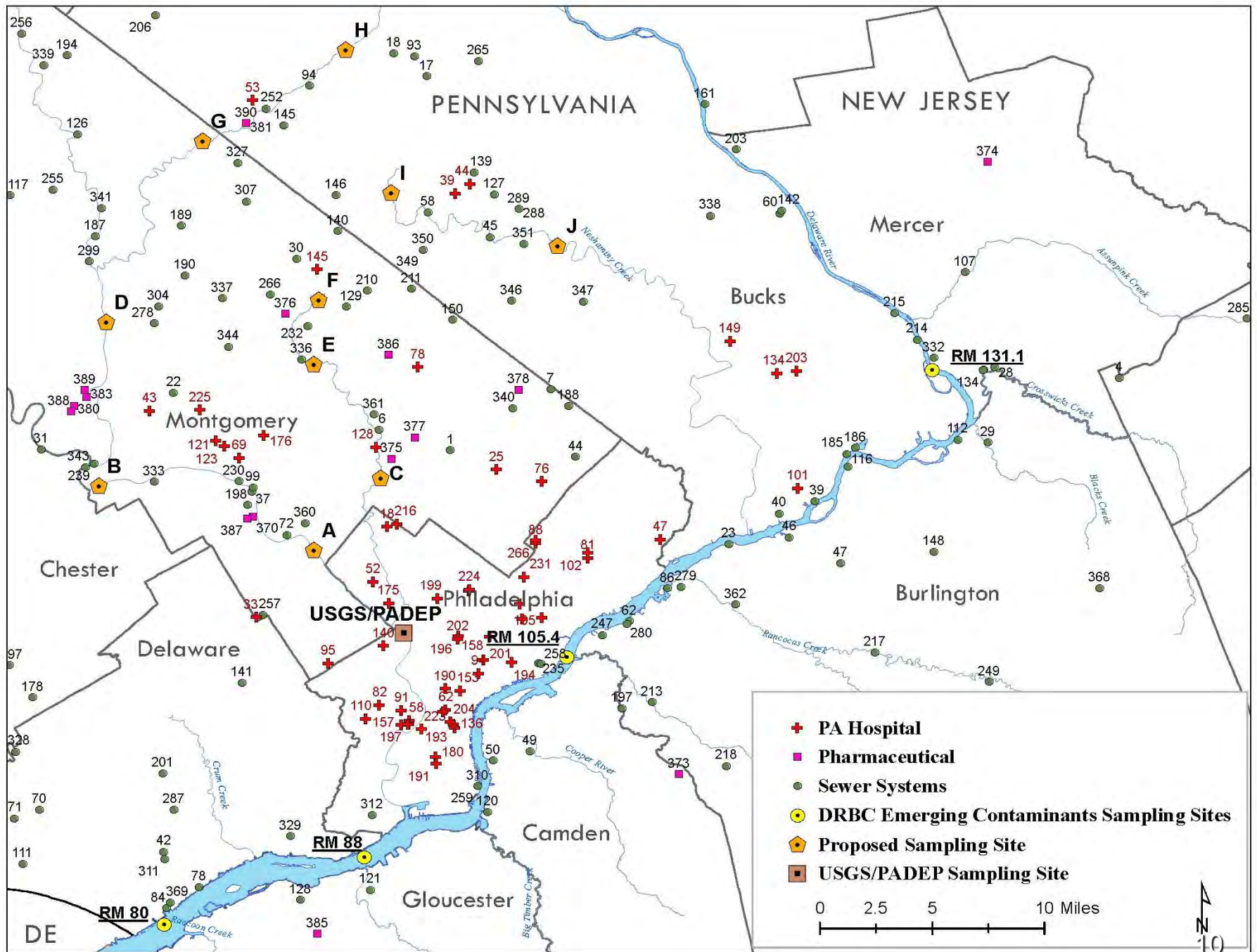




# PPCP

- DRBC survey in 2007 to 2009 found similar contaminants and concentrations reported in other fresh and estuarine surface waters with exception of codeine and metformin.
- Recommend monitoring all parameters feasible.
- Fifteen priority PPCP proposed for focused study in Delaware Estuary out of 57 PPCP detected out of 119 analytes.
- Ongoing Temple U and DRBC, PAWRRC and PASG 2013 to 2014 Project : Occurrence Survey for Emerging Contaminants of Concern in Pennsylvania Tributaries of the Delaware River





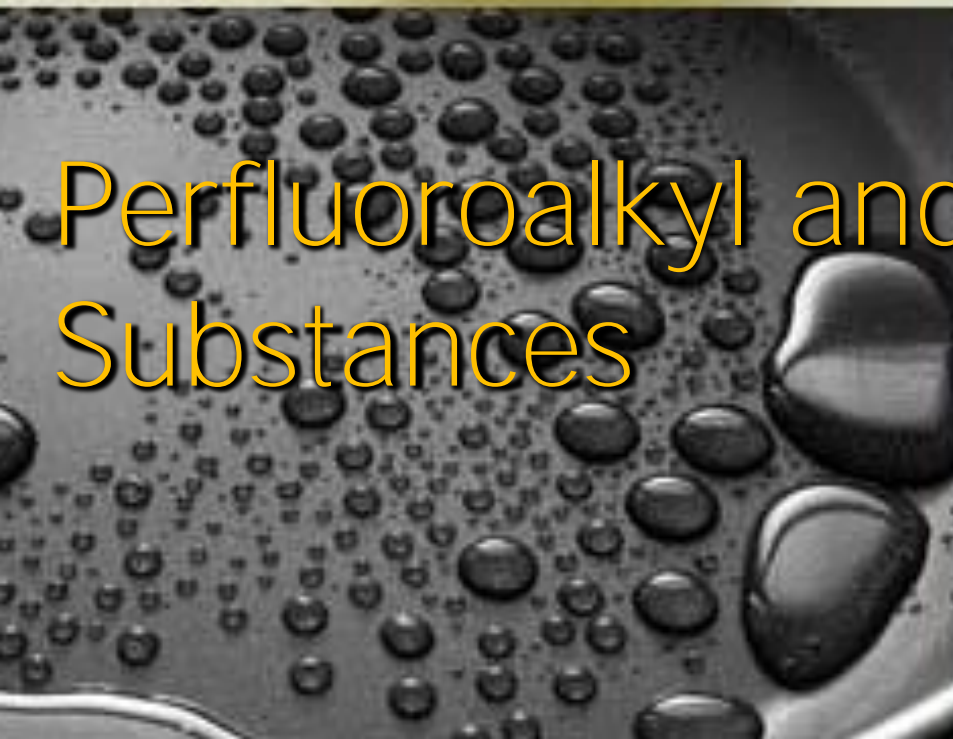
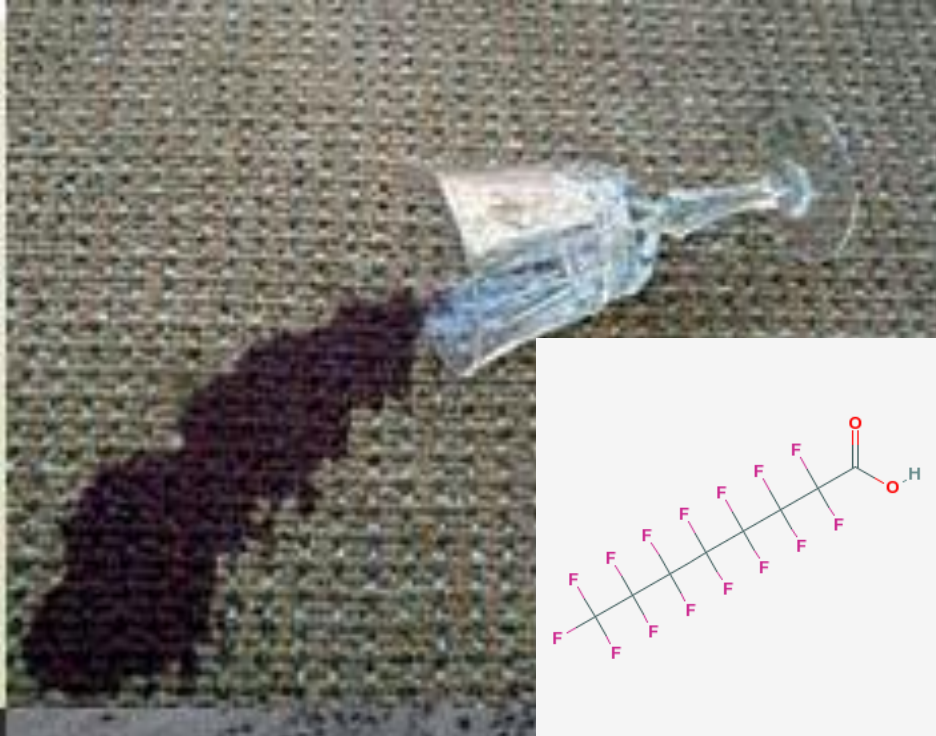
# Actions to Reduce PPCP in Waters

- 1) Reduce flushing of drugs in households
- 2) Reduce flushing in health care facilities
- 3) Change national and state approaches to unused drug management
- 4) Consumers choose PCP wisely
- 5) Voluntary corporate phase out of hazardous chemicals in PCP
- 6) Foster research
- 7) Reduce discharges from manufacturing facilities



# Hormones

- 2007 to 2009 tidal Del R survey detected natural and synthetic hormones in low ng/L levels at limited locations (e.g, estrone, norethindrone, 17- $\alpha$ -ethynylestradiol, desogestrel and testosterone).
- Some hormones are included in SDWA Unregulated Contaminants Monitoring Rule 3.
- Hormones warrant further study in the Delaware River Basin because of potential and know risk to the environment.
- Analytical methods and QA are challenging.



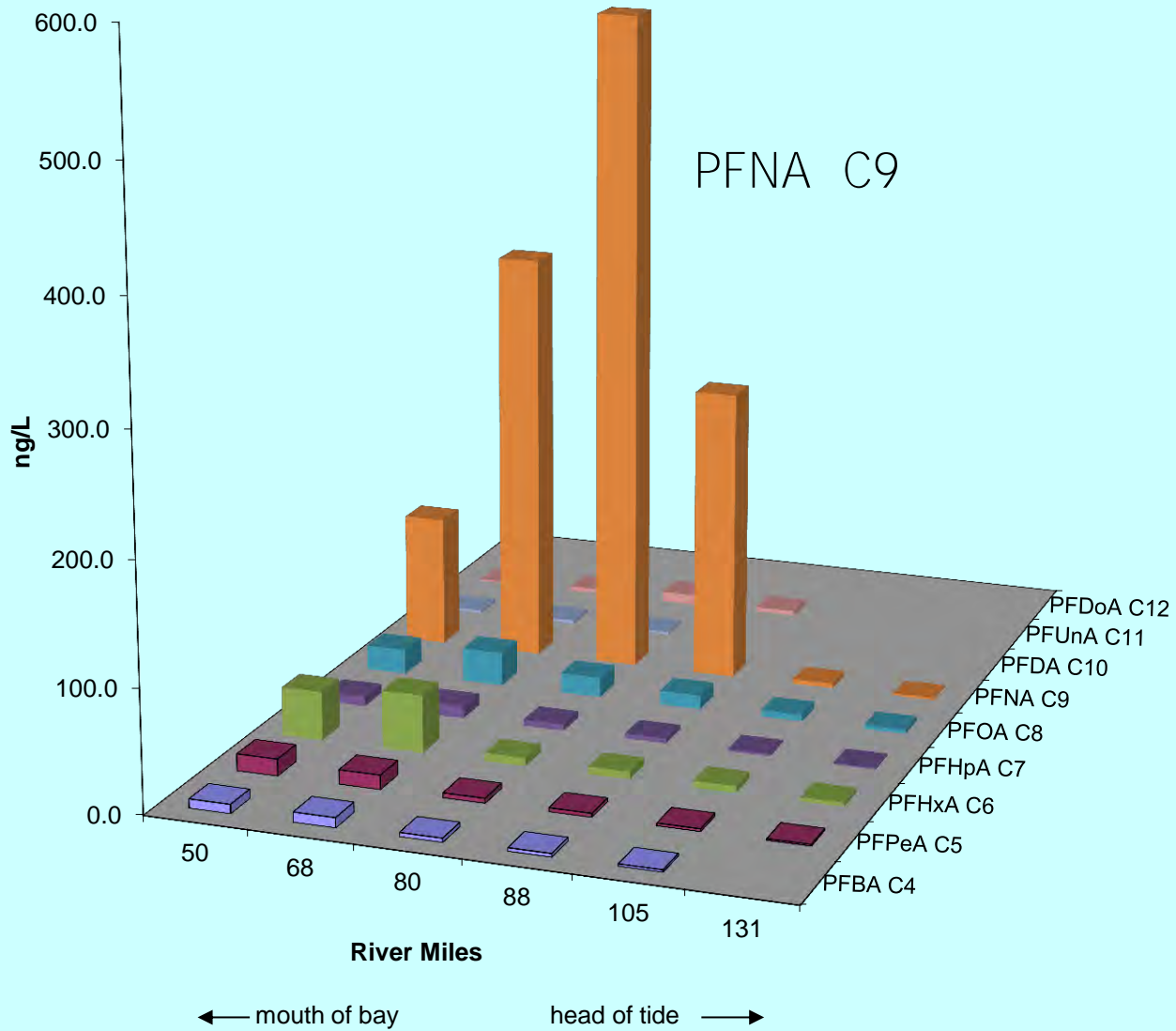
# Perfluoroalkyl and Polyfluoroalkyl Substances



# Why are PFAS of concern in Drinking Water?

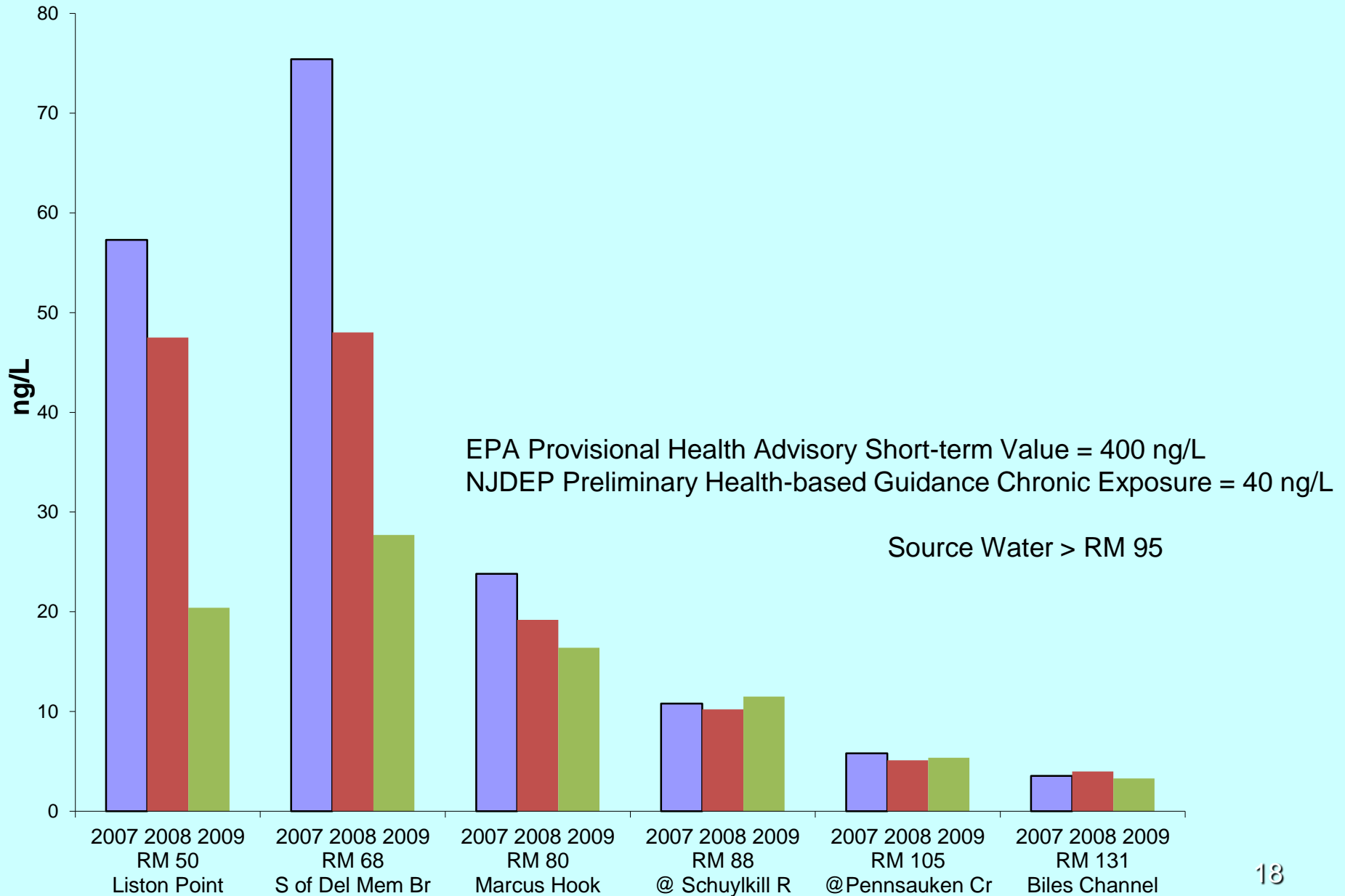
- Many are persistent in the environment
- Some have long human half-life
- Water soluble
- Even relatively low conc. in DW increase human serum levels
- Potential health risks especially in sensitive populations (e.g., infants)
- Widespread use including aqueous film forming foam (AFFF)
- Unregulated Contaminants Monitoring Rule 3 Contaminants

# Perfluoroalkyl Carboxylic Acids (PFCAs) In Ambient Waters Of The Tidal Delaware River 2009





# PFOA (C8) In Ambient Water Of The Tidal Delaware River



# Summation

- Current assessment and regulatory approaches are inadequate for many compounds detected in waters.
- Some CEC may require regulation under the SDWA.
- Additional ecotoxicology information is needed for assessment of aquatic life and wildlife protection.



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## **More information**

<http://www.state.nj.us/drbc/quality/reports/emerging/>

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