

Delaware River Basin Commission

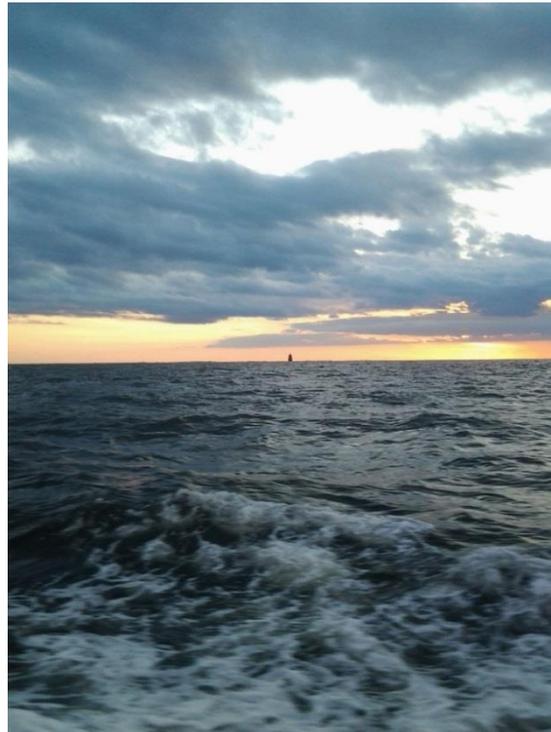
Contaminants of Emerging Concern in the Delaware River Basin

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Delaware River Basin Commission

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Why was the DRBC created in 1961?

- Water supply shortages and disputes over the apportionment of the basin's waters;
- Severe pollution in the Delaware River and its major tributaries;
- Serious flooding



The 1937 *Philadelphia Record* editorial page cartoon depicts the time when the tidal Delaware was an open sewer, where pollution in some stretches robbed the river of all its oxygen needed to support fish and other aquatic life.

Five Equal Members:
Delaware
New Jersey
Pennsylvania
New York
Federal Government



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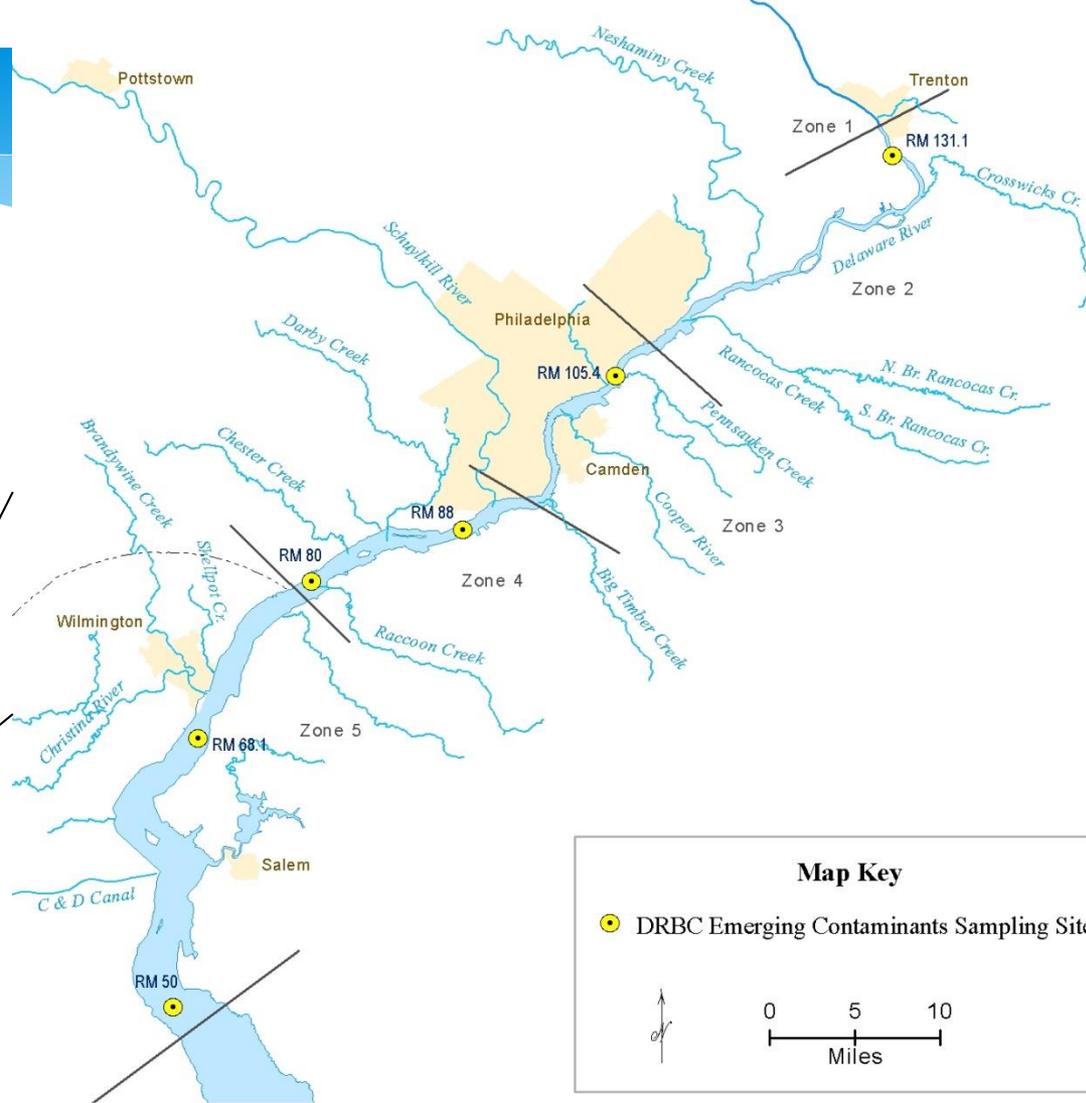
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Current Water Quality Concerns

Why are Pharmaceuticals and Personal Care Products (PPCP) of concern?

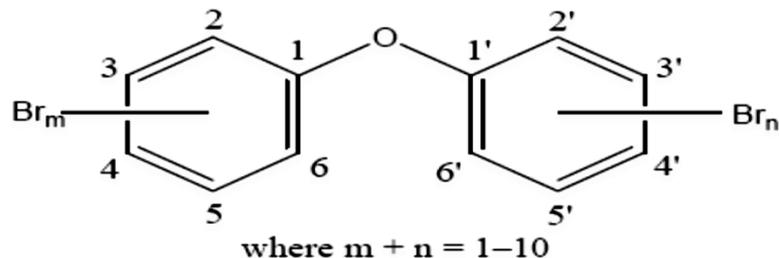
- * Biological effects (diclofenac, triclocarban)
- * Resistant to degradation (carbamazapine)
- * Widespread and increasing use (ibuprofen, metformin)
- * Wastewater treatment plants are not designed to remove (trimethoprim, erythromycin)
- * Effects on aquatic life (hormone EE2)

Delaware River Basin



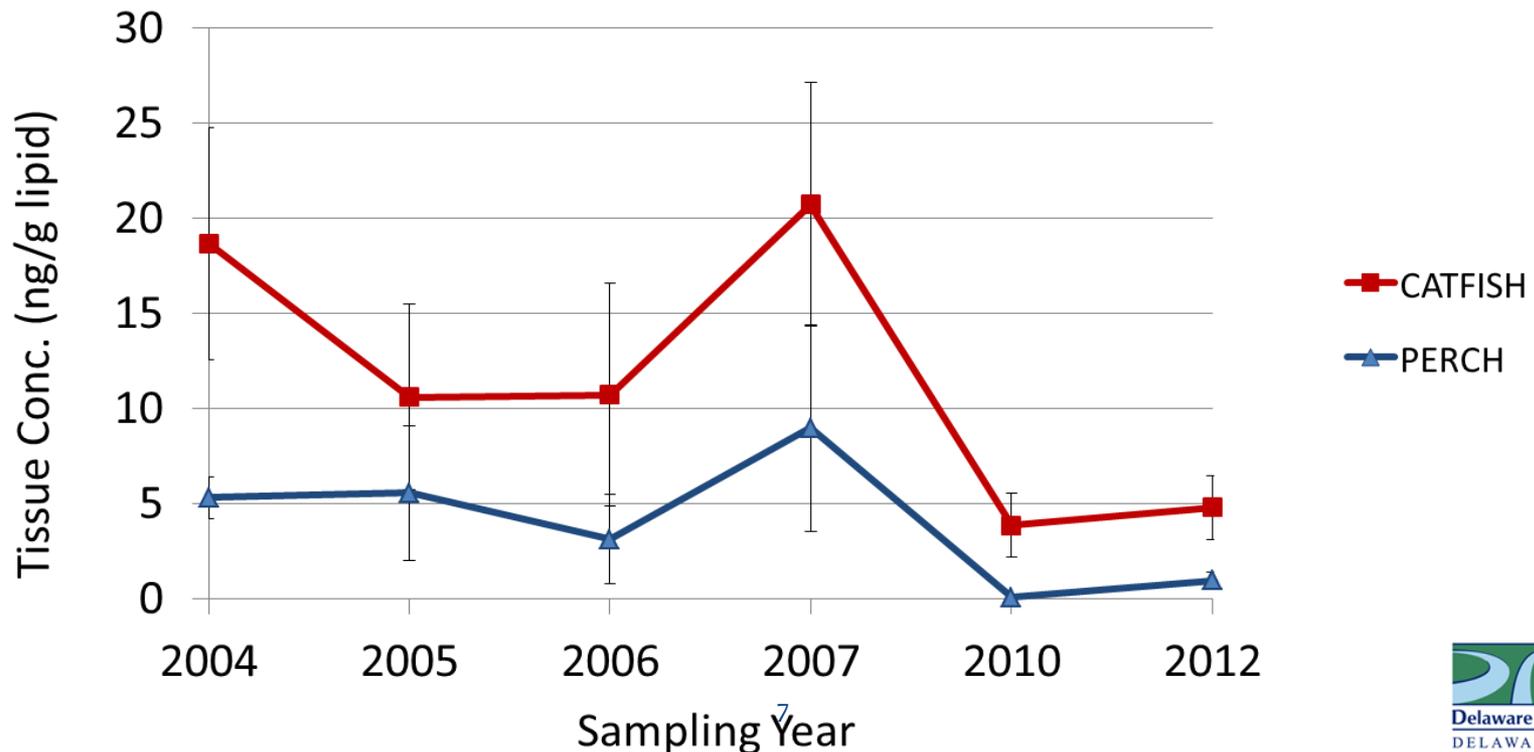
Polybrominated Diphenyl Ethers (PBDE) Flame Retardants

- * Used in consumer products such as television casings and polyurethane foam inside furniture cushions.
- * **Indoor dust** is believed to be the primary source of human exposure (~ 90%) but **dietary exposure** is also a concern
- * PBDEs are characterized as persistent, bioaccumulative, toxic compounds.
- * High PBDE levels in serum alter steroid hormones levels and thyroid function, motor and cognitive deficits in children



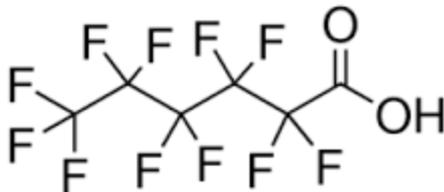
Polybrominated Diphenyl Ethers (PBDE) Flame Retardants

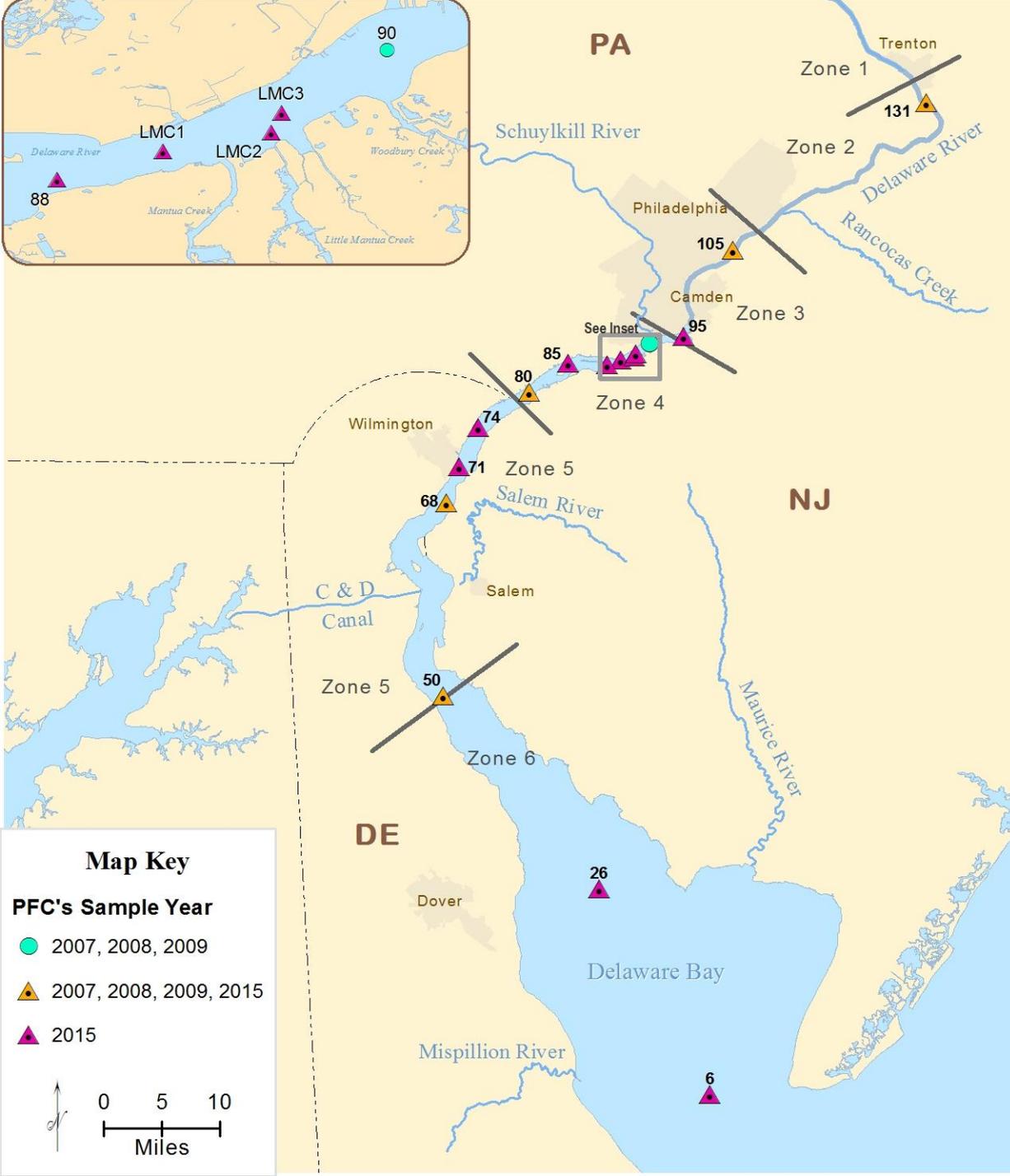
Lipid normalized tissue concentrations of BDE 209 in catfish and perch by year sampled



Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

- * Properties
- * Uses
- * Sources
- * Stewardship
- * Alternatives
- * Discharges
- * Persistence
- * Toxicity
- * Bioaccumulation
- * Sinks



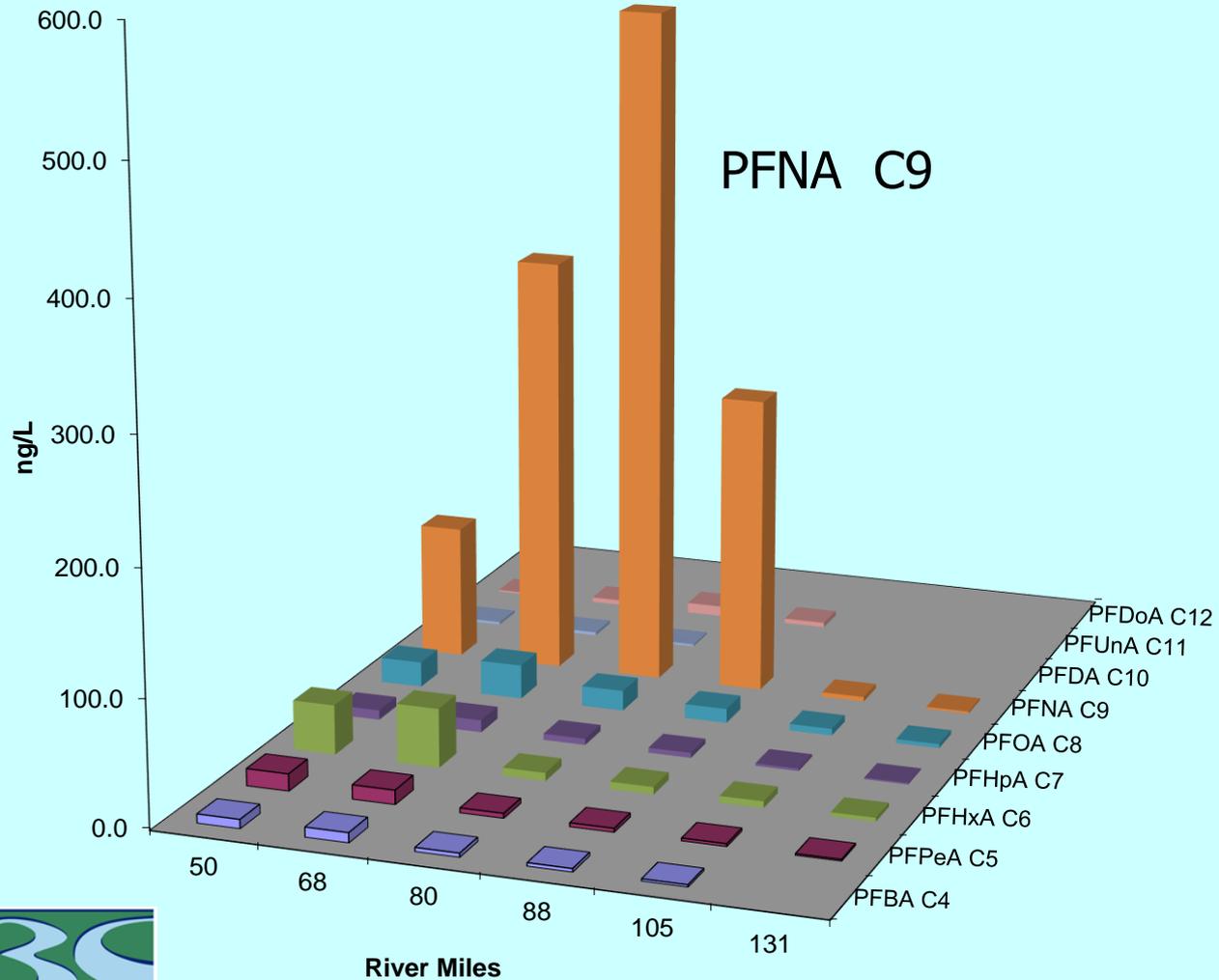


Surface Water Samples
 Six sites in 2007, 2008, 2009
 Fifteen sites in 2015

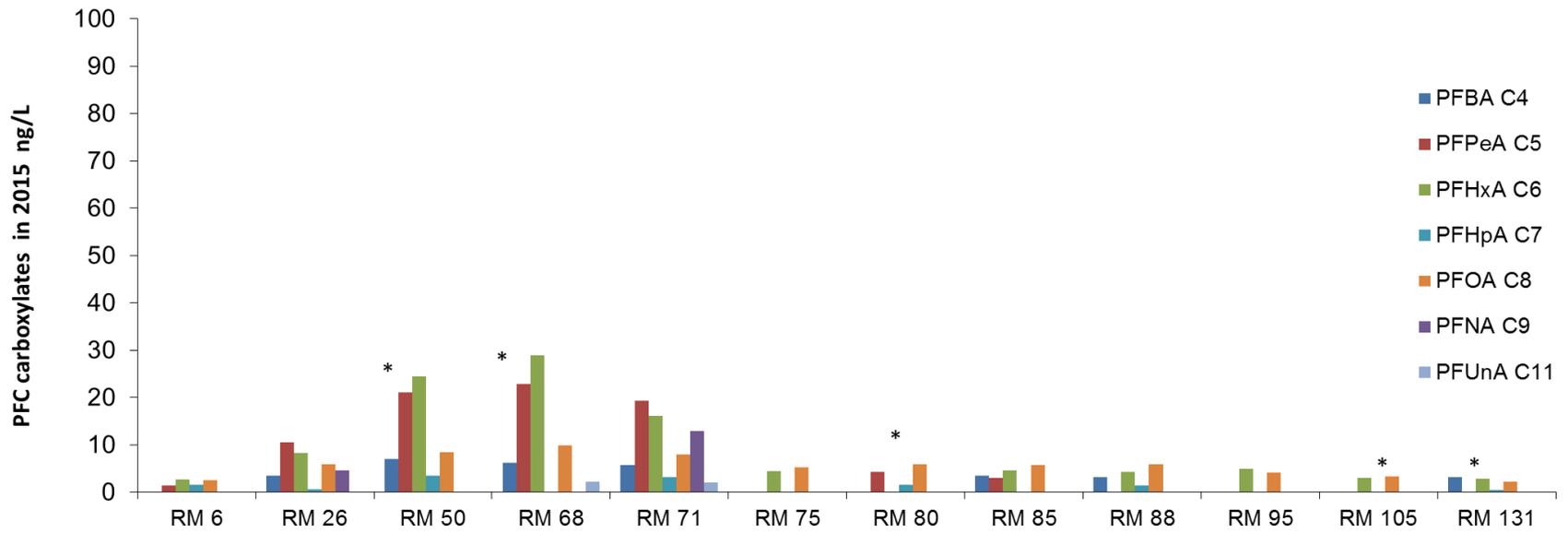
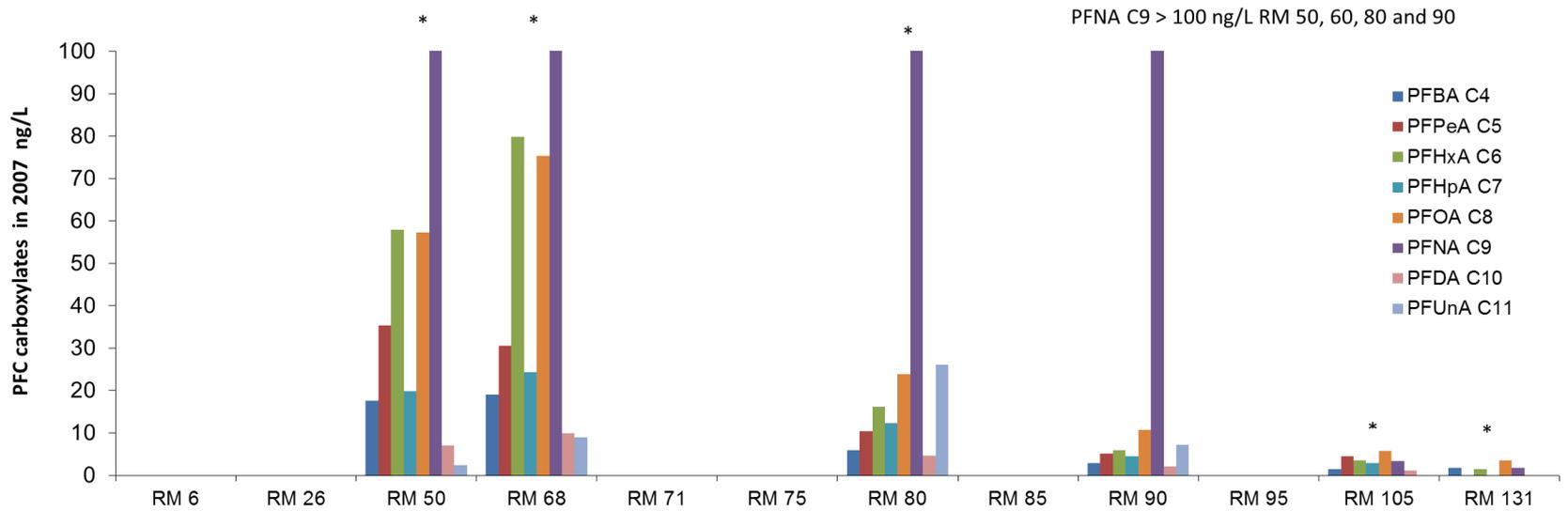


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Perfluoroalkyl Carboxylic Acids (PFCAs) In Ambient Waters Of The Tidal Delaware River 2009



← mouth of bay head of tide →



* Sites sampled in 2007 and 2015

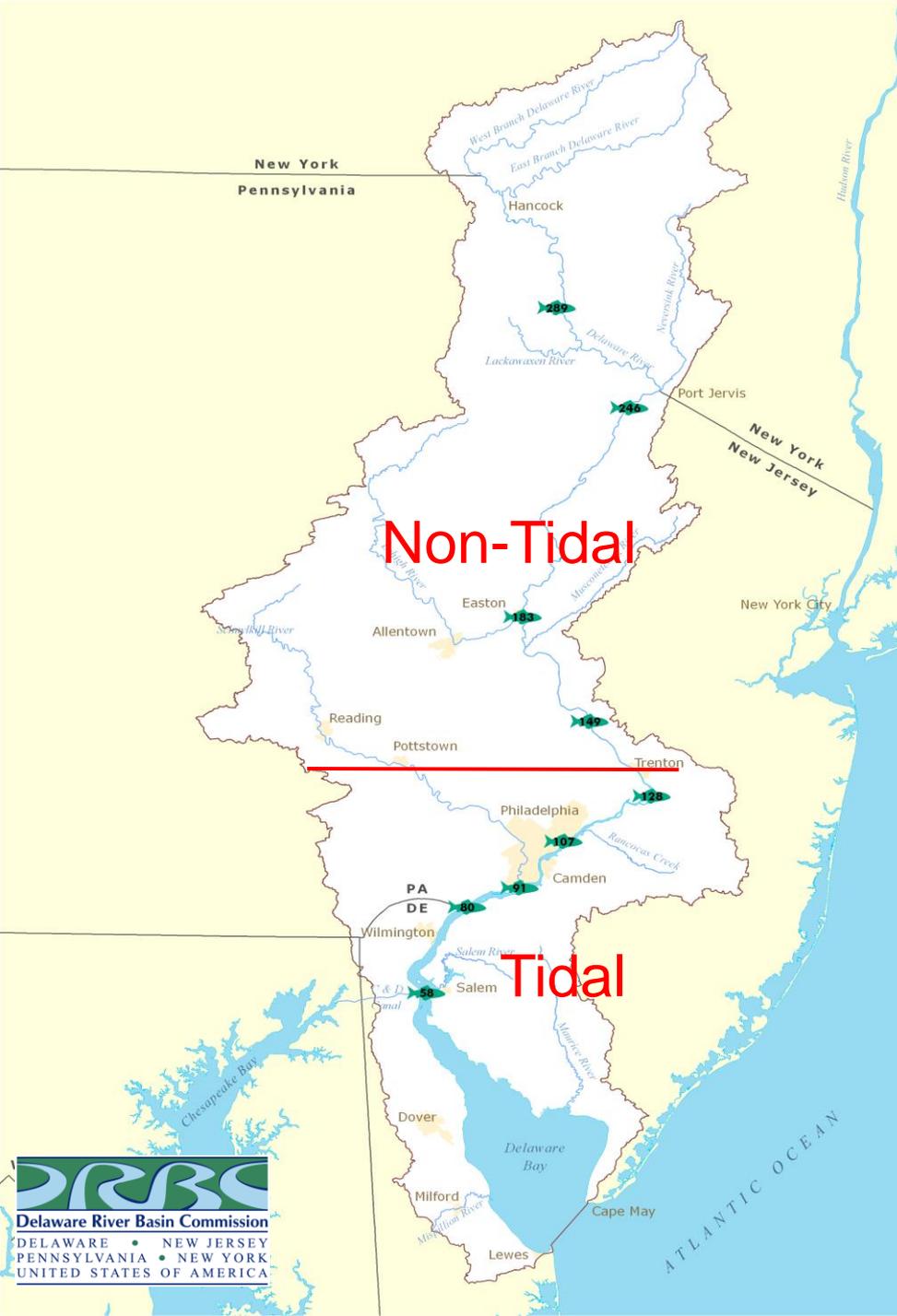
Fish Sampling Locations 2004 - 2015

Non-Tidal Locations

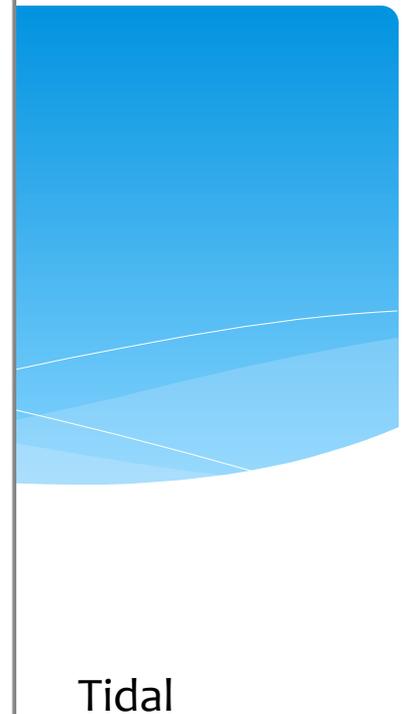
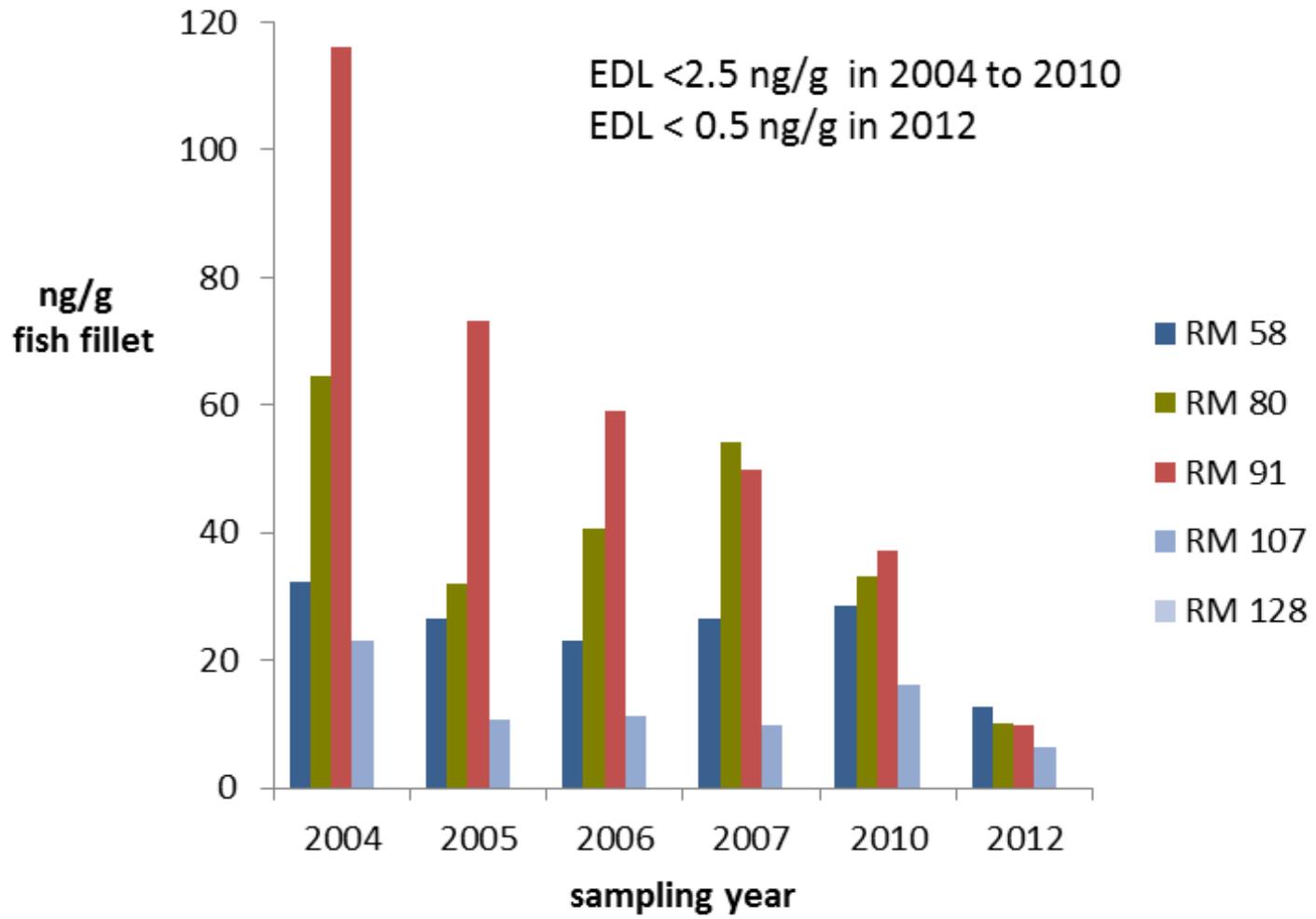
Narrowsburg, NY	RM 290
Milford, PA	RM 246
Easton, PA	RM 183
Lambertville, NJ	RM 149

Tidal Locations

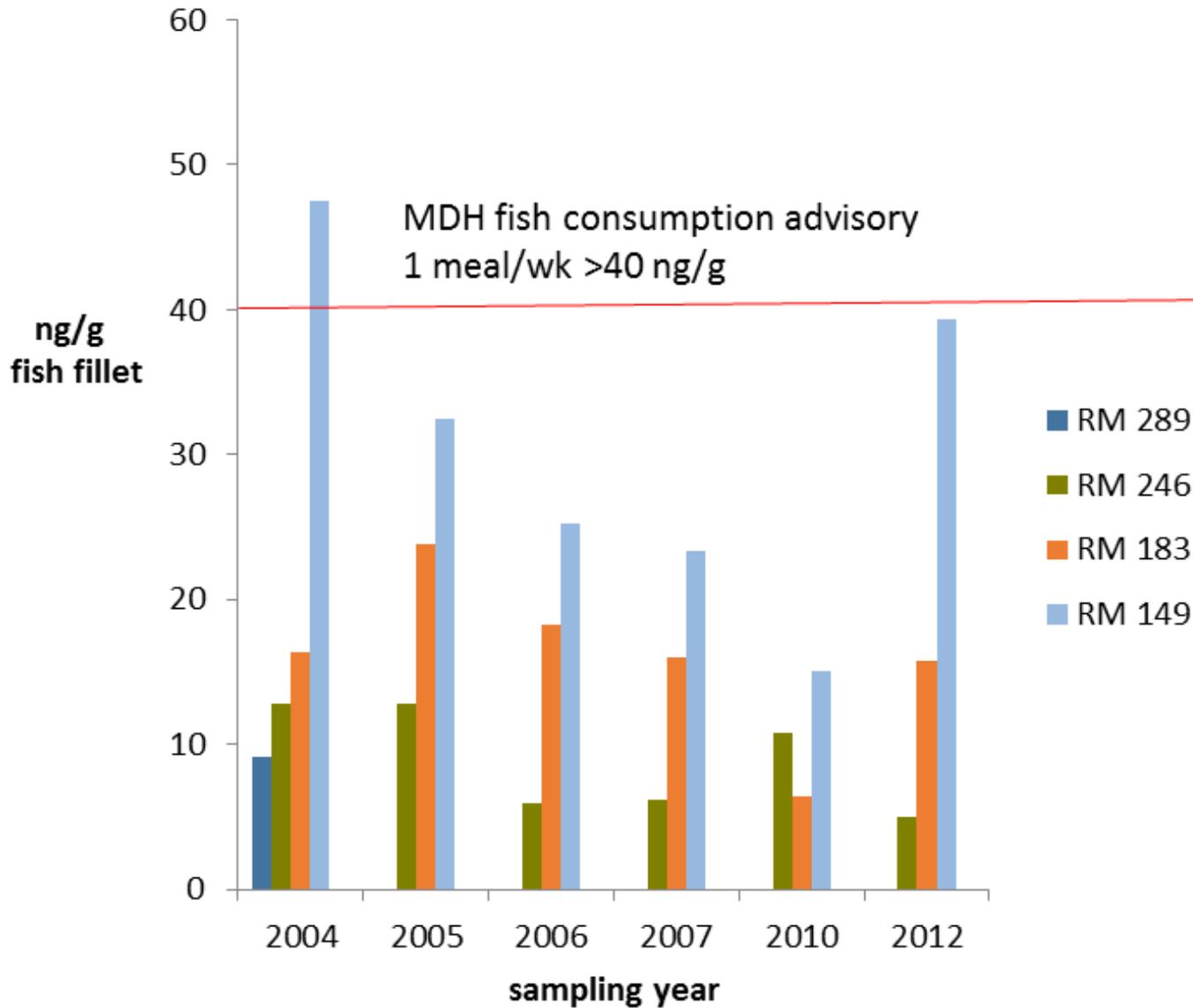
Crosswicks Creek	RM 128
Tacony-Palymra Br.	RM 107
Woodbury Creek	RM 91
Raccoon Creek	RM 80
Salem River	RM 58



PFUnA (C11) in White Perch from Delaware Estuary



PFOS (C8) in Smallmouth Bass from Delaware River



Non-tidal



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