Emerged:
Contaminants of Environmental Concern

March 13, 2017, 8:00 AM – 3:00 PM
Del Tech, Terry Campus (Dover, DE), Conference Center, Education and Technology Building 727
94 attendees (73 evaluation responses)

- Government Agencies (33)
  - USGS, Army Public Health Center
  - DNREC, DDA, DGS
  - Counties, Municipalities
- Academia – researchers and students (20)
- Environmental Groups (9)
- Industry (4)
- Other (7)
  - News Journal, Cape Gazette
AGENDA

- Welcome by Emily Seldomridge and Secretary Small
- “Keynote” by Pat Phillips, USGS
- Monitoring (Ron MacGillivray, DRBC)
- Environmental thresholds (Kelly Smalling, USGS)
- Regulation of contaminants (Keith Harrison, DE ODW)
- Treatment technologies (Tom Schueler, CSN)
- Effects of contaminants on horseshoe crabs (Danielle Dixson, UD)
- Microplastics (Jonathan Cohen, UD)
- Estuarine acidification (Bill Ullman, UD)
- Exposure to legacy and EC of ospreys (Barnett Rattner, USGS and Thomas Bean, UMD)
CONTAMINANTS OF CONCERN

- Pharmaceuticals
- Personal care products
- Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
- Polybrominated Diphenyl Ethers (PBDE) [flame retardants]
- Phytoestrogens
  - Occur naturally, released by plants (ex: red clover)
  - We have changed the landscape and concentrated certain plants
- Sun screen (oxybenzone)
- Microplastics (< 5mm)
  - Primary – manufactured small
  - Secondary – fragments of larger plastic debris
- Protons (coastal and estuarine acidification)

Many of the above detected in/around Delaware
The DE Office of Drinking Water oversees public systems
- >= 15 service connections or serves > 25 people 60+ days/year

Standard parameters routinely collected (coliform, nitrates, chlorine, iron, pH)

EPA publishes Contaminate Candidate List (CCL) every 5 years

Data collected through the Unregulated Contaminant Monitoring Rule (UCMR)
- In 2013-2015, public water systems were sampled
  - 701 contaminants detected in DE
  - 2018-2020 next round

EPA uses data to make a regulatory determination on at least 5 contaminants on the list

A maximum contaminant level (MCL) and maximum exposure guidelines get released

Data posted in the National Contaminant Occurrence Database
BMPS

- Urban stormwater BMPs generally very good at removing urban toxic contaminants
  - Most have sediment-like properties
  - Accumulation in BMP sediments over time; ok?
- Shift to conservation tillage has changed herbicide usage
  - Still routinely detected in surface waters, rarely detected in groundwaters, aquatic life criteria not exceeded
- Biogenic hormones being phased out of animal feeding operations due to social messaging on food quality and safety
  - Buffers, wetland, lagoons effective at removing in runoff
- Also phasing out routine use of antibiotics
  - No conventional BMPs remove antibiotics; very persistent, hydrophillic, and soluble; can degrade soil microbial communities and reduce denitrification rates when waste land applied
RESEARCH NEEDS

- **Fate/transport,**
  - All media (water, sediment, & tissue) to understand total exposure
  - Seasonality, storms
  - Groundwater lag time an issue for these chemicals too
- **Effects**
  - Some species more sensitive than others, even within taxa
  - Very small amounts (nanograms/liter) can have a biological effect
  - Subcellular responses observed in minutes/hours; cellular in hours/days; organisimal in weeks/months; population in years/decades
- **Inter-relationships (cocktails)**
- **Are replacements / alternatives safer?**
- **“Emerging concerns related to known contaminants”**
OTHER NEEDS

- Communication to public about
  - These contaminants,
  - Their sources,
  - Pathways,
  - Potential impacts
- Social movement to drive alternatives, bans
  - Consumer choice decisions
- Citizen scientists to collaborate on microplastics
EMERGED ONLINE

- https://www.inlandbays.org/events/emerged-symposium/
- Agenda
- Speaker Bios
- Presentations and Posters
  - (No USGS presentations allowed; working on getting abstracts posted instead)
WHAT’S NEXT?

- Most relevant information for Inland Bays?
- What follow up should be done?
- Research priorities?
- Recommendations?