F I N A L

NJ Water Monitoring Council

Measuring What Counts for Clean & Plentiful Water

January 21, 2016
MEETING MINUTES

Member Attendees

NJDEP – *WM&S*: Leslie McGeorge, Alena Baldwin-Brown, Bill Heddendorf, Brian Henning, Helen Pang, Vic Poretti *DWS&G* – Jeff Hoffman, Ray Bousenberry *DSREH* – Sandra Goodrow, Nick Procopio C&*LUP* – Danielle Donkersloot
NJDOH – Doug Haltmeier
USGS – Bob Reiser, Heather Heckathorn, Tom Imbrigotta, Pam Reilly
USGS (retired) –
DRBC – Tom Fikslin
EPA R2 – John Kushwara
IEC – Robin Jazxhi
NJ Pinelands Commission –
NJ Water Supply Authority – Sarah Helble
Rutgers (Coop Extension Service) – Lisa Galloway Evrard
Rutgers (IMCS) –
Rutgers (Env. Bioengineering) – Eric Vowinkel
Montclair University –
Monmouth University/Urban Coast Institute – Jim Nickels
Stockton College –
Meadowlands Environmental Research Institute –
NOAA –
Monmouth County Health Dept – David Sorenson
Barnegat Bay Partnership – Jim Vasslides
Stony Brook-Millstone Watershed Association – Erin Stretz
Musconetcong Watershed Association –
Raritan Headwaters Association – Angela Gorczyca
Great Swamp Watershed Association –
NJ Harbor Dischargers – Ashley Slagle
Brick Township MUA – Rob Karl, William Ruocco

Guest Speakers/Discussion Leaders

Joe Bilinski – NJDEP/DSREH
Ed Furlong – USGS (via Webex)
Josh Kogan – EPA R2 (via phone)
Ron MacGillivray - DRBC
Mike Meyer – USGS
Brian Pachkowski – NJDEP/DSREH
Lori Pillsbury – OR DEQ (via Webex)
Blaine Snyder – TetraTech
Tim Wilson – USGS NJWSC

Other Attendees

F I N A L

Lisa Carper – USGS NJWSC
Chris Kunz – NJDEP/DWM&S
Lee Lippincott – NJDEP/DSREH
Kelly O'Day – Retired Engineer/Private Citizen
Lisa Oberreiter – NJ Harbor Dischargers Group
Bruce Ruppel – NJDEP/DSREH
Mara Tippett – NJ Watershed Ambassador
John Yagecic - DRBC

- **Council Business (**Copies of the agenda, minutes and many of the information updates and presentations are available on the Council's webpage, under "Meeting Information" - **http://www.state.nj.us/dep/wms/wmccmeetinginfo.html)**

- Minutes from the 09/23/15 Council meeting were approved.
- The next meeting will be May 19 at the Stony Brook Millstone Watershed Association. The Technical Theme is Wetlands Monitoring. Suggested wetlands presenters/presentations include DEP/State Forestry Service, Mid-Atlantic Wetlands Condition Assessment (MAWCA), wetlands monitoring & citizen science, National Wetlands Condition Assessment, and National Coastal Wetlands Conservation Grant monitoring. Additional ideas should be sent to Leslie, Bob or Alena. Potential technical topic for the September meeting is sediment monitoring.

- Information Updates, Presentations and Announcements:
  1. *Membership Updates* – **Replacement Member**: Cheryl Yao (MERI) has replaced Christine Hobble on the Council.

  2. *Announcements* – 1. Leslie announced that Pat Gardner is now the Director of NJDEP's Division of Water Supply & Geoscience, Bruce Friedman is the new Director of the Division of Water Monitoring & Standards and Bob Schuster is Interim Chief of DWM&S' Bureau of Marine Water Monitoring. 2. Leslie also announced that two Council member organizations - Stony Brook Millstone Watershed Association & Raritan Headwaters Association - had received 2015 Governor's Environmental Excellence Awards. SBMWA's award was for its new LEED Platinum facility, and RHA received an award for its water quality monitoring program. 3. Chris Kunz (chris.kunz@dep.nj.gov) shared a handout of the current fresh and marine water-related toxics monitoring being conducted by NJDEP – both as part of routine networks as well as projects and/or capabilities [Note: handout attached at back of this document]. 4. Josh Kogan spoke briefly about EPA's Trash Free Waters Initiative, which is a rebranding of the Marine Debris Program. Its charge is to eliminate land-based trash discharge to surface waters via permit guidance, floatables, research, and capacity building through partnerships. Questions about the program can be directed to Josh at: Kogan.Joshua@epa.gov. 5. Pam Reilly announced the publication of several new reports as well as the establishment of a listserv to provide this type of information routinely. Anyone wishing to be put on the listserv should email Pam at: jankowsk@usgs.gov.

  3. *National Water Monitoring Information from the National Water Quality Monitoring Council (NWQMC - http://acwi.gov/monitoring/)* – Leslie McGeorge and Danielle Donkersloot provided information from the December NWQMC meeting, including: a. an update on National Water Quality Portal progress and a new focus on web service tools for data discovery and data characterizations ; b. a NWQMC webinar by USGS' Ted Stets on the evolution of water quality trends from the 20th century to the present as well as information on an upcoming cyanobacteria-related webinar by EPA R1's Hillary Snook. NWQMC webinars can be viewed at http://acwi.gov/monitoring/webinars/index.html); c. an update on the 2016 National Water Monitoring Conference - abstract notifications are expected in February and nominations are being accepted for 3 awards (achievement/distinguished leadership, perseverance/significant contributions, and extraordinary vision/cooperation – note: Faith Zerbe, of the Delaware Riverkeeper Monitoring Network, received the Barry Long award for significant contributions); d. an announcement that articles are being sought for the 12th edition of the Council's newsletter (deadline for submission is March 4), and e. an update on the Citizen Science/Volunteer Monitoring activities, including progress on the Volunteer Monitoring Charter, the establishment of a Volunteer Monitoring Workgroup, and a request for NJWMC Volunteer Monitoring members to consider joining the workgroup.

4. *Barnegat Bay Research Results* – Joe Bilinski (DEP/DSREH) provided an overview of all of the recent DEP-funded Barnegat Bay research projects including overall goals for the research and how the research supports other areas of the Governor's 10 Point Plan (e.g., water quality standards/monitoring, education/outreach, and reducing watercraft impacts). Additionally, he shared information about each of the 10 projects that have been funded – purpose, preliminary &/or final results and further evaluation/action needed, where necessary. The projects encompass areas such as benthic macroinvertebrates, diatoms, hard clams, fish and crabs, stinging sea nettles, phytoplankton communities and harmful algal blooms, zooplankton communities, multi-trophic level modeling, wetland function and adaptation, and ecological evaluation of Sedge Island Marine Conservation area. Findings from this comprehensive initiative were initially presented at a Science Symposium held in November, to which stakeholders and other interested parties were invited. A communication plan for rolling out this information has been implemented, and an action plan for recommended management strategies derived from these studies is presently in development. Final reports for all projects (Years 1, 2, and 3) can be viewed on the Division of Science, Research & Environmental Health's Barnegat Bay Research website (http://nj.gov/dep/dsr/barnegat/final-reports/).

- **Session – Contaminants of Emerging Concern (CEC)**

A. *CECs: An Overview of the Issue & New Developments in Environmental Understanding* – Ed Furlong (USGS)

Ed Furlong provided an overview of CECs including the various types of contaminants that can be encompassed under the term "CEC", including pharmaceuticals, insecticides, fragrances, detergents, disinfection by-products, pathogens, Perfluorinated Compounds (PFCs), fire retardants, and algal toxins, etc.. He explained that CEC source-to-receptor research has been ongoing since 1998 and, as a result, there have been many publications on this topic. Studies have focused on both national as well as site-specific occurrence. CECs are also now being incorporated into the USGS NAWQA program. CECs are found in both surface and ground water, although studies have shown that higher CEC concentrations are more typically found in surface waters than in ground water. Sources include both human and animal. Human activities include use of pesticides, personal care products, pharmaceuticals and cleaners, among others. As such, Wastewater Treatment Plants can be substantial proximate sources of CECs depending on plant technology, types of influent received, and temporal/hydrologic/population variability. CECs are also found in both finished & unfinished drinking water, and some may be formed as disinfection by-products. Ed shared that several journal articles related to CECs in drinking water are expected to be published in the Spring. While additional studies have been done on the occurrence, fate and transport of CECs as they travel from wastewater plant to drinking water plant, Ed emphasized that effects-related research (esp. on stream dwellers) is an area where additional information is needed.

B. *Oregon's Statewide Toxics Monitoring Program: Water Column, Tissue & Sediment* – Lori Pillsbury & Aaron Borisenko (OR DEQ)

Lori Pillsbury and Aaron Borisenko shared information regarding Oregon's (OR) Water Quality Toxics Monitoring Program. The program, which began in 2007, is designed to monitor and interpret levels of toxics in OR's aquatic environment. This statewide program currently uses targeted sampling to: determine the presence and concentrations of toxic chemicals, identify chemical sources, present information to the public and look for chemical reduction opportunities in the environment (not just in water). It also incorporates both fish tissue and sediment. Sampling uses a rotating basin design approach due to the state lab capacity. In 2015, a statewide water quality toxics assessment was completed and is available on the OR DEQ website (http://www.deq.state.or.us/lab/wqm/toxics.htm). 177 sites are contained in the sampling program which are analyzed for >500 analytes, including: consumer products, current use and legacy pesticides, flame retardants, PCBs/dioxins/furans, combustion by-products, metals, industrial intermediates and steroids and sterols. The program may pursue adding probabilistic sampling in the future. Data from the program are used for water quality assessment (305(b) and 303(d)), identifying emerging contaminants and related issues, developing fish consumption advisories (done by OR Health Authority), NPDES permitting, to focus stakeholder & partner efforts, to inform other internal/external monitoring efforts, and as part of OR DEQ's Toxics Reduction

Strategy. Future plans include expanding the analytical suite to include glyphosate, alkyl phenols, additional current use pesticides and additional pharmaceuticals, as well as combining the 2017 statewide lakes assessment with the EPA National Lakes Assessment to provide greater toxics monitoring in lakes.

C. Pharmaceuticals in Wastewater Effluent in NJ – Tim Wilson (USGS NJWSC)
Tim Wilson summarized a2010 study to ascertain whether or not wastes from pharmaceutical producing plants and hospitals are major contributors of active pharmaceutical ingredients and CECs to sewage treatment plants (STP), both in wastewater entering and leaving the STPs. Tim explained that the project encompassed 5 sewer sheds in 3 counties (which contained residential, retirement, commercial, hospital, industrial, industrial with with pharmaceutical processing and other sewer sheds), measured the inflow and outflow from 3 major WWTPs and also looked at the wet and dry biosolids produced at these WWTPs. Compounds analyzed included pharmaceuticals, fragrances/flavors, sterols, detergent metabolites/flame retardants/plasticizers, sterols, pesticides/fungicides and PAHs. Data analyzed included presence/absence, concentrations vs. molar abundances, and molar ratios of pharmaceuticals to human waste indicators. Results showed concentrations and suites of major pharmaceuticals are similar in raw wastes and STP inflows (differences often exist in the trace compounds), STP outflow differs in both concentration as well as compound suite from raw effluent (however, a number of pharmaceuticals are still present in outflow effluent), and biosolids can contain elevated concentrations of both pharmaceuticals and active pharmaceutical ingredients. Planned further work includes studying sampling of mid-size STP inflow/outflow and evaluation of different treatment systems, completing the review of new antibiotics and (possibly) hormones in waste samples, and an evaluation of sediment phase composition in STP effluent.

D. Antibiotics in the HoHoKus Brook – Mike Meyer (USGS)
Mike Meyer shared information from nationwide studies on antibiotics in streams as well as a study, requested by the former NJDEP Division of Watershed Management, designed to look at sources and occurrence patterns of antibiotics and their distribution in the HoHoKus Brook. Nationwide, sources of antibiotics include WWTPs, CSOs, on-site septic systems, livestock & aquaculture, pharmaceutical & medical discharges, orchards, and land application of biosolids as fertilizer. Studies have shown that multiple types of antibiotics are being released from each of these sources, with elevated levels of some antibiotics still detectable in surface waters downstream of WWTPs. Additionally, some antibiotics - because of their physical-chemical characteristics - will adsorb to sediment. In NJ, in 2008, 9 sampling stations downstream on WWTPs on both the HoHoKus Brook and Saddle River (in the Saddle River Watershed) were sampled for variation in antibiotic concentrations. Results showed antibiotic concentrations of <1.0 µg/l in surface water samples and <1 to 44 µg/kg in bed sediment samples. A literature review shows these results are typical for stream locations downstream of WWTP's.

E. Extent of Known PFC/PFA Occurrence in Public Drinking Water Systems – Sandra Goodrow provided an overview of poly- or perfluoralkyl substances (PFAs, also referred to as Perfluorinated Compounds or PFCs) as emerging contaminants. She explained that PFAs are highly water soluble, repel oil and water, are chemically and thermally non-reactive, and occur in groundwater, surface water and finished drinking water. They are or have been used in the manufacture of non-stick cookware, waterproof/breathable clothing, chemical/heat resistant industrial uses, water/stain resistant coatings for carpet & upholstery, grease proof food packaging, and aqueous firefighting foam.. They have been the subject of much recent study because they are extremely persistent and pose potential health threats to both humans and animals from exposure via drinking water – NJ was the first state to conduct statewide PFA occurrence studies. PFOA, PFNA, PFOS, and PFHxS are currently the PFAs of most potential concern in drinking water; however, US manufacture of these compounds has either stopped or is being phased out, while similar replacement compounds are being created and put into use. Currently in NJ, there is an Interim Ground Water Quality Standard of 10ng/L for PFNA and a 2007 Health Based Drinking Water Guidance Level of 40ng/L for PFOA. Sandra also explained the various methods used for PFA removal from both ground water and drinking water.

F. BTMUA's Watershed Trackdown for PFCs – Rob Karl (BTMUA)

Rob Karl summarized a study, conducted by Brick Township MUA (BTMUA), that was designed to trackdown the source of elevated PFOA levels in the Metedeconk River. Rob explained the genesis of the study (elevated levels of PFOA found in BTMUA's source water inflow) and the desire to either identify and eliminate the source(s) or, if that was not possible, pilot treatment techniques at BTMUA to remove the PFCs. He shared the sampling that was done to narrow down the target area to a portion of the S. Branch of the Metedeconk River, the additional investigations that occurred to further refine the potential source(s) of the contamination, the use of an EPA lab to confirm the age of the contamination and confirm that the PFCs were coming from an older manufacturing source. From this and additional information, the likely source(s) were able to be identified. Rob also indicated that, since 2010, BTMUA has been able to keep finished drinking water PFOA levels below the NJDEP 40 ng/L health based drinking water guidance level.

G. Perfluorinated Compounds (PFCs) in Delaware River Surface Water & Fish Tissue – Ron MacGillivray (DRBC)

Ron MacGillivray shared information regarding work that DRBC has done related to PFCs in Delaware River surface water and fish tissue. Surface water sampling was conducted at 6 sites in 2007, 2008, 2009 and 15 sites in 2015. Overall, results showed that concentrations of both some of the longer chain PFCs (PFUnA, PFDA, PFNA and PFOA) as well as the shorter chain PFCs (PFBA, PFPeA, PFHxA and PFHpA) were decreasing in surface water, albeit some less so than others. There is a need for more assessment values for both human health and aquatic life (e.g., water quality criteria, guideline values or benchmarks of safety). Comparison of PFCs in other surface waters indicates that there may be local sources of PFCs in the Delaware River. Fish tissue sampling occurred between 2004-2015 at 4 sites in the non-tidal portion of the river, and at 5 sites in the tidal portions. Target species were smallmouth bass and white sucker in the non-tidal portions and white perch and channel catfish in the tidal areas. Overall, results showed that concentrations of PFNA and PFUnA appear to be decreasing, PFDA may be slightly decreasing, but there is no decrease for PFOS. However, concentrations of PFCs in resident fish of the Delaware River vary by species, sample location and sample year. Next steps include continuation of surface water quality assessments, comparison of 2015 fish data (when available) to previous years, and initiation of sediment sampling in 2016, as well as fish sampling in Delaware Bay (target species: striped bass, blue fish, weekfish and white perch).

H. PFCs in Fish: What We Learned from EPA Probability-Based Surveys of US Urban Rivers and the Great Lakes – Blaine Snyder (TetraTech)

Blaine Snyder provided a summary of EPA's National Aquatic Resource Surveys related to PFCs in fish. He explained that the 2008-2009 National Rivers & Streams Assessment (NRSA) and the 2010 National Coastal Condition Assessment (NCCA) in the Great Lakes were the first time that there was a nationally (& regionally) representative assessment of PFCs in freshwater fish, using a statistically based sampling design. Results showed that, with NRSA, 80% of the river samples collected showed some detectable PFCs, with PFOS being the most frequently detected in 73% of the samples (i.e., fillets from predator species, primarily largemouth and smallmouth bass). In the Great Lakes, during NCCA, 100% of samples collected showed some detectable PFCs and, again, PFOS was the most frequently detected in 100% of the samples (i.e., fillets from predators, predominately lake trout, smallmouth bass and walleye). The indication is that PFOS appears to have the highest bioaccumulation in foodwebs and that the highest PFOS values are in top carnivores in large urban rivers and the Great Lakes. There are currently no national risk-based consumption limits or human health screening values for PFCs. However, EPA has subsequently proposed draft human health reference doses for both PFOA and PFOS that are currently under review. EPA HQ is also interested in fish consumption advisory guidance as well as more fate and transport information.

I. Microplastics as Contaminants of Emerging Concern – Brian Pachkowski (DEP/DSREH)

Brian Pachkowski presented an overview of microplastics including what they are, where they are found, what are their potential ecological and human health implications, as well as their impacts on NJ. Microplastics (<5mm) can be microbeads, fragments and/or fibers. Nanoplastics are even smaller (<0.1µm) but their presence in the environment is unknown due to limited sampling technology. Sources include manufactured microplastics or microbeads (personal care products, media for air blasting machinery or boat hulls, pre-

production plastics), secondary microplastics (degradation of larger plastics), and shedding of synthetic fibers during clothes washing. Microplastics have been found worldwide mostly in aquatic environments (oceans, artic sea ice, freshwater rivers and lakes, sediment, etc.). They have also been found in species consumed by humans (bivalves, finfish, etc.) as well as via table salt, raising the possibility of adverse health effects. There are large pieces of plastic debris in NJ waters which could be due to population density or proximity to large cities (NYC, Philadelphia) that could degrade into microplastics. While the impact of microplastics in NJ is unclear, in March 2015, NJ became the second state to pass a law banning non-biodegradable microbeads from personal care products; the law becomes effective in January 2018. Other states with similar bans include Illinois, Colorado, Maine & Wisconsin. Additionally, the Public Health Subcommittee of the NJ Science Advisory Board investigated the potential human health effects of both micro and nanoplastics and the final report is available on the NJDEP website - http://www.state.nj.us/dep/sab. Nationally, in December 2015, the federal Microbead-Free Waters Act of 2015 was signed which bans manufacture and use of microbeads. This will be effective in July 2017. [Note: Discussion after the presentation included questions regarding whether or not the topic of microplastics and their uptake by shellfish is on FDA's radar as an issue yet.]

J. Monmouth University's Microplastics Monitoring in Raritan Bay – Jim Nickels (MU)
Jim Nickels summarized his participation in a NY-NJ Harbor microplastics study, funded by the NY/NJ Baykeeper. The goals of the study were to: measure the concentrations of microplastics in the NY/NJ Harbor; and document the sizes of the plastics that were found. Jim performed the sampling for the study and, as such, described use of a 0.33 mm Manta Trawl to capture various types and sizes of microplastics. Categories of plastics found were foam, fragments, film, line and pellets; foam was the most abundant type found. Approximately 85% of the particles were categorized as microplastics (<5mm). The final report on the study is available at: http://nynjbaykeeper.org/wp-content/uploads/2016/02/NYNJBaykeeper-Plastics-Report-February-2016.pdf.

- **Technical Topic for Next Meeting**
  Wetlands Monitoring

- **Next Meeting**
  May 19 at Stony Brook- Millstone Watershed Association

F I N A L

Gaps/Needs Related to Contaminants of Emerging Concern

- Summarize existing NJ CEC data
- Toxicity associated with CEC compounds
- Pesticides in coastal waters
- Toxics monitoring in lakes
- Routine monitoring of pharmaceuticals in waters – which are the best indicators? Need to prioritize which waters to monitor (ground water-urban areas with septic, Surface water downgradient from Sewage Treatment Plants, etc.)
- Impacts of microplastics on ecosystems, including biomagnification to humans
- PFC treatment and removal
- PFC toxicity data needed
- Toxicity/health effects of replacement PFCs
- PFC-related fish consumption advisories
- Need for more PFC-related fate & transport information in soil, surface water and groundwater
- More information needed as to whether precipitation is an important contributor of PFCs to surface water
- Microplastics – rate of degradation and factors that promote degradation
- In need of microplastics research on fish tissue and fish guts
- More CEC effects-related research needed (esp. on stream critters and aquatic ecosystems)
- More information needed on the occurrence and environmental behavior of hormones & opioids

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Additional Gaps that were suggested by DEP/NJGWS after the January 21 meeting:

- Need for more PPCP-related fate & transport information in soil, surface waters and groundwater. For PPCPs this can become complicated for several factors (pH, organic matter etc.) impact the sorption, degradation and transport of the compounds and each compound (or class of compound) reacts to the different factors in a different manor. There may need to be multiple small studies.
- PPCP treatment and removal
- More information needed as to whether precipitation is an important contributor of PFCs to groundwater - atmospheric deposition impacts ground water quality as well, like chloroform in undeveloped areas
- Investigate PPCP-related fish consumption advisories as well as PFCs?

CURRENT TOXICS MONITORING CONDUCTED BY NJDEP (Bureau of Freshwater and Biological Monitoring, Bureau of Marine Water Monitoring, New Jersey Geological and Water Survey)

AMBIENT SURFACE WATER QUALITY MONITORING NETWORK

Network Lead: Bureau of Freshwater and Biological Monitoring and United States Geological Survey

Partners: New Jersey Water Supply Authority, Bureau of Environmental Analysis, Restorations and Standards, Division of Water Quality, Site Remediation Program

Network Information

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics Monitored
Water Column (Fresh water rivers and streams)	Statewide	123; 73 fixed sites, 50 probabilistic sites	Fixed sites; none Probabilistic Sites: reselection of 50 every two years	2 times per year for ~25 sites	Trace Metals, Pesticides
Sediment (Fresh water rivers and streams)	Statewide	123; 73 fixed sites, 50 probabilistic sites	Fixed sites; none Probabilistic Sites: reselection of 50 every two years	Once per year for ~20 sites	Trace metals, PAHs, total PCBs

Contact for Additional Information: Chris Kunz (BFBM) chris.kunz@dep.nj.gov

HUC14 MONITORING PROJECT

Network Lead: Bureau of Freshwater and Biological Monitoring

Partners: Bureau of Environmental Analysis, Restoration and Standards

Network Information

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics Monitored
Water Column (Fresh water rivers and streams)	Specific Water Regions (currently Lower Delaware and Atlantic)	39	2 years	2 times per year	Trace Metals

Contact for Additional Information: Chris Kunz (BFBM) chris.kunz@dep.nj.gov

REGIONAL TARGETED WATER QUALITY NETWORK

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics Monitored
Water Column (Fresh water rivers and streams)	Specific Water Regions (currently Lower Delaware)	13	2 years	4 times per year	Trace Metals

Contact for Additional Information: Alex Dinkel (BFBM) alexander.dinkel@dep.nj.gov

AMBIENT GROUND WATER QUALITY MONITORING NETWORK

Network Lead: New Jersey Geological and Water Survey

Partners: Bureau of Freshwater and Biological Monitoring, United States Geological Survey

Network Information

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics Monitored
Shallow Ground Water	Statewide	150	3 years (~ 50 wells per year)	Once per year	Volatile Organic Compounds, Pesticides, Radionuclides, Trace Metals

Contact for Additional Information: Ray Bousenberry (NJGWS) Raymond.bousenberry@dep.nj.gov

FISH TISSUE MONITORING NETWORK

Network Lead: Bureau of Freshwater and Biological Monitoring, Division of Science, Research and Environmental Health

Network Information

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics Monitored
Fish Tissue (Fresh water rivers and lakes)	Statewide targeted (rivers and lakes) Probabilistic(lakes only)	Statewide targeted=100 Probabilistic=50	Rotating basin approach for statewide targeted (2014-Raritan, 2015 Atlantic, 2016-Lower Delaware, 2017 Northwest, 2018-Northeast	Once per year	Mercury, Pesticides, PCBs, PBDE, PFAS (future)

Contact for Additional Information: Brian Henning (BFBM) brian.henning@dep.nj.gov

LAKES MONITORING NETWORK

Network Lead: Bureau of Freshwater and Biological Monitoring

Network Information

Media	Area of Interest	Total # of Sites in Network	Rotation	Sampling Frequency (for toxics)	Toxics/Toxins Monitored
Fresh water lakes, ponds and reservoirs	Statewide Probabilistic	250	25 per year	Once per year	Microcystins, Cylindrospermopsin, Anatoxin-a
	Regional Targeted (currently Lower Delaware)	40 (8 per Water Region)	2 years	1-2 times per year	Microcystins
	Statewide Reference	10	none	2-3 times per year	Microcystins

Contact for Additional Information: Johannus Franken (BFBM) johannus.franken@dep.nj.gov

*Monitoring Information does not include NJDEP participation in National Aquatic Resource Surveys administered by USEPA. Information on National Aquatic Resource Surveys is available at http://www.epa.gov/national-aquatic-resource-surveys

OTHER PROJECTS/CAPABILITIES

- BFBM/USGS did collect volatile organic compounds in freshwater rivers and streams from 1998-2005 as part of the Ambient Surface Water Quality Monitoring Network.
- BFBM can accommodate add on parameters in many of its current networks and projects as it has in the past (i.e. perchlorate)
- Although part of routine now, low level Hg was monitored for special studies in 2005, 2007, 2009 and 2010.
- BFBM has capacity to analyze for cyanotoxins in fresh water rivers and streams
- BMWM: Shellfish samples collected for analysis of metals, pesticides and PAH's, between 2005-2009 from New Jersey waters; showed no violations of FDA criteria for human consumption. A total of 125 locations were visited and resource was found at 89 stations. The stations covered the New Jersey Marine waters and included tissue analysis for both oyster and hard clams.
- BMWM has the capability to analyze Marine algal toxins for ASP, DSP, and PSP.
- BMWM has secured funding to add Statewide fish tissue and shellfish tissue sampling in 2016. Will be testing for PCB's, metals and pesticides.