Delaware River Basin Commission
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

Monitoring Fact Sheet

Point Source Nutrient Monitoring in the Delaware Estuary

Overview

The Delaware River Basin Commission serves as the lead agency for developing nutrient and/or nutrient-related criteria for the Delaware Estuary. Since 2008, the Commonwealth of Pennsylvania and the states of Delaware and New Jersey have been working with the DRBC and with representatives of industry, municipal dischargers, academic researchers, environmental groups, and the Federal government to identify appropriate actions and efforts in this nutrient criteria process. Because of elevated nutrient conditions in the estuary and because the Delaware Estuary continues to see depressed dissolved oxygen in the urban corridor, advisory committee members have agreed that quantifying the current loads of nutrients and oxygen depleting materials to the estuary is a critical first step. To this end, the Commissioners approved resolution #2010-5 on July 14, 2010, authorizing the Executive Director to require nutrient monitoring for 2 years from estuary discharges. Although nutrient loadings to the estuary arise from both point source facilities within the estuary and from point and non-point sources throughout the watershed, the focus of this Fact Sheet is on the point source monitoring authorized under resolution #2010-5.

The information below provides the details on the monitoring effort, the parameters that will be monitored, the frequency of monitoring, and how the data will be used. In addition, because the monitoring requirement has arisen through the committee process at DRBC, we encourage facility representatives to contact DRBC and/or the industrial, municipal, academic, environmental, or government representatives on the Water Quality Advisory Committee with any questions or information requests (see http://www.state.nj.us/drbc/wqac_list.htm for members' contact information).

Why Are Nutrients Being Monitored?

The Delaware Estuary has both high loadings and high concentrations of nutrients relative to other estuaries in the United States. The effects from these high nutrients are not well-understood, but monitoring in the estuary shows many signs of poor ecological health, including a persistent summer dissolved oxygen sag in the urban corridor of the estuary. Many stressors affect the Delaware Estuary, and high nutrient loading is one of the main candidates for understanding the estuary's poor health. Nutrients and nutrient-containing compounds can directly affect ecological conditions, and excessive nutrients can stimulate excess algal production that then causes dissolved oxygen depression when the excess algae decays. In addition, the USEPA has prioritized nutrient criteria development in the United States for over 10 years, with states, inter-states, and tribes serving as the lead agencies for understanding how nutrients function in their aquatic systems and what nutrient loadings and/or concentrations are needed to sustain healthy biological conditions long-term.

For the Delaware Estuary, it has long been understood that point source facilities exert a strong influence on the ecology of the estuary. Yet the magnitude of this influence has not been quantified for

many parameters such as nutrients, and without quantitative data there have been varying estimates and speculation about the importance of these point source facilities. In order for policies on the estuary's water quality to be based on rigorous scientific information, all stakeholders involved in the nutrient criteria process have recognized that current and accurate measurements of nutrient loadings are needed (both point and non-point). The watershed loadings via point and non-point sources are being monitored through separate efforts. The effort described herein pertains to quantifying the point source contribution from NPDES discharges to tidal waters of the Delaware Estuary.

What Parameters Are Being Monitored, and At What Frequency?

The main focus of the monitoring will be on nutrient parameters, although oxygen-demand parameters and effluent conditions will also be included in the monitoring requirement. The following is the list of parameter that each facility will need to monitor.

- → **Phosphorus:** Total Phosphorus, Soluble Reactive Phosphorus (SRP)
- → **Nitrogen:** Ammonia, NO_3, NO_2, TKN, SKN
- → **Ancillary Lab:** BOD_5, $CBOD_5$, BOD_{20}
- → **Ancillary *In Situ*:** Discharge flow (Q), Temperature, D.O., Conductivity, pH

Most parameters will be monitored for whole-water effluent, but the following parameters will need to be monitored on a filtered sample (0.45 μm filter): Ammonia, Soluble Reactive Phosphorus, and Soluble Kjeldahl Nitrogen (SKN). *{note: Ammonia will be monitored on both filtered and unfiltered samples}*

Because the larger point source facilities dominate the total effluent discharge to the estuary, larger facilities will be required to conduct more frequent nutrient monitoring. For those facilities discharging less than 1 MGD, monitoring will be required quarterly for 2 years. For those facilities discharging more than 1 MGD, monitoring will be required monthly for 2 years. Across the estuary, there are 67 smaller and 47 larger nutrient-related discharges, with the larger discharges composing approximately 98% of the effluent flow volume.

In addition, BOD_{ult} will be monitored only by the 21 discharges with the largest estimated BOD loads, and this monitoring will be conducted twice during the two year effort (winter of 2012-2013 and summer of 2013). Furthermore, because BOD_{ult} cannot routinely be measured by existing labs in the region, a working group from DRBC's Water Quality Advisory Committee will convene to identify the specifics for the method, the labs, and the nutrient monitoring for these BOD_{ult} tests.

How Will The Data Be Used?

The primary purposes for these data are to identify the absolute and relative loading of point sources, to guide the set-up and parameterization of a water quality model for the Delaware Estuary, and to quantify the relative contributions of point and non-point sources of nutrients to the estuary. In addition, these data will guide future monitoring efforts and requirements, including which facilities will be monitored during the water quality model calibration.

Additional Details

- **Costs**: The monitoring costs will depend on the parameters currently being monitored at each discharge, the availability and use of in-house laboratories versus contract laboratories, and the cost of labor. Preliminary cost estimates based on contract laboratory rates are $500/year for smaller facilities monitoring quarterly and $1500/year for larger facilities monitoring monthly.

- **Additional Data**: Each facility will be requested to submit effluent data for POC, TSS, and Ammonia already being collected at the discharges covered by this monitoring request during the two year monitoring window. To provide a more accurate and complete characterization of the effluent for a facility, each NPDES permittee may also submit any and all data it feels will assist in characterizing its effluent quality.

- **Relation to NPDES DMR:** These DRBC nutrient monitoring requirements are separate from, and supplement, the current NPDES monitoring. Although the results from this effort should ***not*** be reported with the DMRs, the best approach for meeting these requirements may be to simply add these parameters to the existing NPDES sampling events.

- **Exemptions:** Discharges that contribute no additional nutrient load to the estuary will be exempt from these monitoring requirements (e.g., non-contact cooling water). In addition, outfalls that discharge only during wet-weather events (i.e., stormwater outfalls) will not be included in this monitoring program. Requests for exemptions should be directed to Dr. Erik Silldorff at the DRBC (ext. 234; erik.silldorff@drbc.state.nj.us).

- **Analytical Methods:** Analytical methods must be selected from the approved EPA methods listed at 40 CFR, Part 136 – Table 1B for wastewater samples (link available at www.nj.gov/drbc/nutrients/index.htm). Any alternative analytical methods must be approved by the Executive Director, based upon a showing of method comparability quantified with split-sample tests. All samples must be analyzed by a lab certified by the National Environmental Laboratory Accreditation Conference (NELAC) or by a state certification program. However, the analytical lab need not be certified for each of these specific parameters (e.g., no certification is available for $CBOD_{20}$).