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February 14, 2024

MEMORANDUM

TO: Anna Truszczynski, PhD

FROM: Elizabeth A. Booth, PE, PhD
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RE: Update to the Strategy for Addressing Phosphorus in NPDES Permitting

Clean water is important to Georgia's environmental and economic vitality. Our citizens, industries (including the tourism industry), and aquatic life depend on clean water. Controlling nutrients, particularly phosphorus, is a critical part of protecting our water resources.

Phosphorus is the primary pollutant associated with the eutrophication of Georgia's surface waters. Excess phosphorus can cause nuisance algal blooms and reduced transparency which may make waters unsuitable for swimming or other recreational activities. Algal blooms can also cause taste and odor problems in drinking water. Excess algae can also affect the dissolved oxygen resources in a waterbody and impair biology.

Phosphorus comes from both point and nonpoint sources. Point sources consist mainly of Publicly Owned Treatment Works (POTW) and Non-POTW wastewater treatment plant discharges. Nonpoint sources include runoff from agricultural fields, feedlots, urban areas, urban construction sites, and on-site sewage treatment systems. With respect to nonpoint phosphorus loads entering State waters, the Georgia Environmental Protection Division (EPD) works with the Georgia Department of Agriculture; the University of Georgia Cooperative Extension Service; the Environmental Quality Incentives Program through the Natural Resource Conservation Service; the Resource, Conservation, and Development (RC&D) Councils; and the Georgia Soil and Water Conservation Commission to develop and implement ideas for managing phosphorus from agricultural lands and urban landscapes. EPD also works with the Georgia Forestry Commission to develop ideas to manage phosphorus from forested areas.

Regulatory Framework

Since the early 1990s, Georgia has been concerned about the effect of phosphorus on rivers and lakes. In 1990, the Georgia General Assembly passed a phosphorus detergent ban (OCGA 12-5-27.1), and the Lake Law, which required site-specific nutrient and chlorophyll *a* water quality standards on lakes greater than 1000 acres (OCGA 12-5-23.1). The following year, a law was passed requiring a total phosphorus permit limit of 0.75 mg/L for all discharges to the Chattahoochee River between Burford Dam and West Point Lake (OCGA 12-5-23.2). The General Assembly later passed legislation that all new permits issued after January 1, 2001, discharging in excess of 3 million gallons per day (MGD) are required to meet a minimum phosphorus limit of 0.30 milligram per liter (mg/L) (OCGA 12-5-29 (d)(2)).

EPD is required to issue permits that protect human health and aquatic life. Based on the nature of a waste stream or of the treatment process, point source discharges may have the reasonable potential to discharge total phosphorus in quantities that may cause or contribute to algae blooms, eutrophication, and violation

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of nutrient criteria. Hence, where appropriate, EPD includes effluent limits for total phosphorus in point source wastewater National Pollutant Discharge Elimination System (NPDES) permits to protect the instream water quality standards.

Federal regulations at 40 C.F.R. § 122.44(d)(1)(i) state, "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." NPDES permit writers conduct quantitative reasonable potential analyses using effluent data, receiving water data and modeling techniques. Watershed and lake models that include both point and non-point source loads will be used to determine the total phosphorus permit limits necessary to meet the instream narrative and numeric nutrient criteria. These models, using data characterizing the effluent and receiving water will make up the quantitative analysis used to assess whether the discharge would cause, have the reasonable potential to cause, or contribute to an excursion of water quality standards. If it is projected by the model that the concentration in the receiving water under critical conditions will exceed the applicable criterion, then there is reasonable potential and water quality-based limits will be included in the permit.

The regulations at 40 C.F.R. §125.3(a) require NPDES permit writers to develop technology-based treatment requirements, consistent with Clean Water Act (CWA) section 301(b), that represent the minimum level of control that must be imposed in a permit. The regulation also requires permit writers to include in permits additional or more stringent effluent limitations and conditions, including those necessary to protect water quality. When analyzing the effect of a pollutant in the discharge on the receiving water, an NPDES permit writer could find that technology-based effluent limitations (TBELs) alone will not achieve the applicable water quality standards or protect downstream users. In such cases, the CWA and its implementing regulations require development of water quality-based effluent limitations (WQBELs). WQBELs are included in permits in accordance with Georgia's water quality standards, reasonable potential procedures, wasteload allocations, and total maximum daily loads. Where numeric water-quality-based limits cannot be determined, best management practices may be used to control or abate the discharge of pollutants when numeric effluent limitations are infeasible, in accordance with 40 C.F.R. §122.44(k). Additionally, permit limits are retained in accordance with the federal regulations at 40 C.F.R. §122.44(l) and CWA section 402(o) which requires a reissued permit to be as stringent as the previous permit. Increases in pollutant loading may only be considered in NPDES permits in accordance with the State's antidegradation policy or the exceptions listed in 40 C.F.R. §122.44(l)(2)(I).

Updated Strategy

Since 2005 the Watershed Protection Branch has been implementing an unofficial strategy for addressing phosphorus loadings in State Waters. The strategy was officially signed in November 2011, and after more than ten years, it is time to update the strategy. Georgia EPD remains committed to adopting nutrient standards as outlined in "Georgia's Plan for the Adoption of Water Quality Standards for Nutrients."

The updated strategy has two key elements: 1) provide effluent phosphorus limits for all POTW facilities, and 2) maintain Total P loads upstream of lakes from all POTWs and Non-POTWs until an ultimate technology-based permit limit has been reached. This strategy is intended to define a framework for permitted point sources by outlining permit limits. The monitoring requirement in the previous strategy is being removed, since this requirement has been fully implemented by most POTWs and Non-POTWs that have reasonable potential to discharge Total P.

The implementation of this strategy will be associated with the permitting cycle and with basin/watershed management approaches. Phosphorus limits and phosphorus management will be evaluated as permittees request new or expanded treatment plant discharges, and for those not expanding, phosphorus limits will be evaluated as permits are reissued. As nutrient impairments are identified, water quality-based phosphorus limits will be established and implemented for discharges causing or contributing to the impairment through permit reissuance and/or permittee-initiated modification.

The strategy includes the following:

- General Strategy for All Waters
- Strategy for Waters Upstream from Lakes without Numeric Nutrient and/or Chlorophyll *a* Criteria
- Strategy for Discharges to Waters in Close Proximity to Lakes without Numeric Nutrient and/or Chlorophyll-a Criteria
- Strategy for Waters Upstream from Lakes with Numeric Nutrient and/or Chlorophyll *a* Criteria
- Strategy for Discharges to Waters Downstream from Lakes but Upstream from Estuaries
- Strategy for Discharges to Waters that flow into States with Instream Numeric Nutrient Criteria

General Strategy for All Waters

- POTW and Non-POTW NPDES wastewater dischargers may provide phosphorus data or design information as a part of the routine permit reissuance process. Based on the presence of nutrients (pollutants of concern) in the permit application, EPD may assign permit limits, increase monitoring requirements for total phosphorus and orthophosphate, and/or require a Comprehensive Nutrient Optimization Plan upon reissuance of a permit to evaluate phosphorus loadings.
- All NPDES permits for treated wastewater discharges will include monitoring requirements for orthophosphate if total phosphorus is present in the discharge.
- All new POTWs with flows greater than 3.0 MGD will be permitted at a maximum 0.3 mg/L total phosphorus based on OCGA 12-5-29. Per OCGA 12-5-29(d)(3), this provision does not apply to the reissuance of existing permits or permits for the expansion of existing facilities.
- New Non-POTWs with flows greater than 3.0 MGD will be permitted at a maximum of 0.3 mg/L total phosphorus based on OCGA 12-5-29, if the presence of phosphorus in the discharge exists based on the presence of nutrients in the permit application. Per OCGA 12-5-29(d)(3), this provision does not apply to the reissuance of existing permits, permits for the expansion of existing facilities, or permits for mining activities which use water for the transportation of materials.
- All stormwater NPDES permittees that have the potential to discharge total phosphorus are required, per 40 CFR §122.44(k), to implement Best Management Practices (BMPs) to reduce total phosphorus loads.
- Watershed Assessment and Protection Plans must include an analysis and discussion of potential nonpoint sources of phosphorus in the watershed.

Strategy for Waters Upstream from Lakes without Numeric Nutrient and/or Chlorophyll *a* Criteria

The main strategy for waters upstream from lakes is to maintain total phosphorus loads from all POTWs and Non-POTWs in order to meet the narrative nutrient criteria for all waters provided in 391-3-6-.03(5)(c). To be in agreement with the original total phosphorus permitting strategy, all new or expanding facilities will be given total phosphorus permit limits equivalent to 1 mg/L at 1 MGD or 8.34 lbs/day. This will be consistent with OCGA 12-5-29 (d)(2), where new facilities over 3 MGD are permitted with a total phosphorus limit of 0.3 mg/L.

- **All existing** NPDES permitted POTWs and Non-POTWs with the presence of phosphorus discharging upstream from a lake without numeric nutrient and/or chlorophyll *a* criteria will be given a facility-specific total phosphorus TBEL based on demonstrated performance, which is the 95th percentile of the existing discharge concentrations.
- **All new or expanding** major POTWs discharging 1.0 MGD or more of treated wastewater upstream from a lake without numeric nutrient and/or chlorophyll *a* criteria will be permitted at a concentration equivalent to 8.34 lbs/day total phosphorus or less, up to an ultimate treatment technology to protect the lake from algae blooms, eutrophication, and taste and odor problems.
- **All new or expanding** Non-POTW discharging treated wastewater upstream from a lake without numeric nutrient and/or chlorophyll *a* criteria will be permitted at a concentration equivalent to 8.34 lbs/day total phosphorus or less if the presence of phosphorus in the discharge exists.
- **All new or expanding** minor POTWs discharging less than 1.0 MGD of treated wastewater upstream from a lake without numeric nutrient and/or chlorophyll *a* criteria will be permitted at a concentration equivalent to 8.34 lbs/day total phosphorus or less, but not greater than a concentration of 5.0 mg/L to protect downstream waters.

Strategy for Discharges to Waters in Close Proximity to Lakes without Numeric Nutrient and/or Chlorophyll *a* Criteria

The following items apply to NPDES permittees discharging to or in close proximity (within 7 miles) of drinking water reservoirs (391-3-16-.01(6) & (7) Criteria for Water Supply Watersheds); lakes and other impoundments greater than 1000 acres; or Lakes Banks, High Falls, Rabun, Tugaloo, and Worth without numeric nutrient and/or chlorophyll *a* criteria:

- **All existing** NPDES permitted POTWs and Non-POTWs with the presence of phosphorus discharging to the areas described above will be given a facility-specific total phosphorus TBEL based on demonstrated performance.
- **All new or expanding** POTWs discharging treated wastewater to the areas described above will be permitted at a concentration equivalent to 4.17 lbs/day total phosphorus or less, but not greater than a concentration of 2.5 mg/L, to protect these waters from algae blooms, eutrophication, and taste and odor problems.
- **All new or expanding** Non-POTWs discharging to the areas described above will be permitted at a concentration equivalent to 4.17 lbs/day total phosphorus or less, if phosphorus is present in the discharge.

Strategy for Discharges to Watersheds Upstream from Lakes with Numeric Nutrient and/or Chlorophyll *a* Criteria

As of the date of this strategy, eight lakes (West Point, Walter F. George, Jackson, Lanier, Allatoona, Carter's, Oconee, and Sinclair) have site-specific water quality criteria for chlorophyll *a*. These chlorophyll *a* criteria were established based on a combination of point and nonpoint source loads. Watershed and lake models were used to predict the effect the combined total phosphorus loads discharged into the watershed have on chlorophyll *a* levels. Six of these lakes (West Point, Walter F. George, Jackson, Lanier, Allatoona, and Carter's) have site-specific nutrient criteria that include total nitrogen criteria in milligrams per liter and total phosphorus lake loading given in pounds per acre-foot volume per year. Major lake tributaries also have annual total phosphorus loadings established to maintain the phosphorus loads into each lake. Based on the Georgia's Nutrient Criteria Development Plan, lake criteria will be developed for all lakes greater than 1000 acres and for Lakes Banks, High Falls, Rabun, Tugaloo, and Worth. The watershed and

lake models will be used to evaluate the effect both point and non-point source nutrient loads have on these criteria. This strategy, in part, is intended to ensure these loads are not exceeded and the water quality is protected.

- The total permitted phosphorus loading from wastewater treatment facilities shall not exceed the total phosphorus loading allocated to point sources in the watershed used in developing the applicable lake criteria (annual total phosphorus loading criteria for the major lake tributaries, the total phosphorus lake loading (TMDL) developed for the lake
- Treated wastewater discharge expansions will be considered on the basis of maintaining or reducing total permitted phosphorus loading.
- EPD will carefully evaluate requests for new discharges on a case-by-case basis where the phosphorus load is small and if there is available assimilative capacity to minimize the proliferation of septic systems.
- For waters on the Georgia 303(d) list for parameters associated with nutrients, TMDLs will be developed, point and nonpoint source allocations will be calculated, and reductions will be implemented as appropriate through permits and TMDL implementation plans.
- For waters on the Georgia 303(d) list for parameters associated with nutrients, where TMDLs have not yet been developed, treated wastewater discharge expansions will be considered on the basis of maintaining or reducing total permitted phosphorus loading.
- For lakes where TMDLs have been established and a new POTW or Non-POTW discharger requests a wasteload allocation (WLA) but there is no available assimilative capacity, nutrient trading will be allowed if the reduction is not required by the TMDL per the requirements EPD's *Guidance for Water Quality Trading in Georgi*a (February 2023).
- Local governments in these watersheds are expected, as a part of their Watershed Assessments, to assess waters on the Georgia 303(d) List, develop Protection Plans and implement best management practices to minimize nonpoint source pollution in existing urban areas and newly developing areas.

Strategy for Discharges to Waters Downstream from Lakes but Upstream from Estuaries

- All **existing** NPDES POTWs and Non-POTWs discharging upstream from an estuary will be given facility specific total phosphorus TBEL concentrations based on demonstrated performance.
- All **new or expanding major** POTWs with permitted flows of 1 MGD or greater that discharge upstream from an estuary will be permitted at 1.0 mg/L total phosphorus or less to protect downstream waters.
- If phosphorus is present in the discharge, all **new or expanding major** Non-POTW dischargers upstream from an estuary will be permitted at 1.0 mg/L total phosphorus or less.
- All **new or expanding** minor POTWs that discharge less than 1 MGD upstream from an estuary will be permitted at a concentration equivalent to 8.34 lbs/day total phosphorus or less, but not greater than a concentration of 5.0 mg/L to protect downstream waters.

Strategy for Discharges to Waters that flow into States with Instream Numeric Nutrient Criteria

- Watershed models that include both point and non-point source loads will be used to determine the total phosphorus permit limits necessary to meet the downstream State's instream numeric nutrient criteria.

Information and knowledge about nutrient management issues and nutrient criteria is expected to change over time, and this strategy will be updated as appropriate.