APPENDIX D - Maryland's Watershed Cycling Strategy

Overview

The Maryland Department of the Environment (MDE) is implementing a watershed-based permitting system. Under this approach, the State is divided into five regions where management activities will be cycled through those regions over a five-year period. This approach allows a significant amount of resources to be concentrated in 20% of the State at any given time, thereby increasing both the efficient use of resources and the intensity of water quality evaluations. The choice of a five-year cycle is dictated in large part by the requirements of federal surface water discharge permits, which dictate they be reissued every five years.

Historically, permits in the same watershed have been issued in different years, because the initial permit issuance dates differ. Maryland is currently in a transition period, after which permitting activities in the same watershed will be conducted simultaneously. Under the watershed cycling strategy, each five-year cycle begins with intensive monitoring, followed by the development of Total Maximum Daily Loads (TMDLs) where necessary, followed by watershed-based permitting and other implementation activities. Because the watershed cycle is repeated, this approach ensures that the effectiveness of the implementation activities will be evaluated by field monitoring. Targeting data gaps and targeted monitoring opportunities are also under the watershed cycling strategy.

These intensified watershed-based efforts are being conducted in addition to the water quality assessment programs already in place. Thus, although much of the State's resources will be focused on a limited number of watersheds in a given year, some resources will be set aside to ensure the ability to conduct monitoring, modeling, and permit development elsewhere in the State at any given time. This will preserve Maryland's state-wide long-term monitoring network, and make resources available for high-priority issues. The following sections of this document expand on the elements of the watershed cycling strategy summarized above. With the exception of the first section on water quality standards, each section corresponds to a step in the watershed cycling strategy.

Water Quality Standards

Water quality standards (standards), established by MDE, provide the foundation for Maryland's water pollution control efforts. Water quality standards are established to protect human health and aquatic life. A water quality standard is the combination of a designated use for a particular body of water and the water quality criteria established to protect that use. For example, Use III waters are defined as those in which natural trout can live and propagate. In waters designated for Use III, MDE has established stringent numeric criteria for temperature and dissolved oxygen designed in regard to the special needs of natural trout.

In practice, water quality standards both support Maryland's watershed cycling strategy, and will be enhanced by feedback information that is generated by the cycling strategy. Specifically, standards support elements of the cycling strategy by serving as the basis for identifying impaired waters. The standards also provide the basis for defining end-point goals required in TMDLs. After a TMDL has been established and implemented, the standards serve as evaluation benchmarks. In return, information is generated by the more geographically detailed assessments inherent in the watershed cycling strategy. This feed back mechanism could provide technical justification for refining Maryland's water quality standards in the future. For example, the refined information could help to document areas in which natural conditions vary from established numeric criteria, or help provide the information needed to refine designated uses that better reflect different ecosystems.

Monitoring

Maryland's Water Quality Monitoring efforts can be divided into two broad categories. First, Maryland conducts State-wide Long-term Monitoring. This supports numerous mandates such as, tracking trends in ambient water quality, evaluation of atmospheric acid deposition, fish tissue screening for toxic substances, shellfish harvesting area monitoring, and routine permit compliance monitoring.

Second, the State conducts Intensive Monitoring. This supports model development for establishing TMDLs; follow-up monitoring of waters for which previous analyses indicate a potential problem, but for which current data is insufficient to identify the waterbody on Maryland's 303(d) list; monitoring to support the establishment of federal National Pollution Discharge Elimination System (NPDES) permits; and monitoring for special studies like those related to on-going Pfiesteria research and acid mine drainage remediation projects.

While this general bifurcation between long-term and intensive monitoring oversimplifies the relationship among existing programs, it provides a reasonable picture of Maryland's monitoring activities. The second category, "Intensive Monitoring" best describes the monitoring associated with the watershed cycling strategy at this time.

In a given year, the watershed cycling strategy concentrates approximately 80% of MDE's available resources for field work in approximately one-fifth of the State (i.e., one of the five watershed regions). This field work entails water quality monitoring, pollutant source assessment, and collection of other physical parameters to support TMDL modeling and the establishment of NPDES permits. The remaining 20% of MDE's monitoring resources are reserved for high-priority TMDL work, and immediate NPDES permitting needs that fall outside of the watershed region. According to the strategy, complete coverage of the State for these important water quality management activities will occur in a 5-year cycle. This approach is supported by the federal Environmental Protection Agency (EPA) and used by many other states (e.g., Delaware has been using a similar approach for about 4 years).

The monitoring effort will be paralleled by data management activities. In particular, the data collected in the field will be subject to data QA/QC. In addition, that data will be processed and archived for future use.

Assessment and TMDL Development

After monitoring is completed in the watershed, data assessment and TMDL development will occur. At that time, the monitoring resources will be shifted into the next watershed. The assessment will entail data validation to assure quality of the information, data processing and interpretation to characterize the problem, and data processing to create computer model input files.

The characterization step will clearly define the water quality problem. This will enable MDE to determine what methodology to use for establishing a TMDL. This will entail assessment of data sufficiency, identification of water quality target(s), source assessment, an initial assessment of quantifiable controls, and the selection of a modeling framework for use in making the linkage between the water quality target(s) and quantifiable controls.

The TMDL development will entail the development and application of an appropriate model. This will result in the quantification of the feasible controls expressed in terms of the maximum pollutant load or stress, and the establishment of allocations between point and nonpoint sources. The TMDL development step in the cycling strategy also involves TMDL documentation and TMDL adoption through a formal public process.

TMDL Implementation and Watershed-based Permitting

Watershed-based permitting will occur both in waters that require TMDLs, and in waters that do not require TMDLs. Nevertheless, to ensure that the permits in a given region are synchronized, they will be issued in sequence with the TMDL implementation step of the cycling strategy.

Recall that TMDLs are established for waters that are already impaired. This implies that corrective actions must be implemented to remedy the impairments. In addition to fixing the problem, the TMDL establishes a framework for implementing future activities in a manner that ensures the problem remains under control. It should be noted that TMDL documents are not required to specify highly detailed descriptions of these implementation actions. Rather, the documentation need only give reasonable assurances that the TMDL goal is achievable. Consequently, after the establishment of a TMDL, additional planning of implementation steps is necessary. According to the cycling strategy, these detailed implementation planning activities are envisioned to begin following the establishment of the TMDL.

The implementation process will depend on the type of TMDL. In general, implementation will involve identification of specific pollution reduction controls that are

needed to meet TMDL goal, and the establishment of administrative procedures for state and local environmental management programs, which will ensure the TMDL limit is maintained. It is within this cycle of the watershed cycling strategy that additional public outreach will be conducted.

Upon approval of a TMDL by the federal EPA, the measures for conducting future environmental management activities will be documented through Maryland's Continuing Planning Process (CPP). The CPP, required by the federal Clean Water Act, represents Maryland's formal documentation framework for identifying water quality management operating procedures, such as procedures for issuing surface water discharge permits. Watershed evaluations, water quality modeling, and TMDL development will all be used in the development of discharge permits.

Follow-up Evaluation

Because the five-year cycle repeats itself, the watershed cycling strategy establishes a natural evaluation framework. As the cycle is completed for a given watershed, field monitoring will be conducted again where it had been conducted five-years beforehand. This will serve as an opportunity to assess the initial results of the TMDL and implementation activities. In time, it is envisioned that the goals of the monitoring in each five-year will change as the bulk of the TMDLs are established, and new watershed issues arise.