Steering Committee Alternate Wasteload Allocation Proposal
June 28, 2006

Introduction

DEP released Pennsylvania's current Chesapeake Bay Tributary Strategy (the Strategy) in early 2005 to address Pennsylvania's commitment for nutrient and sediment reductions in the Chesapeake Bay Watershed, as required under the Chesapeake 2000 Agreement. The goal of the Chesapeake 2000 Agreement is to remove the Chesapeake Bay from the federal Clean Water Act's list of impaired waters prior to 2011 when the United States Environmental Protection Agency (EPA) would establish a bay-wide Total Maximum Daily Load resulting in mandatory directives from EPA. The Strategy consists of various initiatives to meet these nutrient and sediment reduction obligations in a cost effective manner. The release of this document prompted statements of support, as well as concerns, questions and discussion from impacted entities, the public and legislature.

Since the release of the Strategy, nearly one hundred (100) public and stakeholders meetings have been held by DEP to enable public participation in the effort. In January 2006, DEP Secretary McGinty refocused and expanded the standing DEP Chesapeake Bay Steering Committee, composed of representatives from various impacted stakeholder organizations, to continue to discuss the wide variety of issues about the Strategy and to consider possible new approaches to meet the water quality obligations. The Steering Committee formed several workgroups to allow for more focused discussion on specific aspects of the Strategy and to provide feedback to the Steering Committee on issues they identified. The PSWG was formed to address concerns arising over implementation of nutrient reduction requirements for point source sewage dischargers.

This 25-30-member workgroup held 7 full-day meetings since early February to discuss options and alternatives to the Strategy. Representatives from the following organizations participated:

DEP Central and Regional Offices
EPA
Municipal Consulting Engineers
Municipal Wastewater System Managers, Solicitors and Operators
The PA Municipal Authorities Association (PMAA)
The PA Water Environment Association
The PA Builders Association
The Chemical Industry Council
The Chesapeake Bay Foundation
The Chesapeake Bay Commission
DEP's Citizens' Advisory Council

One of the issues raised through the process was whether an alternative approach to allocating the reductions assigned to point source could be considered. The direction given to the PSWG was that change to individual discharge loads was acceptable, however, no changes could be made to the overall point source cap load. Overall point

source load reductions were allocated based upon overall point source contribution to the total nutrient overloads.

Three primary topics discussed by the PSWG were: 1) the different levels of nutrient reduction that different plants would need to meet resulting from the Strategy, 2) the use of projected 2010 flows in the calculation of individual cap loads and 3) the difficulty of achieving compliance by 2010 if all significant facilities are considering upgrades at the same time.

The Strategy as released would assign annual "cap loads" for "significant" sewage facilities (those with a design flow of 0.4 million gallons per day (mgd) or greater) based on achieving annual mass load limits for total nitrogen (TN) and total phosphorus (TP). These annual mass load limits would be calculated using average effluent levels of 8 mg/l for TN and 1 mg/l for TP at projected annual average flows for the year 2010.

The Strategy also encompasses point source sewage dischargers that are smaller than 0.4 mgd design flow. It would require all sewage dischargers with design flows greater than 2,000 gal/day to at least monitor and report on effluent levels of TN and TP, and would eventually impose individual "cap loads" on such dischargers consisting of annual mass load limits based on existing performance levels at design flow. Dischargers whose flows are between 0.15 and 0.4 mgd would most likely receive individual "cap loads" corresponding to 8 mg/l TN and 1 mg/l TP at a flow of 0.4 mgd, which could also require many of them to consider trading or make modifications to their treatment facilities.

After identifying the above considerations, and presenting data to the DEP Steering Committee and Secretary McGinty, the PSWG was given the opportunity to develop an alternate allocation methodology that could achieve the same aggregate nutrient reductions. The direction given to the PSWG was that change to individual discharge loads was acceptable, however, no changes could be made to the overall point source cap load.

The PSWG presented a preliminary version of an alternative proposal to the Steering Committee for consideration and review on April 13, 2006. The proposal is based on calculating annual cap loads using annual average design flow at a TN level of 6 mg/L and TP of 0.8 mg/L. The PSWG presented additional information on this alternative to the full Steering Committee on June 23, 2006.

Workgroup Findings and Recommendations

The degree to which the Tributary Strategy will affect individual significant sewage discharges is directly correlated to the relationship between existing flow, the 2010-projected flow and the design flow at each specific facility. The amount of nutrient reduction that would be required at each specific facility is therefore a function of the

relationship of these flow values. Those facilities whose projected 2010 flows are significantly lower than their respective design flows could probably achieve their "cap loads" by modifying their facilities to take advantage of available currently unused treatment capacity. These facilities would have to provide little if any nutrient reduction initially. To accommodate community growth, these dischargers would be faced with the options discussed below.

Facilities with projected 2010 flows lower than design flow, but not significantly lower, would be faced with greater nutrient reduction requirements, and the choice of the more cost-effective of the following: obtain offsets from the retired on-lot systems or installation of BMPs, require developers to obtain nutrient reduction credits elsewhere, undergo capital facility upgrades, recycle and reuse effluent, land apply effluent, or a combination thereof. Facilities with 2010 projected flows near or greater than their design flows are facing a mandatory upgrade under any circumstance, and would have to include a nutrient reduction component as part of that construction project.

Estimates of potential treatment levels based on moving beyond 2010 flows toward full design capacity for the 184 "significant" sewage dischargers, if all facilities choose to upgrade rather than participate in trading or employ alternate technology would be:

- 87 % would need to reduce TN and TP to levels lower than 8 and 1 at design flow. (160 facilities)

- 59% would need to achieve TN of 6 (or lower) and TP of 0.8 (or lower) at design flow. (108 facilities)
- 11% may need to achieve TN and TP levels that would be at or below the practical limits of existing treatment technology, $\leq$ 4mg/l, at design flow. (21 facilities)

Realizing that the individual effects of the Tributary Strategy would be highly variable, the PSWG examined ways to achieve the overall "cap loads" for TN and TP from point source sewage dischargers in a more even manner. The optional approach was to derive uniform effluent levels (mg/l) that, when achieved at design flows, would collectively result in the same overall "cap load" for Pennsylvania point source dischargers.

The end result for these deliberations was to focus on design flow as opposed to 2010 flow. To meet the cap load reductions**,** the PSWG proposed calculating individual discharger annual cap loads based on TN of 6 mg/l and TP of 0.8 mg/l at annual average design flow as shown in the table below. Under this alternate approach, approximately half of the significant sewage facilities would receive less restrictive cap loads, while the other half would have more stringent cap loads. These cap load differences are illustrated in Appendix A.

		TN		TP	
	Design Flow	**Current Trib Strategy**	**Optional Approach**	**Current Trib Strategy**	**Optional Approach**
Phases 1-3	Greater than 0.4 MGD	2010 Flow at 8 mg/l	Design Flow at 6 mg/l	2010 Flow at 1 mg/l	Design Flow at 0.8 mg/l
Phase 4	Greater than 0.2 MGD and Less than 0.4 MGD	Design Flow at existing performance or maximum of 9,740 lb/yr(1)	Design Flow at 8 mg/L or maximum of 7,306 lb/yr(2)	Design Flow at existing performance or maximum of 1,218 lb/yr(3)	Design Flow at 1.0 mg/L or maximum of 974 lb/yr(4)
Phase 5	Greater than 0.002 MGD and Less than 0.2 MGD	Same as previous category	Design Flow at existing performance or maximum of 7,306 lb/yr(2)	Same as previous category	Design Flow at existing performance or maximum of 974 lb/yr(4)

(1) – 9,740 lb/yr = 8 mg/L TN x 0.4 MGD x 8.34 conversion x 365 days
(2) – 7,306 lb/yr = 6 mg/L TN x 0.4 MGD x 8.34 conversion x 365 days
(3) – 1,218 lb/yr = 1.0 mg/L TP x 0.4 MGD x 8.34 conversion x 365 days
(4) – 974 lb/yr = 0.8 mg/L TP x 0.4 MGD x 8.34 conversion x 365 days

In order to insure that the "cap load" objective would be met, it was necessary to complete a comparison of the loads resulting from the current tributary strategy point source implementation plan and the optional approach. A summary table of the analysis is shown below.

Comparison of Allocation Strategies (lbs/year)				
	Current Trib Strategy (Discharged)	**Current Trib Strategy (Delivered)**	**Optional Approach (Discharged)**	**Optional Approach (Delivered)**
TN	10,300,000	9,300,000	10,400,000	9,400,000
TP	1,500,000	681,000	1,410,000	636,000

These numbers represent the load from all point source sewage discharges in the Susquehanna and Potomac River Basins (total of 825).

Specific Recommendations

a) Existing "significant" sewage dischargers would be expected to achieve a cap load based on an average of 6 mg/l TN and 0.8 mg/l TP at design flow:

TN Cap Load = [annual average design flow] x 6.0 mg/L x 8.34 x 365 days
TP Cap Load = [annual average design flow] x 0.8 mg/L x 8.34 x 365 days

Cap loads can be achieved by any combination of capital upgrade, effluent trading, land application of effluent, recycle and reuse, allowing offsets for replacement of existing sources or installation of BMPs.

b) In addition to the options in a) above, a significant sewage discharger can meet its cap load by achieving an annual loading equivalent to 8 mg/l TN and 1 mg/l TP at design flow, but would need to either:
   - Arrange for a trade to achieve its cap load (see (f) below); or
   - Contribute a fixed annual amount, to be determined based on cost of credits to meet performance levels of 6mg/l TN and 0.8 mg/l TP, to a dedicated fund that supports agricultural or other non-point source, or point source TN and TP reduction above what is needed to achieve their respective cap loads. [Note: Priority use of fund revenues would be to support non-point source BMPs or point source treatment that achieve the greatest levels of TN and TP reduction, on a long-term basis. This Fund should be maintained in a separate account dedicated to this purpose. The details of the Fund and the cost per pound of nutrient are under discussion and have yet to be determined.]

c) Phases 1, 2, and 3: It is recommended that DEP institute a 10-year phased approach at imposing TN and TP cap loads for "significant" sewage dischargers, based on their respective delivered loads to the Bay. This phased approach would not prevent any plants from implementing an earlier implementation schedule if they choose. Based on current data:

   - Phase 1 would address the 63 dischargers with the highest TN delivered loads to achieve an estimated TN delivered loading (from all "significants") of about 10.9 million lbs/yr (within 1.5 million of the target loading). However, this estimate assumes that Phase 1 dischargers will be discharging at design conditions. Based on estimates of costs for TN removal and economies of scale, it is anticipated that it will be most cost-effective for most of the Phase I plants to choose technology upgrades, which will be under construction in the initial 5-year period. Modeling conducted by DEP indicates that if the Phase I plants were to meet their proposed nutrient cap loads, and were discharging at their projected 2010 flows with average TN concentrations of 6 mg/l and TP concentrations of 0.8 mg/l, the overall cap load objectives would be achieved. The 63 plants in the first phase of implementation of this proposal will have their permits re-opened (as soon as the Steering Committee process is finalized) to receive nutrient cap loads.
   - Phase 2 would focus on the next 52 dischargers to reduce the overall TN delivered loading down to 10.1 million lbs/yr. This estimate assumes that Phase 1 and Phase 2 dischargers are discharging at design conditions. Plants in Phase 2 will receive nutrient cap loads and compliance schedules timed to allow for construction, if they so choose, during years 6 through 8 of the phased approach.

- Phase 3 would achieve about 0.7 million lbs/yrs reduction by the remaining 70 "significants" to reach an overall cap load of 9.4 million lbs/yr. This estimate assumes that all 184 dischargers are discharging at design conditions. Phase 3 plants will receive nutrient cap loads and compliance schedules timed to allow for construction, if they so choose, during years 9 and 10 of the phased approach.

A plant-by-plant spreadsheet (Appendix A) illustrating the above phased effort is attached. The spreadsheet also provides a comparison between effluent levels for TN and TP under the current tributary strategy and this optional approach. The timeframe and scheduling of the phases have not yet been defined and are being discussed within the PSWG.

d) Phase 4: Existing Non-significant point source sewage dischargers (greater than 0.2 mgd but less than 0.4 mgd) would be required to begin monitoring and reporting for TN and TP. These requirements would be imposed as NPDES permits are up for renewal and would provide a basis for future cap load limitations as part of a Phase 4, occurring after the implementation of Phases 1 through 3. In the interim, any expansion would have to result in no net increase in loading, based on current annual average design flow and nutrient concentrations not to exceed 7306 lbs. TN and 974 lbs. TP. Implementation dates will be determined after completion of the first 3 phases.

e) Phase 5: Existing smaller dischargers (less than 0.2 mgd) would be required, at permit renewal, to monitor and report on levels of TN and TP in their discharge for the purpose of data collection and possibly assigning cap loads under Phase 5, occurring after the implementation of Phases 1 through 4. In the interim, any expansion would have to result in no net increase in loading, based on current annual average design flow and current average effluent nutrient concentrations. Implementation dates will be determined after completion of first 4 phases.

f) Trading for nutrient reduction credits will strongly be encouraged as a cost-effective method of achieving cap loads. Among significant sewage dischargers, approximately ½ would now have less restrictive cap loads to achieve, while the others would have stricter cap loads. This might prove more workable within a specific geographical area (county, watershed), and more particularly within the context of a watershed permit.

g) Implementation of the Tributary Strategy for industrial point sources for the thirty (30) significant industrial direct dischargers caps those sources at their aggregate 2002 loading, plus a 10% reserve for future growth. The work group suggests the same consideration for significant industrial customers connected to sewage systems, perhaps in the form of an adjusted cap load for the sewage discharger. The work group suggests that significant industrial sources that are connected to sewage systems could be treated as if they were direct discharges, with cap loads calculated separately, and those TN and TP loads could then be added to the

domestic flow based cap load for the sewage treatment plant. In order to implement this approach, the sewage treatment plant should have an approved pre-treatment plan and request the department to consider this alternative.

The determination of who is a significant industrial customer should be evaluated on a case-specific basis, and may hinge upon size or other factors, such as overall percent of nutrient load contribution to the sewage system. Additional loads to be added to the sewage treatment plant cap loads would be taken from the referenced 10% reserve for industrial dischargers. The "consortium" of direct industrial dischargers may have to agree to this approach.

h) Any significant sewage dischargers that have already received NPDES permit renewals based on achieving 8/1 at 2010 flows would not be required to achieve lower cap loads based on this optional approach.

i) All sewage discharges proposing to expand their facilities beyond existing design flows would be evaluated in terms of where they would fit under the abovementioned phased approach.

j) As in the current strategy, any plant with final Act 537 approval for increased design flows before August 29, 2005 (effective date of Maryland water quality regulations) will receive cap loads based upon these increased design flows.

Related Issues And Recommendations

A. This alternative approach would be subject to review and comment.

B. Recent cost estimates compiled by the PSWG (Appendix B) are significantly higher than those originally compiled by the Department. This is primarily due to year data was collected, different assumptions on attaining compliance (use of excess capacity, new technologies, trading), analytical methods used and the availability of actual construction costs and engineering estimates for several facilities. Costs also reflect that currently the number of impacted plants is 184, while the Strategy originally included only 124 plants.

The PSWG also discussed the anticipated costs of achieving these levels of nutrient reduction, along with the practical difficulties of achieving compliance by the year 2010. Again, this discussion is based on the assumption that that the majority of the affected facilities will choose capital upgrades. The work group also intends to examine the potential for cost reductions using trading or a combination of trading and upgrades.

It is important to note that the cost analysis did not factor~~ed~~ in the potential cost savings associated with trading. PSWG intends to consider how the trading option, from both point and non-point sources, can be integrated into the cost figures so that

the reductions available from those cost-effective options may be properly evaluated at the same time. In addition, although the PSWG continues to evaluate costs, it may not be possible to nail down a final number. Each facility will have to make its own decisions as to what alternative is the most cost-effective for it to meet its overall goals and needs. This effectively results in 184 independent decisions, or independent variables, in the overall equation. The best we can hope to arrive at is a range of potential costs.

C. Further clarification is needed to more clearly articulate nutrient reduction credits/offsets available to sewage dischargers that:
    1) Connect homes using on-lot sewage disposal to their sewer systems; For example, it is being suggested that a sewer plant treating to at least first level NRT would receive an annual credit of 25 lbs of TN reduction for every septic system taken off-line and connected to their system after January 1, 2003.
    2) Collect and treat septage from local haulers.

    [Note: Both of the above items are non-point nutrient sources to the Bay]

    Discussion must also occur on concerns that the removal of limits on septic systems may cause an unintended proliferation of new developments on septic systems which would actually increase nitrogen amounts in the groundwater.

D. DEP should continue development of the Watershed NPDES Permit approach in order to facilitate implementation of the Tributary Strategy.

E. The workgroup discussed several alternatives for addressing the "zero net increase in nutrients" requirement for new development, and a separate sub-group, consisting of members of the PSWG and representatives from the developer community, has been formed to further flesh out this issue. That smaller group is scheduled to meet in mid-June.

F. It is recommended that permitted CSOs, under an approved LTCP (long term control plan) are excluded from contributions to the nutrient cap at that particular facility. This recommendation is based on data collected that show that there is only a minimal nutrient loading from the discharges, which occur only in wet weather.

G. This strategy is a plan to achieve the goals of the Chesapeake 2000 Agreement. In the long-term, there is a concern when the cap loads are reached and the impact on future development. Under the current Strategy, when the cap is reached, no more growth can happen without offsets to achieve a zero net load of nutrients. Some consideration is needed to address this issue in the future.

H. The PSWG would like to review and comment on any future revisions to the Tributary Strategy.