



Economic Impact Analysis Virginia Department of Planning and Budget

9 VAC 25-260 – Water Quality Standards
Department of Environmental Quality
September 17, 2007

Summary of the Proposed Amendments to Regulation

The State Water Control Law (Code of Virginia §62.1-44.15(3a)) requires the State Water Control Board (Board) to establish standards of quality for state waters. In addition, federal and state mandates in the Clean Water Act 303(c), 40 CFR 131 and the State Water Control Law require that the Board review water quality standards every three years and adopt, modify, or cancel standards as appropriate.

As a result of the most recent triennial review, the Board's proposed changes include: (1) revised pH criteria for Class VII swamp waters from 4.3-9.0 to 3.7-8.0 and an expanded narrative criteria to recognize that in these waters, dissolved oxygen (DO) and pH can naturally fluctuate outside of these values, (2) deletion of a protocol for developing site specific temperature criteria, (3) revisions to the human health and aquatic life criteria for surface water including the addition of two new aquatic life criteria (nonylphenol and diazinon), (4) a possible increase in the E.coli geometric and single sample mean criteria for freshwater (the change will be made depending upon public reaction during the public comment period) and a revision of the regulation to make the geometric mean criteria the main standard for evaluation, (5) deletion of the disinfection waiver for sewage discharge, (6) deletion of the section on tidal water sampling, (7) deletion of a special standard for chlorides, and (8) a revision to the criteria for the specific sites of the Mattaponi Chesapeake Bay segment, Lake Curtis in Stafford County, John H. Kerr Reservoir, and a section of the Little Calfpasture River.

Result of Analysis

The benefits likely exceed the costs for one or more proposed changes. For one proposed change, costs likely exceed the benefits. There is insufficient data to accurately compare the magnitude of the benefits versus the costs for other changes.

Estimated Economic Impact

Class VII Swamp Waters

Under the current regulation, the pH criteria for Class VII swamp waters is 4.3-9.0. The current regulation also recognizes that the natural quality of swamp waters may fall outside of the ranges for pH (and dissolved oxygen) and allows, on a case-by-case basis, criteria for specific Class VII waters to be developed that reflect the natural quality of the water body. In addition, Virginia Pollutant Discharge Elimination System limitations in Class VII waters are currently required to meet a pH criteria of 6.0-9.0. Under the proposed amendments, the pH criteria for Class VII swamp waters would be 3.7-8.0, and water quality standards would not be considered violated when fluctuations outside of the ranges for pH and dissolved oxygen (DO) are determined by the Board to be natural and not due to human-induced sources. The proposed amendment specifies that the Board may develop site-specific criteria for Class VII waters that reflect the natural quality of the water body when the evidence is sufficient to demonstrate that the site specific criteria rather than narrative criterion will fully protect aquatic life. In addition, under the proposed amendment, Virginia Pollutant Discharge Elimination System limitations in Class VII waters do not have to meet a pH range, but “shall not cause significant changes to the naturally occurring dissolved oxygen and pH fluctuations in these waters.” In sum, this proposed amendment changes the pH criteria for Class VII waters and allows the Board to use a narrative criterion instead of a site-specific numerical criterion to judge if the Class VII standards are violated when the pH or DO levels are outside of the water quality criteria. This amendment affects not only those waters currently classified as Class VII waters, but also those waters that the amendments propose be classified as Class VII waters.

Swamp waters are waters with naturally occurring low pH and low DO. These conditions are caused by both low flow velocity that prevents mixing and reaeration of stagnant, shallow waters and the decomposition of vegetation that lowers DO concentrations and causes tannic acids to color the water and lower the pH. Every year, the Department of Environmental Quality

(Department) extensively tests Virginia's rivers, lakes, and tidal waters for pollutants. Waters that do not meet the required water quality standards are considered "impaired waters" and the Department must develop plans to restore and maintain the water quality for the impaired waters. The plans are called Total Maximum Daily Loads (TMDLs), a term referring to the total pollutant a waterbody can assimilate and still meet standards. Under the current regulation, many swamp waters are considered impaired and therefore require TMDLs even though the "impairment" is natural. Under current regulation, in order to eliminate the incorrect impairment listings, the Department is required to develop site specific criteria. Upon reviewing the large fluctuations in the DO concentrations (sometimes close to zero) and working closely with the Department of Game and Inland Fisheries and the U.S. Fish and Wildlife Service, however, the Department decided that a narrative criterion was more protective than site specific criteria.

These amendments will allow the regulation to more accurately represent the conditions in swamp waters and give the Board flexibility in determining whether a water body is impaired. There are two potential benefits. First, it is possible that the situation of the aquatic species in the swamp waters will improve, or at least, not deteriorate. The ecological conditions of the swamp waters, including the lower pH and lower DO concentrations, have forced the aquatic species inhabiting the swamps to adapt. If the Department allowed higher DO concentrations or higher pH levels to occur in a swamp, other species that cannot tolerate the usual swamp conditions could migrate into the swamp from a connecting flowing river and out-compete (and overwhelm) the swamp species. On the whole, this could alter the unique swamp community of aquatic life. Although this hypothetical situation is difficult to quantify, it is still potentially an important benefit of this amendment.

The other benefit lies in the removal of a number of naturally-impaired swamp waters from the impaired waters list. The Department estimates that between this amendment and the special standards that this amendment proposes (discussed below), approximately 42 TMDLs will be removed from the TMDL development effort. Removing 42 TMDLs will provide a net cost-savings of \$600,000.¹ Since the "impairment" of these waters is natural, the Department argues that it is not an efficient use of state resources—and is often infeasible—to alter the pH and dissolved oxygen levels to meet the water quality criteria.

¹ Source: Department of Environmental Quality

There is no environmental cost to removing these waters from the impaired waters list, since it will only affect those waters determined by the Board to be naturally impaired. The removal will not exempt the waters from the usual water quality monitoring and related treatment processes. The revision of the pH criteria for swamp waters could inflict a cost on those entities discharging into Class VII waters; however, when the Department called the facilities that were likely to be impacted by this amendment, the facilities responded that this amendment would not require them to alter their current monitoring process. Therefore, the benefits likely outweigh the costs for this proposed amendment.

Site Specific Temperature Criteria

The Board is proposing to delete the protocol for developing site-specific temperature criteria from the regulation. Under current regulation, the temperature limits set forth in 9VAC 25-260-50 through 9VAC25-260-80 may be suspended in certain locations either by Site Specific Temperature Criteria or where a thermal variance demonstration is performed in accordance with §316(a) of the Clean Water Act. Under the proposed amendment, the technical protocol for developing site specific criteria will no longer be regulated. Site specific temperature criteria can still be done, however, under the general allowance for site specific numerical criteria in 9VAC 25-260-140 D (Site specific modifications). Since the protocol for site-specific temperature criteria has never been used², the cost should not be significant. The benefit of the repeal is to delete a protocol that the Department feels is more appropriate as guidance than regulation. Since both the costs and the benefits of this proposed change are small and not easily quantifiable, the net impact of this proposal is not clear, but will likely be very small.

Human Health and Aquatic Life Criteria for Surface Water

The Board is proposing changes to 93 of the human health criteria for surface water. The criteria were recalculated using the EPA 2000 Human Health Methodology, which results in human health criteria that are 60-80 percent more stringent. In addition, the Board is proposing adding a fish tissue criterion for methyl mercury of 0.30 mg/kg, a revision to the aquatic life criterion for cadmium, lead, tributyltin, and two new aquatic life criteria: nonylphenol and diazinon.

² Source: Department of Environmental Quality

The human health criteria are becoming more stringent for two reasons. First, new research has suggested to the scientific community and to EPA that the general public eats almost three times as much fish than was previously estimated; therefore concentration rates of certain chemicals in fish must decrease in order to ensure that humans are not ingesting unsafe amounts. Second, some of the criteria include a Relative Source Contribution factor. This means that for some of the chemicals, EPA determined that humans are potentially exposed to these chemicals not only from contaminated water and fish, but also from other media.

The human health criteria are being altered because of scientific research indicating that humans should not be exposed to the chemicals in the amounts that we are currently being exposed, given the amount of fish that we eat and the other ways that we ingest the chemicals. Therefore, the benefit of the proposed changes to the human health criteria, according to EPA, the Board, and the scientific community, is to better protect the public. According to the Department, of the 103 facilities in Virginia that qualify for potential impacts as a result of the proposed changes in limits, 25 discharge the relevant pollutants, and 15 facilities have discharge levels for the specific pollutants that are within close range of the limits being proposed. The Department made every effort to contact these Virginia Pollutant Discharge Elimination System (VPDES) permit-based facilities (i.e., permittees) and found that most of them already employ more stringent controls on the pollutants of interest than those that would be needed under the proposed criteria. According to the Department, for most permittees, human health criteria are not the binding constraints; it is the aquatic life criteria that drive most of the monitoring and control processes. The remaining facilities could not provide an estimate of the changes in management and/or operation to comply with the revised changes, but did not believe that the costs would be very high. Therefore, the proposed changes in the human health criteria are not predicted to impose very high costs on facilities, or offer much benefit in terms of water quality, since facilities will not be significantly changing much in their discharge procedure.

Mercury mixes quickly into the environment and is bioaccumulated in the fatty tissue of fish. EPA determined that the best way to protect designated uses is to develop a fish tissue criterion rather than a water column number. Again, the benefits of the new criteria lie in better protection of the public and the environment. High levels of mercury in children can lead to retardation, cerebral palsy, deafness, and blindness; in adults, mercury poisoning can affect fertility and blood pressure regulation and can cause memory loss, tremors, and vision loss.

According to the Department, this new criterion will not create any increase in state monitoring costs, since they already monitor fish tissue for many bioaccumulative substances, including mercury. This addition should not impose any cost to permittees, since it represents a change in measurement procedure, not in the permitted levels of mercury.³

Revisions to the existing aquatic life criteria for tributyltin, cadmium, and lead, and the addition of nonylphenol and diazinon are proposed based on more recent EPA guidance.⁴ The proposed tributyltin criterion is less restrictive than the existing criterion and the proposed criteria for cadmium and lead are both more stringent than existing criteria. The Department anticipated that the new tributyltin criterion could potentially affect permittees in the Norfolk/Hampton Roads area, that the new cadmium criterion could affect four permittees in Virginia, and that the new lead criterion could affect five permittees in Virginia. Upon holding discussions with the permittees, however, the Department found that the facilities were not likely to need to change their procedures based on the new criteria; the facilities either have permit limits that are below existing detection limits, or are already in compliance with more stringent criteria that are driving the discharge procedure. Therefore, there are no clear benefits or costs to the proposed changes to existing criteria.

Nonylphenol is an organic chemical that can have adverse effects on the reproductive life of aquatic organisms. It is used as a chemical intermediate and is often found in wastewater treatment plant effluent as a breakdown product from surfactants and detergents. Diazinon is also toxic to aquatic life, particularly invertebrates. The chemical is frequently found in wastewater treatment plant effluent and urban and agricultural runoff. Both of these chemicals are toxic to aquatic life; therefore, the benefit of imposing limits lies in maintaining the health of Virginia's water and aquatic organisms. The Department anticipates that there will be a cost associated with adding these criteria; however, facilities were not yet able to quantify the costs. The Department anticipates more comment from facilities during the public comment period before the final regulation is adopted.

³ Source: Department of Environmental Quality

⁴ For information on the EPA research and criteria, see the EPA guidance documents at: <http://www.epa.gov/waterscience/criteria/tributyltin/tbt-final.pdf>,

Bacteria Criteria for Recreational (Fresh) Waters

Under current regulation, the geometric mean criterion for E.Coli in freshwater is 126 colony forming units (CFU)/100 ml of water. This criterion is based on an illness rate of 0.8% (eight out of 1000 swimmers may get gastrointestinal illness). The Board has proposed an alternative criteria of 206 CFU/100 ml of water that is based on an illness rate of 1.0% (ten out of 1000 swimmers may get gastrointestinal illness). The criteria will be changed depending upon public input into the costs and benefits of both values. Both criteria meet federal standards; EPA has recently published guidance that considers an illness rate of 8-10 per 1000 people for primary contact recreation in freshwater acceptable.

One benefit of changing the criteria is that facilities—mostly public sector entities—will not have to spend as much trying to reach the more stringent bacteria criteria. One public sector wastewater utility representative estimated that his city would save approximately \$20 million over the long-term on one body of water with the change in the criteria.⁵ The Department feels that this change may also make private facilities more willing to increase their participation in the voluntary aspects of the TMDL implementation plans. According to the Department, some stakeholders have said that the existing bacteria criteria results in unreasonable and unattainable end points that undermine the feasibility of achieving standards and the credibility of the program. At the current level, some watersheds must eliminate 100 percent of the bacteria loading to the watershed, including the removal of some naturally occurring bacteria. The unreasonable and unattainable end points can also make TMDLs impractical to implement and the Department anticipates savings in state resources, including staff time, under this amendment. The cost of the amendment is, of course, that swimmers in freshwater in Virginia will have a slightly higher probability of contracting gastrointestinal illness after engaging in freshwater-based recreational activities. However, the wastewater utility representative and the Department agree that most freshwater bodies in the Commonwealth cannot meet, or have not yet met, the current criteria. This amendment, therefore, should not change the probability of illness for Virginia citizens from its current level. Although the information that the Department anticipates receiving during the public comment period should be closely analyzed, it is likely

that the benefits significantly outweigh the costs of the proposed amendment to change the bacteria criteria.

Under current regulation, the bacteria criteria are expressed as a geometric mean and as a single sample maximum. The proposed amendment lists the geometric mean as the main criteria to protect primary contact recreational uses. If there is insufficient data to compute the geometric mean, however, no more than ten percent of the total samples in the assessment period shall exceed a maximum value, which is the single sample maximum value. This change is being made because, according to EPA, the geometric mean is the environmentally relevant endpoint. The benefits of this change are having criteria that are environmentally relevant, more protective, and more consistent. In practice, this should not affect the monitoring practices of facilities, since a facility's sampling frequency and permit limits are determined by the Department in the permit. Therefore, there are neither costs nor benefits to this amendment.

Disinfection Waivers

Under current regulation, the Board, with the advice of the Virginia Department of Health, may issue disinfection waivers to allow reduced or no disinfection of a sewage discharge on a seasonal or year-round basis. These determinations are made on a case-by-case basis and the Board must provide a 45-day public notice period and an opportunity for public hearing. Under the proposed amendments, permittees with disinfection waivers—or those pursuing disinfection waivers—will have to get a variance that must be approved by EPA. This change is occurring because EPA has issued guidance on temporary use changes (disinfection waivers are temporary use changes), and the Department feels it best to be in line with EPA guidance. In addition, a court decision ruled that a change in water quality standards cannot be effective until EPA approves it, so the Department would anyway need to start getting EPA approval for disinfection waivers. Still, this amendment will add cost both for the state and the permittee. Gaining EPA approval uses staff time that will impose a cost on the state. In addition, although the permittee may submit data that was gathered for each previous waiver and let that partially serve as a variance submittal, the original information will need repackaging and perhaps some instream bacterial level monitoring. If a permittee does not have the ability to do this monitoring or

⁵ For more information, see http://www.deq.virginia.gov/wqs/documents/TR_BACT_CS0_PRESEN_12_06_001.pdf

properly write up the report, the permittee may be forced to hire a consultant, which can cost anywhere from a few thousand dollars, to \$15,000. (Most consultants charge \$8-10 K/year for each round of water quality sampling.)⁶ The Department estimates that there are five facilities currently with waivers. The Department realizes that, in the end, the small town permittees with waivers will not be able to pay consultants, so Department staff will provide the necessary assistance in taking pictures, writing memos or reports, issuing the permit, and sending it to EPA for approval. Although many of these costs will be one-time costs in order to move from a disinfection waiver to a variance, the overall costs of this proposed amendment are likely to exceed the benefits. Most of the costs are likely to be borne by existing Department staff.

Tidal Water Sampling

The current regulation requires that tidal water samples for determining compliance with standards shall be collected at slack before flood tide or slack before ebb tide (“slack water” sampling). Under the proposed amendment, there will be no specification on the timing of tide water sampling. According to the Department, slack water occurs for approximately 30-60 minutes, four times per day, at different times each day and at different times for each place. While slack water times can be somewhat predicted in advance, they will vary from predictions based on wind conditions each day. It is also time consuming and difficult when collecting data to tell if it is slack water or not. According to the Department, because of a lack of resources, this regulation has never been exactly followed for the Chesapeake Bay Program and rarely exactly followed in other programs. Therefore, this amendment reflects what is currently happening in practice and will not significantly affect either procedure or the type/quality of data being collected.

Special Standards

The Board proposes to cancel the special standard that chlorides not exceed 40 mg/l at any time. The special standard was originally added in response to a proposed discharge that might affect tobacco farming in the area; tobacco farmers believed that chlorides had an adverse effect on tobacco at 35 mg/l. The proposed discharge never occurred, however, so the special standard was never applied. Therefore, the special standard has no effect on current water quality standards and can be deleted. There are neither costs nor benefits to this change.

⁶ Source: Department of Environmental Quality

The Board also proposes several new special site specific standards. First, a pH criterion of 5.0-8.0 is proposed to apply to the tidal freshwater Mattaponi Chesapeake Bay segment. Second, a special pH standard for Lake Curtis is proposed to maintain the fishery. Third, a manganese criterion for one intake location on the Kerr Reservoir is proposed to protect the aesthetic qualities of the water supply. Third, a new benthic numerical criterion is proposed for the Little Calpasture River, which, according to the Department, reflects a subcategory of benthic aquatic life uses due to the presence of the Goshen Dam. Finally, the maximum temperature for seasonally stockable trout waters of 31° C is proposed that will apply May 1 through October 31. The benefit of the changes is to make criteria better reflect natural conditions and to prevent what the Department considers “unreasonable” TMDLs from moving forward. For example, it is common that aquatic life uses are modified below dams. Current standards for the Little Calpasture River in the area of the Goshen Dam, however, do not reflect the environmental conditions inevitable to the area around a dam, and the result is a TMDL which, according to the Department, cannot be reasonably implemented without removal of the Dam. The monetary benefit of these changes to the site-specific criteria is included in the \$600,000 that the Department anticipates to save by removing unnecessary TMDLs (approximately \$14-\$15 K per TMDL). There should not be any environmental cost, since the water bodies will simply reflect their natural conditions (given the existence of the Goshen Dam), nor will there be any cost to discharge facilities, as they indicated that they would not need to change their processes.⁷ Therefore, the benefits should outweigh the costs for these amendments.

The Board has also made a number of changes to the River Basin Tables, including making the pH requirements less stringent for certain water bodies (limestone streams have naturally higher pH conditions) and adding certain water bodies into the Class VII swamp water category. The costs and benefits of these changes have been covered above. For all of these changes, either the benefits outweigh the costs or there are neither quantifiable benefits nor costs to the change.

⁷ Source: Department of Environmental Quality

Businesses and Entities Affected

According to the Department, there are 103 facilities that could be affected by the proposed amendments. Fifty-three of the facilities are municipal localities and 50 are businesses. Only 15 entities are “most likely” to be affected by proposed changes, based on their discharge and permit limits.

Localities Particularly Affected

The localities that are considered particularly affected are those containing a water body for which a specific, non-statewide amendment is being proposed to change a classification, designated use, or criteria. The counties included in this list are: Alleghany, Amelia, Bath, Caroline, Charles City, Charlotte, Chesterfield, Dinwiddie, Essex, Frederick, Halifax, Hanover, Henrico, Isle of Wight, King George, King & Queen, King William, Mecklenburg, New Kent, Nottoway, Roanoke, Rockingham, Rockbridge, Richmond, Shenandoah, Southampton, Stafford, and Westmoreland. The towns are: Branchville, Blackstone, Burkeville, Clarkesville, Crewe, and Montross. The cities are: Chesapeake, Lexington, Roanoke, Salem, and Suffolk.

There is no expected monetary impact on these localities.

Projected Impact on Employment

The proposals have no projected impact on employment.

Effects on the Use and Value of Private Property

If the change in bacteria criteria offers significant cost savings to specific permittees, they could see the value of their business rise. If the addition of diazinon and nonylphenol to the aquatic life criteria, or the disallowance of the disinfection waiver, create significant cost for certain permittees, then they could see a fall in the value of their business.

Small Businesses: Costs and Other Effects

All of the 15 facilities most likely to be impacted by the proposed changes qualify as small businesses. If after reviewing the proposed regulation, these facilities determine that the addition of nonylphenol and diazinon to the aquatic life criteria imposes significant cost, then that will be a cost borne by small businesses. In addition, the disallowance of disinfection waivers could also impose the cost of consultant fees on small businesses who seek an EPA variance, although the Department believes that Department staff will complete the tasks for

which permittees might have had to hire a consultant. Finally, small businesses might save resources if the E.coli criterion for freshwater is made less stringent.

Small Businesses: Alternative Method that Minimizes Adverse Impact

There is no apparent alternative method that minimizes adverse impact while still accomplishing the intended positive policy goals.

Real Estate Development Costs

If the increased stringency of the human health or aquatic life criteria increases the cost of developing land, then this amendment could increase the costs of real estate development. Similarly, if the Department makes the bacteria criteria for freshwater less stringent, and this decreases the cost of developing land, then this amendment could decrease costs for real estate developers.

Legal Mandate

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.H of the Administrative Process Act and Executive Order Number 36 (06). Section 2.2-4007.H requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. Further, if the proposed regulation has adverse effect on small businesses, Section 2.2-4007.H requires that such economic impact analyses include (i) an identification and estimate of the number of small businesses subject to the regulation; (ii) the projected reporting, recordkeeping, and other administrative costs required for small businesses to comply with the regulation, including the type of professional skills necessary for preparing required reports and other documents; (iii) a statement of the probable effect of the regulation on affected small businesses; and (iv) a description of any less intrusive or less costly alternative methods of achieving the purpose of the regulation. The analysis presented above represents DPB's best estimate of these economic impacts.