

PART F: APPENDIX I – DATA SOLICITATION AND PUBLIC REVIEW MEMOS



Maryland Department of Natural Resources
Resource Assessment Service
Tawes State Office Bldg., D-2
Annapolis, MD 21401

March 1, 2005



Maryland Department of the Environment
Technical and Regulatory Services
1800 Washington Blvd., Suite 540
Baltimore, MD 21230

Data Solicitation Letter

The Maryland Department of Natural Resources (DNR) and the Department of the Environment (MDE) are currently developing the 2006 List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality in Maryland. This information is required by the federal Clean Water Act (Sections 305(b) and 303(d)) and must be completed by April 2006. State and federal monitoring programs typically provide much of the water quality data used for this report, but there are numerous water monitoring efforts conducted by local government agencies, researchers, students, and community groups that may be helpful in our statewide assessment.

We are specifically interested in water quality measures that we can compare to criteria or standards that are published in State regulation (*e.g.*, temperature, dissolved oxygen, pH, turbidity, *E coli* or enterococcus bacteria - see COMAR §26.08.02.03). Other water quality data collected (*e.g.*, field measures such as salinity, analysis of nutrients, chlorophyll, alkalinity levels, benthic macroinvertebrate and fish communities, habitat conditions, and field observations of the environment) may also be useful in characterizing water quality conditions. DNR and MDE will share water quality data and assessment methods to ensure that all data received are reviewed in a consistent manner.

If your group has collected water quality data in Maryland within the past five-year period (2000-2004) and you are willing to share those data with us, we are interested in hearing from you. Here are some guidelines that will help facilitate this transfer of information:

- Contact one of us (see below) to discuss some details about your program, data quality assurance and control, how your information is available and how we will likely integrate this into the State's report.
- A quality assurance project plan is required with your submittal. For an example of a QA/QC plan, please refer to <http://www.epa.gov/quality/qs-docs/g5-final.pdf>. If one is not available, an annual monitoring report or similar documentation that describes the "**who, what, where, when, why and how**" will help us assess the quality of the data.
- If you have recently provided MDE with data for TMDL development there is no need to resubmit.
- For full consideration please submit all data by April 30, 2005.

If you have any questions, please contact either Sherm Garrison or Charles Poukish for more information.

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**Informational Public Meeting Announcement:
Maryland's Draft 2006 303(d) List of Impaired Watersheds**

The federal Clean Water Act requires that States assess the quality of their waters every two years and publish a list of those waters not meeting the water quality standards set for them. This List of Impaired Waters is also known as the "303(d) List" for the section of the Act that requires it. Water bodies listed as impaired may require the development of Total Maximum Daily Loads (TMDLs). The Maryland Department of the Environment (MDE) is announcing the availability of the draft 2006 303(d) List of Impaired Waters for public review and comment. MDE is providing forty-five days of public review and comment from **January 20 through March 8, 2006**. The Draft List is being posted on the MDE World Wide Web Page <http://www.mde.state.md.us> and advertised in the Maryland Register. Copies will also be available at some branches of county libraries; a list of those libraries will be available on MDE's web site or by calling Linda Watson at (410) 537-3906. Copies may also be requested in writing from Ms. Watson at the address below.

The Department will host three informational public meetings. The public is cordially invited to attend a meeting in a region of their choice. Any hearing impaired person may request an interpreter to be present at the meeting by giving five (5) working days notice to Deanna Miles-Brown, MDE Regulations Coordinator, at (410) 537- 3173. Comments or questions may be directed in writing to Linda Watson MDE, Technical and Regulatory Services Administration, 1800 Washington Blvd., Baltimore Maryland 21230, or faxed to the attention of Ms. Linda Watson at 410-537-3873 on or before **March 8, 2006**. After consideration of public comments, a final List will be prepared and submitted to the US EPA for approval.

Eastern Shore Region

Location: Salisbury

Date: February 23, 2006

Time: 2:30-4:30

Greater Salisbury Committee Offices

200 W. Main St.

Salisbury, MD 21801

(410-742-5161)

This meeting is co-sponsored by the Lower Eastern Shore Tributary Team.

Direction: Follow Route 50 to N. Division St. Head South one block, make right onto West Main Street

Western Maryland Region

Location: Hagerstown

Date: February 22, 2006

Time: 6:00-8:00

University System of Maryland

at Hagerstown, Room 124

32 W. Washington St.

Hagerstown, MD 21740

(240 527-2060)

This meeting is co-sponsored by the Upper Potomac Tributary Team.

Directions: From points east, take I-70 west to the Route 40 West Hagerstown exit. Proceed east approximately two miles to Washington Ave. Continue east until you merge with West Washington Street. Parking is located on both sides of the street.

Central Region

Location: Baltimore

Date: February 16, 2006

Time: 6:30-8:30

MDE Headquarters

1800 Washington Blvd.

Baltimore MD, 21230

(410 537-3873)

Directions: From points North, take I-95 South. Go through the Fort McHenry Tunnel. Exit at Exit 53 (I-395/Martin Luther King Boulevard). Follow signs to Martin Luther King Boulevard to the right. Get into the left lane after exiting. At the first traffic light, make a left onto Washington Boulevard. Follow Washington Boulevard for approximately one mile. Cross over Monroe Street. Make a right into the Red parking lot. Meeting will take place in the Aqua Meeting room on the first floor.

PART G: APPENDIX II – LISTING METHODOLOGIES

G.1 Biological Assessment of Water Quality for Non-Tidal Streams

G.1.1 ABSTRACT

Biological assessment data from first to fourth order streams will be used to assess waters of the State for the purposes of the Water Quality Inventory (305(b) Report) and the List of Impaired Waters (303(d) List). The method presented below relies on statistical measures of uncertainty (confidence interval) to determine whether the mean of the results from the sites sampled in a watershed is above or below the Index of Biotic Integrity (IBI) value considered indicative of satisfactory water quality. Where at least 10 sites have been sampled in a watershed (8-digit), watershed-specific confidence intervals will be calculated. If the upper bound of the confidence interval is less than 3, that watershed will be determined to not meet water quality criteria. Where fewer sites have been sampled, subwatersheds (12-digit) will be the evaluation unit. In such cases, a default confidence interval has been calculated based on the coefficient of variation calculated from replicate samples (benthos) or sampling of proximate segments (fish). Certain exceptions are noted based on the empirical applicability of the IBI. The State is required to consider all readily available data; therefore, guidelines for the incorporation of local biological data into the assessment process have also been provided. Local data that are based on MBSS or comparable methods and that can be fully integrated with MBSS data to assess watersheds would be integrated into 12- and/or 8-digit watershed evaluations (Tier 1). Data of documented quality, but not based on methods comparable to MBSS, will be used to supplement MBSS and local Tier 1 data. Data not meeting the requirements stated above may be helpful for non-regulatory purposes (*e.g.*, targeting, education). Such data will be stored and documented for these uses.

G.1.1.1 Scope

All of the State's waters must be of sufficient quality to provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allow for recreational activities in and on the water (40 CFR §130.11). Biological criteria (biocriteria) provide a tool with which water quality managers may directly evaluate whether such balanced populations are present. Maryland's biocriteria uses two indices of biological integrity, one based on fish communities (F-IBI) and the other on benthic (bottom) communities of invertebrates (B-IBI). Both indices implicitly define "balanced populations" by comparison to biological communities in minimally impaired reference water bodies and both will be used in Maryland to determine the extent to which aquatic life is being supported in Maryland streams. These indices, as described below, are based on several characteristics of fish and benthic communities judged to be relevant to assessing the ability of streams to support aquatic life, and can be calculated in a consistent and objective manner. This framework provides a method for evaluating biological data for the Clean Water Act requirements.

The Maryland Biological Stream Survey (MBSS) program, on which these interim methods are based, is designed to assess water quality, biological communities and physical habitat condition

in Maryland streams on a statewide and watershed scale. The first round of MBSS sampling was designed to assess major drainage basins. The second round was designed to assess smaller (Maryland 8-digit) watersheds. Data collected from this stratified random sampling design support the assessment of first, second, third and fourth order non-tidal streams (determined based on the solid blue line shown on the current edition of U.S. Geological Survey 1:100,000 scale maps) throughout the State. Although the MBSS data can also be used to evaluate the individual stream segments sampled, the locations of sampled segments are selected randomly and not targeted to assess the impacts of specific stressor locations. The use of random assignment of sampling locations within the population of first, second, third and fourth order (fourth order in round two of sampling only) streams supports the assessment of all of the State's waters. The results of biological sampling will be applied for management and regulatory purposes (*i.e.*, CWA §303(d)) at the same spatial resolution (8-digit watersheds) used in the Water Quality Inventory (305(b) report). When there are sufficient data, sampling results will be averaged within these watersheds and compared to the thresholds discussed below for determination of impairment. When there are not sufficient biological data to evaluate the 8-digit watershed, smaller 12-digit subwatersheds where biological samples indicate some level of degradation will be evaluated to determine whether the 12-digit subwatershed is impaired.

If a watershed or subwatershed is determined to be impaired, corrective action must be taken. That action may begin with additional monitoring and evaluation to determine the cause of the impairment. This is known as stressor identification. Once the stressor has been identified, in many cases it may be appropriate to develop an estimate of the Total Maximum Daily Load (TMDL) of the stressor that can be assimilated by the body of water and still allow it to achieve the water quality criteria necessary to maintain its designated use.

G.1.1.2 Application⁹

G.1.1.2.1 Stream Order

The fish and benthic indices shall be applied only in "wadeable" first, second, third, and fourth order streams except as described below under "Exceptions." Biological indices and criteria will be developed in the future for other categories of water bodies (*e.g.*, larger streams, estuaries, and impoundments), which are currently assessed by chemical and physical monitoring programs. However, the streams to which the current indices apply account for about 90% of Maryland's stream miles. The sampling sites will be analyzed within 8- or 12-digit watersheds for the purposes of evaluation, application of management practices, and listing methods. Eight digit watersheds are on average 90 square miles; 12-digit watersheds average 11 square miles.

G.1.1.2.1.1 Procedures for 8-digit watersheds

Data from at least 10 sites are needed within an 8-digit watershed in order to evaluate watersheds at the 8-digit level. In watersheds with 10 benthic IBI scores but < 10 fish IBI

⁹ Excerpts (with minor revisions) from Roth, N.E., M.T. Southerland, G. Mercurio, and J.H. Volstad. Maryland Biological Stream Survey 2000-2004, Volume I: Ecological Assessment of Watersheds Sampled in 2000. Prepared by Versar, Inc., Columbia, MD, for the Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division. Draft, March 2001.

scores, the benthic IBI alone will be used for the 8-digit analysis. In these cases, fish IBI scores will be incorporated into 12-digit subwatershed analysis to avoid losing information about possible impairments.

In general, MBSS currently employs 8-digit watersheds as primary sampling units. In a few cases, where individual 8-digit watersheds have a small number of stream miles, primary sampling units include more than one 8-digit watershed apiece. These are not assessed at the 8-digit level, because of insufficient sample size within individual 8-digit watersheds. Possible impairments in these areas will be assessed at the 12-digit subwatershed scale based on analysis of individual samples.

Where sufficient data are available within an 8-digit watershed (at least 10 sites with IBI scores), mean IBIs and one-sided 90% confidence interval values are calculated from the data as follows.

if IBI_{mean} is < 3 , $CL_{Upper} = IBI_{mean} + (z * SE)$, or

if IBI_{mean} is ≥ 3 , $CL_{Lower} = IBI_{mean} - (z * SE)$

Where

CL_{Upper} = upper confidence limit

CL_{Lower} = lower confidence limit

z = normal variate (in this case, $z = 1.28$ for one-sided 90% confidence interval, assuming a normal distribution for mean IBI)

SE = standard error of the mean = sd / \sqrt{n} , where sd = standard deviation

The following rules will be applied to give one of three ratings for 8-digit watersheds:

1. **Does not meet criteria:** If the mean and upper bound of the one-sided 90% confidence interval (CL_{Upper}) of either index (FIBI or BIBI) is less than 3.0, the 8-digit watershed is listed as failing to meet the proposed criteria.
2. **Meets criteria:** If the mean and lower bound of the one-sided 90% confidence interval (CL_{Lower}) of both indices (FIBI and BIBI) are greater than or equal to 3.0, the 8-digit watershed is listed as meeting the proposed criteria.
3. **Inconclusive:** All other cases are inconclusive.

Within 8-digit watersheds that meet criteria, constituent subwatersheds may still be rated as not meeting criteria or inconclusive. Also, within 8-digit watersheds that are inconclusive, particular 12-digit subwatersheds within them may be rated as not meeting criteria. The 12-digit subwatershed analysis is described below.

G.1.1.2.1.2 Procedures for 12-digit Subwatersheds

Data from individual sites are used to flag 12-digit subwatersheds that may be impaired. One-sided 90% confidence intervals associated with single samples are calculated using an average coefficient of variation (*cv*) of the IBIs from replicate samples, (for example, *cv* = 0.08, as derived from previous analysis of IBI variability (Roth et al. 2001)). Confidence intervals around scores for individual samples are calculated as follows:

if IBI is < 3, $CL_{Upper} = IBI + (z * SE_{Est})$, or

if IBI is ≥ 3 , $CL_{Lower} = IBI - (z * SE_{Est})$

where

CL_{Upper} = upper confidence limit

CL_{Lower} = lower confidence limit

z = normal variate (in this case, *z* = 1.28 for one-sided 90% confidence interval, assuming a normal distribution for mean IBI)

SE_{Est} = estimated standard error of the mean = $IBI \times (cv / \sqrt{n})$ (in this case, *n*=1)

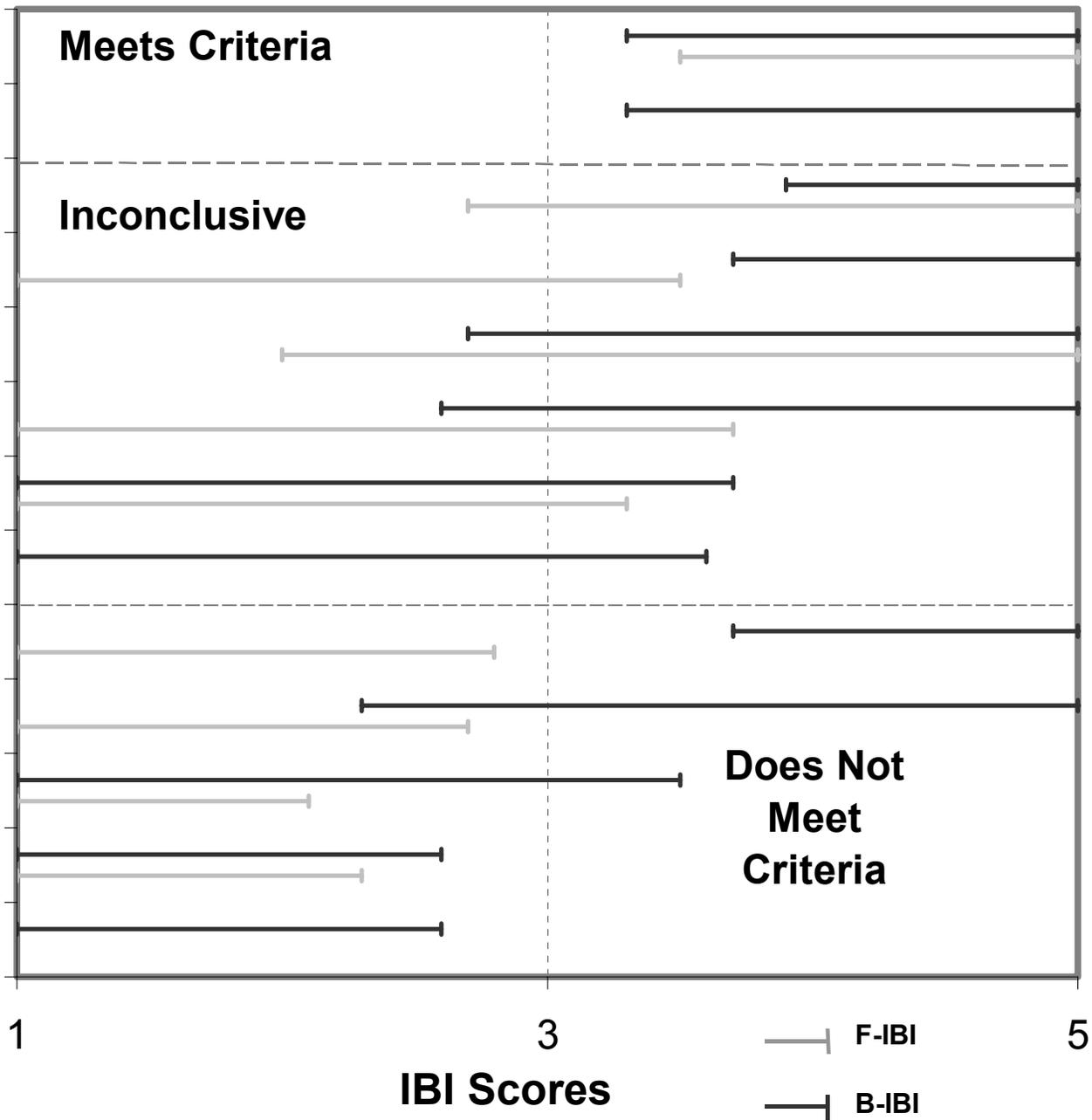
Following the guidelines of the interim biocriteria framework, the following rules will be applied to give one of three ratings for 12-digit subwatersheds:

1. **Does not meet criteria:** If for any site, the value and upper bound of the one-sided 90% confidence interval (CL_{Upper}) of either index (FIBI or BIBI) is less than 3.0, the 12-digit subwatershed is listed as failing to meet the proposed criteria.
2. **Meets criteria:** If for all sites, the value and lower bound of the one-sided 90% confidence interval (CL_{Lower}) of both indices (FIBI and BIBI) are greater than or equal to 3.0, the 12-digit subwatershed is listed as meeting the proposed criteria.
3. **Inconclusive:** All other cases are inconclusive.

If more than one site is sampled in a 12-digit watershed, each site result is evaluated separately. If any one result indicates impairment, that subwatershed will be listed as impaired. Although that single site may not be representative of the entire subwatershed, the State determined that it

is more effective to manage at the watershed level of resolution. Further sampling for stressor identification and/or TMDL development will later define the extent of the impairment.

Application of Proposed Biocriteria: Examples



Bars indicate 90% confidence that true mean is within the indicated limit (one-sided, 90% confidence interval)

G.1.2 Prioritization for Watersheds Where Monitoring Interpretation is Inconclusive

Prioritization for additional monitoring to try to resolve inconclusive results and make a determination that the criteria are, or are not, met:

1a. Mean < 3 (the lower the IBI score, the higher the priority for attention), and large confidence interval. Rationale: low IBI scores indicate more significant problems; large confidence intervals can be reduced efficiently with a moderate increase in the amount of data available.

1b. Large confidence interval where lower limit just includes 3 and the mean is much higher. Rationale: in such cases, managers will be close to making a decision. Just a few additional samples may give a clear answer in one direction or the other.

2. Ecological importance, *e.g.*, spawning area, chemical and physical data, habitat. Rationale: Areas that deserve high priority from a resource management perspective (*e.g.*, spawning areas) should also be considered a high priority for monitoring and conclusive evaluation.

G.1.3 Reporting

A. 305(b) Report - If a watershed is determined to not meet criteria based on biological data, the watershed will be identified in the 305(b) database as “Not supporting aquatic life uses”. A watershed determined to meet criteria based on biological data will be identified in the 305(b) database as “Fully supporting aquatic life uses”. If the result of the biological data is “inconclusive”, the watershed will be listed as “inconclusive”.

B. 303(d) List - If a watershed is determined to not meet criteria based on biological data provided for the 305(b) report and a review of other biological data, the watershed will be identified in the 303(d) List as “Impaired”. A watershed determined to meet criteria, or for which the data are inconclusive, will be identified in the 303(d) List in categories 2 or 3, respectively.

If and when a revised listing procedure is adopted (*i.e.*, several parts as proposed by EPA in August, 1999), those procedures will be incorporated into this framework.

G.1.3.1 Exceptions

- (a) The fish index (F-IBI) does not apply in watersheds smaller than 300 acres.
- (b) In all Use III and IV streams (cold water streams), where brook trout are present and the F-IBI is less than 3.0, the stream will not be rated as impaired by the F-IBI; if the F-IBI is greater than or equal to 3.0, the stream will be rated as good. Cold water streams tend to have a naturally low fish diversity and biomass. Brook trout are normally indicators of high quality waters. So although the index may be low, the presence of brook trout indicates that the water is not impaired.
- (c) In blackwater streams (dissolved organic carbon > 8 mg/l and either pH <5 or acid neutralizing capacity (ANC) <200 µeq/L) and where the F- or B-IBI is less than 3.0, the

stream will not be considered impaired. If the B-IBI or the F-IBI is greater than or equal to 3.0, the stream will be rated as good.

- (d) For limestone streams (defined operationally in the Valley and Ridge physiographic region) with an acid-neutralizing capacity (ANC) > 600 µeq/L, if the F- or B-IBI is less than 3.0, it will be evaluated on a case-by-case basis because limestone streams typically have elevated alkalinity levels that favor the survival and reproduction of crustaceans such as scuds (Gammaridae). However, high alkalinities can also place physiological limitations on the survival and reproduction of other aquatic invertebrate taxa, including crane flies (Tipulidae) and some mayflies (Ephemeroptera), which results in hyper-abundance and dominance of selected species and overall lower species richness.
- (e) If the number of organisms in a benthic sample is less than 60, that sample will not be used and the stream segment “not rated” unless supporting data (*e.g.*, habitat rating, water quality data) indicate impairment and there is no evidence of sampling error or unusual natural phenomena.
- (d) Samples taken within two weeks of runoff events (*e.g.*, heavy rains, sudden heavy snow melt) that result in significant bedload movement (*i.e.*, erosion and transport of sediment) may be considered invalid in the best professional judgment of State biologists and not used for evaluation of stream condition.
- (e) Stream sampling sites that are tidally influenced, affected by excessive drought (seasonally dry) or impounded by beaver dams will not be evaluated in terms of affected Biotic Indices. For example, a site within a natural impoundment that was created by beaver activity between the spring benthic macroinvertebrate sampling and the summer fish sampling activities may be evaluated only in terms of benthic Biotic Index. Man-made alterations to selected stream segments (channelization, dredging) should be noted, but they do not disqualify the utility of these Biotic Indices.

G.1.3.2 Use of Other Data

G.1.3.2.1 Approach to Use of Non-MBSS Data in Biocriteria

Given that a key use of these procedures is for the 303(d) list of impaired waters, and that the State is required to consider all readily available data, MDE recognizes the need to incorporate local biological data into the assessment process. Counties or other water monitoring programs that intend to submit their data to support decisions made using the biocriteria framework should carefully follow the general guidelines below. All data will be placed in one of several data quality tiers and used appropriately according to the quality criteria of the data tier.

Tier 1: Data are documented to be of good quality and can be fully integrated with MBSS data. MBSS or comparable field and lab protocols are followed. MBSS or comparable IBI methodologies are used. Field, laboratory, and IBI methods will be considered comparable to MBSS if methods can be demonstrated to yield stream condition ratings that agree with, or can be calibrated to yield the same ratings as, those of the MBSS methods. A QA/QC document and monitoring protocol is available for the monitoring program. Data are provided in a format readily available for merging into the MBSS database. Benthic macroinvertebrate and/or fish communities are monitored and identified to the lowest practicable taxonomic level (generally genus for benthic macroinvertebrates and species for fish).

At the 12-digit level, the proposed biocriteria framework relies on IBI scores at one or more individual sites, along with the estimated expected sampling error for repeated sampling at a single site. Thus, a County or other program would need to supply fish and/or benthic IBI scores that are unbiased for a site and that have quantifiable precision. If MBSS field, lab, and IBI methods are used, the estimated variance previously derived for repeated sampling at a single site using the MBSS IBIs would apply and a new precision (standard error) estimate would not be required. If MBSS field, lab, and IBI methods are not used, the program would need to demonstrate (in accordance with guidance and technical direction from the State) the following:

- Calibrate the program's IBI scores with MBSS IBI scale to show how scores on the different scales yield stream ratings in agreement, so that a consistent threshold is used to determine impairment.
- Conduct variability analysis for the program's IBI, to estimate variability for repeated sampling at a single site. This variability estimate is needed to calculate the confidence interval around individual site results.
- At the 8-digit level, the proposed biocriteria framework relies on quantifiable estimates of watershed-wide IBI mean and standard error. In addition to the factors listed above, the County or other program must also provide (in accordance with guidance and technical direction from the State): an unbiased estimate of the watershed mean IBI, with 90% confidence interval. This can be achieved with various probability-based sampling approaches (*e.g.*, simple or stratified random sampling), as long as derived estimates are consistent with a survey design that gives unbiased estimates of mean and variance (*i.e.*, all sites have a known, non-zero probability of being selected for sampling, and areawide estimates account for sampling weights based on the inclusion probabilities). Supplemental information on the survey design, sample frame, and site selection procedures may be useful for integration of this watershed estimate with MBSS results.

Tier 2: Data are documented to be of good quality; however, MBSS field and lab protocols are not followed. A probability-based sampling approach may or may not be used. A QA/QC document and monitoring protocol including replicate data and development of known precision are available for the monitoring program. Data are provided in a format readily available for merging into database formats used by the State. Monitoring is generally limited to either the benthic macroinvertebrate or fish communities and may be identified to the lowest practicable taxonomic level

- Data will need to be assessed for general compatibility with MBSS methodology, consistency with good scientific practice, and documentation of adequate quality.
- Data will be used to supplement Tier 1 data. At the 12-digit level, Tier 2 data can be used to augment assessments based on a single Tier 1 observation. At the 8-digit watershed level, Tier 2 data can supplement watershed characterizations.

- Where local data support the State assessment, conclusions can be stated with greater confidence.
- Where local data contradict the State assessment, water quality assessors must understand the basis for the difference before a final determination is made. There may be many valid reasons for differences, but if local data override conclusions based on State data, a rationale must be provided.
- Where there are no State data, local data may be used to make water quality assessment decisions, if, in the determination of the assessor, the data meet quality criteria equivalent to those used in the MBSS program.

Other situations: Data not meeting the requirements stated above may be helpful for non-regulatory purposes (*e.g.*, targeting, education). Such data will be stored and documented for these uses. State biologists may refer submitters to information sources that will help them to improve the quality of their monitoring data.

G.1.3.3Stressor Identification

Cause/source identification - If a watershed is determined to be impaired based on biological data, the cause of the impairment(s) will then be determined by a review of all of the relevant chemical, physical, and physical habitat data. If the source of the impairment(s) cannot be determined from the data, an on-site evaluation of the watershed may be undertaken including more detailed diagnostic testing such as sediment and water column chemistry and toxicity and geomorphic analyses. Habitat evaluation during sampling, along with chemical and physical data, will be used to evaluate the potential causes of impairments. It may be determined in some cases that the appropriate remedy is stream restoration rather than reduction of a specific chemical pollutant.

G.1.3.4References

Calculation of the IBIs:

Roth, N.E., M.T. Southerland, J.C. Chaillou, P.F. Kazyak, and S.A. Stranko. 2000. Refinement and validation of a fish Index of Biotic Integrity for Maryland streams. Prepared by Versar, Inc., Columbia, MD, with Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division. CBWP-MANTA-EA-00-2.

Roth, N., M. Southerland, J. Chaillou, R. Klauda, P. Kazyak, S. Stranko, S. Weisberg, L. Hall, Jr., and R. Morgan II. 1998. Maryland Biological Stream Survey: Development of a Fish Index of Biotic Integrity. *Environmental Management and Assessment* 51:89-106

Stribling J.B., B.K. Jessup, J.S. White, D. Boward, and M. Hurd. 1998. Development of a Benthic Index of Biotic Integrity for Maryland Streams. Prepared by Tetra Tech, Inc., Owings

Mills, MD and Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Program. CBWP-MANTA-EA-98-3.

Additional IBI analysis and interpretation:

Roth, N.E., M.T. Southerland, G. Mercurio, J.C. Chaillou, P.F. Kazyak, S.S. Stranko, A.P. Prochaska, D.G. Heimbuch, and J.C. Seibel. 1999. State of the Streams: 1995-1997 Maryland Biological Stream Survey Results, Prepared by Versar, Inc., Columbia, MD, and Post, Buckley, Schuh and Jernigan, Inc., Bowie, MD, with Maryland Department of Natural Resources, Monitoring and Non-tidal Assessment Division. CBWP-MANTA-EA-99-6.

Roth, N.E., M.T. Southerland, G. Mercurio, and J.H. Volstad. 2001. Maryland Biological Stream Survey 2000-2004, Volume I: Ecological Assessment of Watersheds Sampled in 2000. Prepared by Versar, Inc., Columbia, MD, for Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division.

Roth, N.E., J.H. Volstad, G. Mercurio, and M.T. Southerland. 2001. Biological Indicator Variability and Stream Monitoring Program Integration: A Maryland Case Study. Prepared by Versar, Inc., Columbia, MD, for U.S. Environmental Protection Agency, Office of Environmental Information and the Mid-Atlantic Integrated Assessment Program.

Griffith, M.B., S.A. Perry and W.B. Perry. 1994. Secondary production of macroinvertebrate shredders in headwater streams with different baseflow alkalinity. *Journal of the North American Benthological Society* 13(3): 345-356.

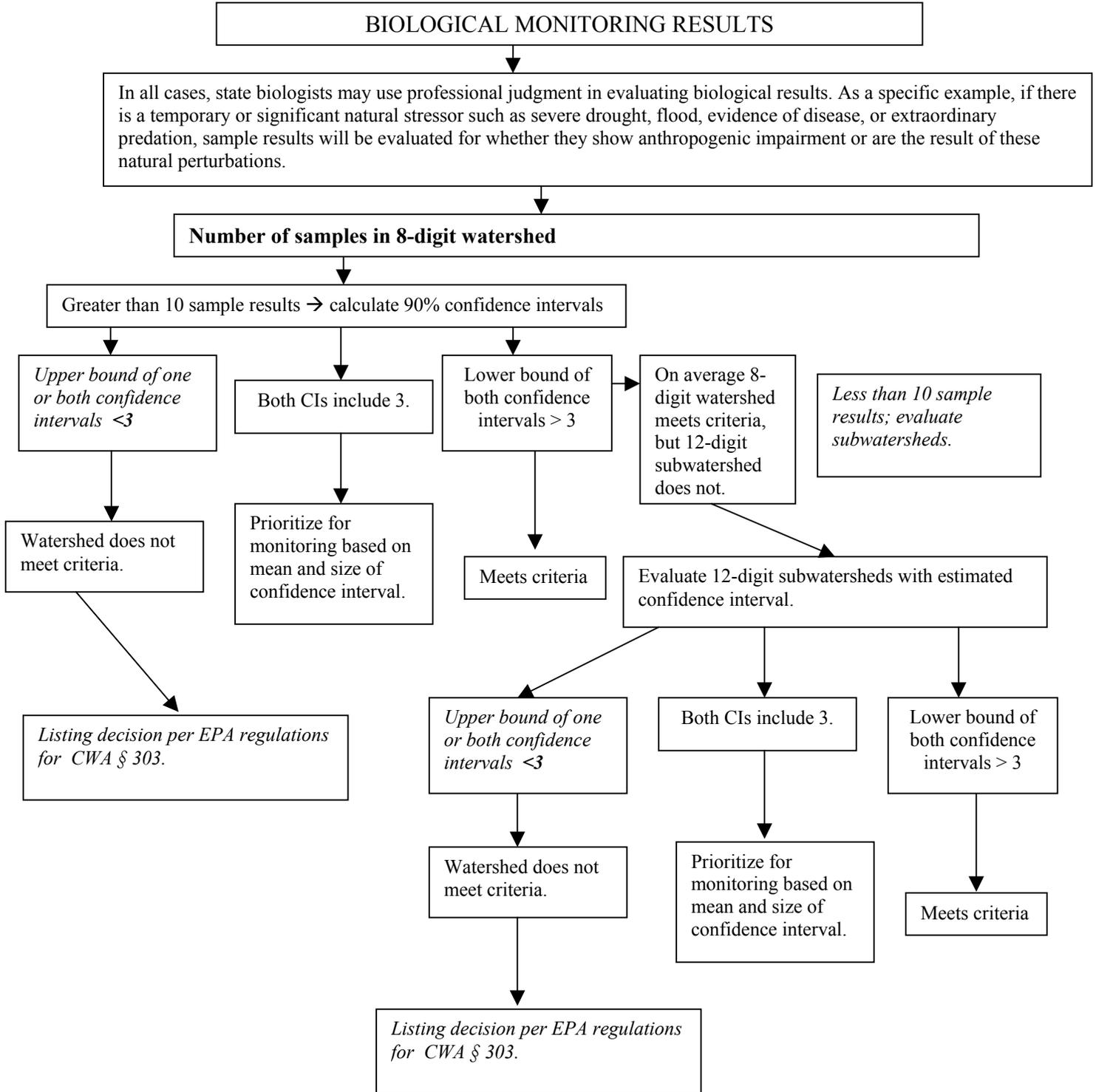


Figure 2. Biological Monitoring Decision Flow – FINAL

G.2 LISTING METHODOLOGY FOR SEWAGE RELEASES

Bacteria released during single or rare combined sewer overflows, sanitary sewer overflows or other releases will dissipate naturally after several weeks. However, repeated sewage releases of significant size may result in violations of the water quality standards, particularly if the volumes are large or frequent and the water bodies are small, slow moving or poorly flushed. Under such spill conditions, violations are presumed to have occurred even in the absence of actual monitoring data. If a TMDL is scheduled to be developed for a water body that has previously been identified as impaired, additional data relative to spill events will be collected. Notwithstanding such documented spill events, if the water quality is consistent with the bacterial standard at that time, a Water Quality Analysis demonstrating the lack of such an impairment will be completed (rather than a TMDL) and the water body will become eligible for de-listing. However, if data indicate that water quality standards are not being met, a TMDL will be completed.

G.2.1 Methodology

Based on data in MDE's spill data bases, if any water body segment has received two spills greater than 30,000 gallons over any 12-month period after the listing or after system improvements have been made, that water body will be considered as impaired and therefore listed as requiring a TMDL. This listing methodology will be applied only in the absence of bacterial monitoring data; if such monitoring data are available, the decision methodology for bacteria will apply.

G.3 Listing Methodology for Solids For the April 2002 Water Quality Inventory

In the existing Water Quality Inventory (303(d) List), there are numerous impairments for "sediments". Many of these were assessed and projected based on land use and the likelihood of such impairments. Unfortunately the term "sediments" does not accurately inform the public as to the nature of the impairment, nor provide helpful guidance to those who need to develop TMDLs to remediate the problem.

In this current list, impairments previously listed for sediments, and new impairments evaluated for this report will be determined and listed as described below.

Free-flowing Streams
Water Clarity

Impairing substance: Total Suspended Solids (TSS)
Measure: Turbidity as measured in Nephelometric Turbidity Units (NTUs)
Criterion: Turbidity criteria are addressed in COMAR §26.08.02.03-3(A)(5):

- (5) Turbidity
 - (a) Turbidity may not exceed levels detrimental to aquatic life.
 - (b) Turbidity in the surface water resulting from any discharge may not exceed 150 units at any time for 50 units as a monthly average. Units shall be measured in Nephelometric Turbidity Units.

Erosional and Depositional Impacts (limited to wadeable streams)

Impairing substance: Soils or sediment
Measure: Biocriteria. The application of biocriteria for assessment decisions for the 303(d) List is addressed elsewhere in this document.
Criterion: Addressed under the narrative criteria:

- 26.08.02.02(B) Specific designated uses.
 - (1) Use I: Water Contact Recreation, and Protection of Aquatic Life. This use designation includes waters which are suitable for:
 - (c) The growth and propagation of fish (other than trout), **other aquatic life**, and wildlife
 - (4) Use III: Natural Trout Waters. This use designation includes waters which have the potential or are:
 - (a) Suitable for the growth and propagation of trout; and
 - (b) Capable of supporting self-sustaining trout populations and **their associated food organisms**.
 - (5) Use IV: Recreational Trout Waters.

- (a) Capable of holding or supporting adult trout for put-and-take fishing; and
- (b) Managed as a special fishery by periodic stocking and seasonal catching.

Waters must be protected for these designated uses (26.08.02.02(A)). Key phrases supporting the use of biocriteria to protect against impacts from eroded or deposited sediments are highlighted.

- If MBSS data indicate impairment, the habitat data related to sediments will be assessed.
- If there is no indication of a sediment problem (*e.g.*, embeddedness does not indicate a problem), the listing will be for "degraded aquatic community."
- If there does appear to be a sediment problem, it will be listed for soils or sediment.

G.3.1 Impoundments

Maryland has no natural lakes. This decision rule covers reservoirs and other manmade lakes. Estuaries, such as Chesapeake Bay will be covered under new regulations currently being developed and which specifically address water clarity and sediment.

Water Clarity

Impairing substance: Total Suspended Solids (TSS)
Measure: Turbidity as measured in Nephelometric Turbidity Units (NTUs)
Criterion: Turbidity criteria are addressed in COMAR §26.08.02.03-3(A)(5):

(5) Turbidity

- (d) Turbidity may not exceed levels detrimental to aquatic life.
- (e) Turbidity in the surface water resulting from any discharge may not exceed 150 units at any time for 50 units as a monthly average. Units shall be measured in Nephelometric Turbidity Units.

If turbidity exceeds the indicated levels, chlorophyll shall also be measured. If chlorophyll is high, the impairment will be attributed to nutrient enrichment (eutrophication), rather than solids. Exceptions may be made and professional judgment applied in areas where soil and local geologic conditions would normally have high sediment runoff.

PART H: APPENDIX 3 - ANTICIPATED FFY 2006 & 2007 TMDLs

Submission Date	Listing Year	Listed Water body	Impairing Substance	1998 MOU Count	2004 303(d) List Count
September 2006					
	1998	<i>Chester River</i>	<i>Nutrients</i>	2	2
	1996	<i>Prettyboy Reservoir</i>	<i>Nutrients</i>	1	1
	1996	<i>Loch Raven Reservoir</i>	<i>Nutrients & Sediments</i>	2	2
	1996	<i>Nontidal Waters</i>	<i>Sediment</i>	7	7
	1996	<i>Wicomico River Headwaters*</i>	<i>Non-tidal Bacteria</i>	1	1
	2002	<i>Anacostia River*</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Cabin John Creek*</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Rock Creek*</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Piscataway Creek*</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Back River</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Georges Creek</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Gwynns Falls</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Jones Falls</i>	<i>Non-tidal Bacteria</i>	0	1
	2002	<i>Wills Creek</i>	<i>Non-tidal Bacteria</i>	0	1
	1996	<i>Upper and Middle Chester River</i>	<i>Nutrients</i>	2	2
	1996	<i>Potomac River Middle Tidal</i>	<i>Cadmium, Chromium, Copper, Lead</i>	4	4
	1996	<i>Potomac River Upper Tidal</i>	<i>Copper</i>	1	1
	1996	<i>Wills Creek</i>	<i>Cyanide</i>	1	1
	1996	<i>Upper North Branch of the Potomac River</i>	<i>Metals</i>	1	1
	1996	<i>Lower North Branch of the Potomac River</i>	<i>Cadmium</i>	1	1
	1998	<i>Triadelphia Reservoir (Brighton Dam)</i>	<i>Nutrients & Sediments</i>	2	2
	1998	<i>T. Howard Duckett Reservoir (Rocky Gorge Dam)</i>	<i>Nutrients</i>	1	1
	1996	<i>Zekiah Swamp</i>	<i>Copper, Selenium, Zinc, Lead</i>	4	4
	1996	<i>Anacostia River (both Tidal and Non-Tidal portions)</i>	<i>Sediments</i>	1	2
	1996	<i>Upper Monocacy River</i>	<i>Nutrients</i>	1	1
	1996	<i>Double Pipe Creek</i>	<i>Nutrients</i>	1	1
	1996	<i>Isle of Wight</i>	<i>Shellfish Area Bacteria</i>	1	1
	1996	<i>Wye River</i>	<i>Shellfish Area Bacteria</i>	1	1
	1998	<i>Patuxent Mainstem to Ferry Landing</i>	<i>Shellfish Area Bacteria</i>	1	1
	1996	<i>Lower Wicomico River</i>	<i>Shellfish Area Bacteria</i>	1	1
	1996	<i>Kent Narrows/Prospect Bay</i>	<i>Shellfish Area Bacteria</i>	1	1
Total for 1998 MOU				38	

Submission Date	Listing Year	Listed Water body	Impairing Substance	1998	2004
				MOU Count	303(d) List Count
		Total Listings Addressed from 2004 303(d) List (1996/1998/2002/2004)			48
September 2007					
	1996	Nontidal Waters	Sediment	7	7
	2004	Tangier Sound	Shellfish Area Bacteria	0	1
	1996	Baltimore Harbor	Nutrients	1	1
	1996	Youghiogheny River	Low pH	1	1
	1996	Tidal Waters	Shellfish Bacteria	6	6
	1996	Lower Choptank River	Shellfish Area Bacteria	1	6
	1996	Severn River	Shellfish Area Bacteria	1	2
	1998	Wills Creek	Low pH	1	1
	1998	Georges Creek	Low pH	1	1
	1996	Upper North Branch of the Potomac River	Low pH	1	1
	1996	Casselman River	Low pH	1	1
	2004	Savage River	Low pH	0	1
	1996	Little Patuxent River	Cadmium	1	1
	1996	Lower Susquehanna River	Cadmium	1	1
	1996	Middle Patuxent River	Zinc	1	1
	1996	Little Seneca Lake	Nutrients	1	1
		Total for 1998 MOU		25	
		Total Listings Addressed from 2004 303(d) List (1996/1998/2002/2004)			33
Grand Total				63	81

* These projects were originally scheduled for 2005 submittal. Will be submitted early in 2006.

PART J: APPENDIX 5 - CHANGES RESULTING FROM REMOVAL OF THE FISH INDICES OF BIOLOGICAL INTEGRITY IN THE LESS THAN 300-ACRE WATERSHEDS

SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
BRIG-105-R-2000	5	1.67	Brighton Dam	02131108	021311080969	021311080969	5	162.49	Supports 8 digit listing - changed at the 8 digit level from category 3a to 2	3a to 2	
BRIG-132-R-2000	4.67	1.67	Brighton Dam	02131108	021311080966	021311080966	5	215.6	Changed from category 5 to 3a	3a to 2	5 to 3a
BYNU-105-R-2004	3.67	1.67	Bynum Run	02130704	021307041131	021307041131	5	105.2	Assessment of the 12 digit shed did not change. Note given for the individual record.		nc
CATO-104-R-2003	3.5	1	Catoctin Creek	02140305		021403050215	5	224.99	Assessment of the 8 digit shed did not change. Scores were recalculated because of the elimination of 2 FIBI scores	nc	
CATO-106-R-2003	3.75	1	Catoctin Creek	02140305		021403050215	5	220.56		nc	
DEER-103-R-	3.67	1.67	Deer Creek	02120202	021202020328	021202020328	5	120.2	Changed at the 8 digit level	3a to 2	nc

SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
2001									from 3a to 2 based on recalculations - 0328 stayed category 5		
DEER-109-R-2004	3.33	1	Deer Creek	02120202	021202020325	021202020325	5	141.62	Changed at the 8 digit level from 3a to 2 based on recalculations. 0325 stayed the same	3a to 2	nc
DEER-110-R-2001	4.33	1	Deer Creek	02120202	021202020322	021202020322	5	131.1	Changed at the 8 digit level from 3a to 2 based on recalculations. 0322 - changed to category 2	3a to 2	5 to 2
DEER-119-R-2004	4.67	1.67	Deer Creek	02120202	021202020324	021202020324	5	143.46	Changed at the 8 digit level from 3a to 2 based on recalculations. Watershed 021202020324 changed from category 5 to category 3a.	3a to 2	5 to 3a
DEER-121-R-2004	4	2.67	Deer Creek	02120202	021202020328	021202020328	5	117.7	Changed at the 8 digit level from 3a to 2	3a to 2	vc

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									based on recalculations - 0328 stayed category 5		
FIMI-198-E-2004	4	1.67	Fifteen Mile Creek	02140511	021405110136	021405110136	5	133.49	Assessment at the 8 digit level remained the same - scores were slightly different - 0136 stayed category 5	nc	
GILB-112-R-2001	3.57	1	Gilbert Swamp	02140107	021401070745	021401070745	5	138.9	Changed at the 8 digit level from category 3a to 2 - 0745 remained category 5	3a to 2	nc
GWYN-102-R-2004	5	2.67	Gwynns Falls	02130905		021309051045	5	170.38	Assessment at the 8 digit level remained the same - scores were slightly different - 1045 remained the same.	nc	nc
JONE-109-S-2000	4.67	1.33	Jones Falls	02130904		021309041036	5	271.5	Changed at the 8 digit level from 5 to 3a based on recalculations - JONE-109-S-2002 is a	5 to 3a	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									sentinal site and remains category 5		
JONE-109-S-2001	5	1.33	Jones Falls	02130904		021309041036	5	271.5	Changed at the 8 digit level from 5 to 3a based on recalculations - JONE-109-S-2002 is a sentinal site and remains category 5	5 to 3a	
JONE-109-S-2002	4.33	1.33	Jones Falls	02130904		021309041036	5	271.5	Changed at the 8 digit level from 5 to 3a based on recalculations - JONE-109-S-2002 is a sentinal site and remains category 5	5 to 3a	
JONE-109-S-2003	4.33	1.33	Jones Falls	02130904		021309041036	5	271.5	Changed at the 8 digit level from 5 to 3a based on recalculations - JONE-109-S-2002 is a sentinal site and remains category 5	5 to 3a	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
JONE-109-S-2004	3.67	1.67	Jones Falls	02130904		021309041036	5	271.5	Changed at the 8 digit level from 5 to 3a based on recalculations - JONE-109-S-2002 is a sentinel site and remains category 5	5 to 3a	
LIBE-113-R-2000	4	2.67	Liberty Reservoir	02130907	021309071048	021309071048	5	291.84	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
LIGU-114-R-2003	3.67	2	Little Gunpowder Falls	02130804	021308040298	021308040298	5	210.57	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
LOCH-107-R-2002	3.67	1.33	Loch Raven Reservoir	02130805	021308050308	021308050308	5	298.99	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
LOCR-116-R-2002	3.57	2	Lower Chester River	02130505	021305050390	021305050390	5	142.47	Assessment of the 8 digit shed did not change. The 12 digit shed	nc	5 to 2

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									021305050390 changed from category 5 to category 2.		
LOCK-108-R-2003	3.57	1	Lower Choptank River	02130403	021304030471	021304030471	5	136.34	Eliminating the FIBI score had no effect on the assessment because of a failing BIBI score.		nc
LMON-130-T-2000	3.75	1	Lower Monocacy River	02140302		021403020224	5	47.14	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
PRLN-104-R-2003	3.5	1	Lower North Branch Potomac River	02141001	021410010072	021410010072	5	144.33	Assessment of the 12 digit shed changed from category 5 to category 3a.		5 to 3a
PRLN-119-R-2003	3.5	2	Lower North Branch Potomac River	02141001	021410010057	021410010057	5	209.67	Assessment did not change.		nc
PRLN-122-R-2003	4	2	Lower North Branch Potomac River	02141001	021410010055	021410010055	5	289.2	Assessment did not change.		nc
MPAX-	3.67	2.67	Middle	02131106	021311060963	021311060963	5	232.41	Assessment of	3a	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
101-R-2002			Patuxent River						the 8 digit shed changed from category 3a to category 2.	to 2	
NANJ-119-R-2000	3.86	1	Nanjemoy Creek	02140110	021401100778	021401100778	5	264.77	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
OCTO-107-R-2004	4.33	2.33	Octoraro Creek	02120203	021202030344	021202030344	5	167.21	Assessment of the 12 digit shed did not change.		nc
OCTO-118-R-2004	4	2	Octoraro Creek	02120203	021202030346	021202030346	5	249.63	Assessment of the 12 digit shed changed from category 5 to category 2.		5 to 2
WCHE-104-R-2003	4.14	2.67	Other West Chesapeake Bay	02131005		021310050976	5	93.03	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
WCHE-106-R-2003	4.14	1	Other West Chesapeake Bay	02131005		021310050976	5	265.14	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	

SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
PATL-106-R-2000	3.33	1.33	Patapsco River Lower North Branch	02130906		021309061014	5	73.54	Assessment at both the 8 digit and the 12 digit level did not change. Scores were recalculated.	nc	nc
PATL-124-R-2000	4.33	3	Patapsco River Lower North Branch	02130906		021309061019	5	240.21	Assessment at both the 8 digit and the 12 digit level did not change. Scores were recalculated.	nc	nc
PAXL-109-R-2004	4.14	2	Patuxent River lower	02131101	021311010883	021311010883	5	221.07	Assessment of the 12 digit shed did not change. Scores for 8 digit shed were recalculated.		nc
PAXL-116-R-2004	3.86	2	Patuxent River lower	02131101	021311010869	021311010869	5	88.11	Assessment of the 12 digit shed changed from category 5 to category 2. Scores for 8 digit shed were recalculated.		5 to 2
PTOB-118-R-	3.57	1	Port Tobacco River	02140109		021401090771	5	140.6	Assessment of the 8 digit	5 to 3a	5 to 2

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
2003									shed changed from category 5 to category 3a. Watershed 021401090771 changed from category 5 to category 2.		
PRLT-104-R-2002	3.86	2	Potomac River Lower tidal	02140101	021401010698	021401010698	5	191.54	Assessment of the 12 digit shed did not change.		nc
PRLT-105-R-2002	4.14	1.67	Potomac River Lower tidal	02140101	021401010698	021401010698	5	111.98	Assessment of the 12 digit shed did not change.		nc
PRUT-103-R-2001	3.57	2	Potomac River Upper tidal	02140201		021402010796	5	77.5	Assessment at the 8 digit level did not change. FIBI was not used in the assessment because n< 10.	nc	
PRUT-116-R-2001	3.86	1	Potomac River Upper tidal	02140201		021402010792	5	83.7	Assessment at the 8 digit level did not change. FIBI was not used in the assessment	nc	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									because n< 10.		
PRWA-103-R-2000	3.5	1.33	Potomac River Washington County	02140501		021405010160	5	241.78	Assessment of the 8 digit shed did not change. Scores were recalculated.	nc	
PRET-112-R-2000	4	1.33	Prettyboy Reservoir	02130806	021308060313	021308060313	5	148.27	Assessment at both the 8 digit and the 12 digit level did not change. Scores were recalculated.	nc	nc
SOUT-109-R-2002	3.57	2.67	South River	02131003	021310030992	021310030992	5	215.55	Assessment of the 12 digit shed did not change.		nc
STCL-112-R-2002	5	2	St. Clements Bay	02140105	021401050727	021401050727	5	98.74	In 2004 watershed 021401050727 was assessed category 2, FIBI score was not used. In 2006 the FIBI score was inadvertently include causing the change to category 5.		5 to 2

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									Because of catchment size the FIBI score should not have been used.		
STMA-110-R-2000	5	2.67	St. Mary's River	02140103	021401030710	021401030710	5	75.39	Assessment of watershed 021401030710 did not change. Assessment of the 8 digit watershed 02140103 changed from category 3a to 2. Scores were recalculated.	3a to 2	nc
STMA-119-R-2003	3.86	2.33	St. Mary's River	02140103	021401030710	021401030710	5	56.83	Assessment of watershed 021401030710 did not change. Assessment of the 8 digit watershed 02140103 changed from category 3a to 2. Scores were	3a to 2	nc

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									recalculated.		
WICO-101-R-2004	3.57	1	Wicomico River	02140106	021401060734	021401060734	5	207.15	Assessment of the 8 digit shed changed from category 3a to category 2.	3a to 2	
WICO-105-R-2004	4.14	1	Wicomico River	02140106	021401060734	021401060734	5	61.45	Assessment of the 8 digit shed changed from category 3a to category 2.	3a to 2	
WYER-104-R-2003	3.57	2.33	Wye River	02130503	021305030436	021305030436	5	118.9	Assessment of the 12 digit shed did not change.		nc
YOUG-101-R-2001	3.5	2	Youghiogheny River	05020201	050202010016	050202010016	5	191.4	Assessment of the 12 digit shed changed from category 5 to category 3a. Scores were recalculated.		5 to 3a
YOUG-107-R-2001	4.25	2.5	Youghiogheny River	05020201	050202010005	050202010005	5	163.9	Assessment of the 12 digit shed did not change.		nc
MATT-117-R-2000	4.43	4	Mattawoman Creek	02140111		021401110780	2	101.2	Assessment of the 8 digit shed did not	nc	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									change. Scores were recalculated.		
BELK-110-R-2003	4.67	5	Big Elk Creek	02130606	021306060387	021306060387	2	255.48	Assessment of the 12 digit shed did not change.		nc
SBPA-103-R-2000	3.67	4	South Branch Patapsco River	02130908		021309081030	2	263.99	Assessment of the 8 digit shed did not change. FIBI n<10	nc	
GILB-108-R-2001	3.86	3	Gilbert Swamp	02140107		021401070753	3a	30.3	Assessment of the 12 digit shed changed from category 3a to category 2. Now supports the 8 digit listing.		3a to 2
FIMI-103-R-2000	3.25	0	Fifteen Mile Creek	02140511	021405110137	021405110137	3a	51.23	Neither 8 nor 12 digit assessment changed.	nc	nc
BRET-115-R-2002	3.57	0	Breton Bay	02140104		021401040720	3a	79.27	No change to 8 dgt shed. Assessment of the 12 digit shed changed from category 3a to category 2.		3a to 2
SIDE-	3.25	0	Sideling Hill	02140510		021405100149	3a	82.3	Neither 8 nor	nc	nc

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
101-R-2001			Creek						12 digit assessment changed.		
PRWA-125-R-2002	3.25	0	Potomac River Washington County	02140501	021405010157	021405010157	3a	91.39	Neither 8 nor 12 digit assessment changed. One CL changed b/c STDEV left out one station.	nc	nc
FIMI-108-R-2000	3.75	0	Fifteen Mile Creek	02140511	021405110137	021405110137	3a	137.49	Neither 8 nor 12 digit assessment changed.	nc	nc
FURN-119-R-2001	3	3	Furnace Bay	02130609		021306090380	3a	167.6	No change to 8 dgt shed. 12 dgt shed needs to be checked.		
WCHE-119-R-2003	3.29	3.67	Other West Chesapeake Bay	02131005	021310050974	021310050974	3a	187.3	8 dgt shed goes from Category 5 to Category 2. 12 dgt shed does not change. FIBI score no longer a factor in 8 dgt assessment.	5 to 2	nc
STCL-106-R-	4.14	0	St. Clements Bay	02140105	021401050731	021401050731	3a	191.76	Assessment of the 8 dgt shed	nc	

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
2002									did not change.		
SBPA-105-R-2000	3.67	3.67	South Branch Patapsco River	02130908	021309081022	021309081022	3a	229.87	Assessment of the 8dgt shed did not change. FIBI <10	nc	
STCL-051-S-2003	4.43	3.67	St. Clements Bay	02140105	021401050730	021401050730	3a	235.57	Assessment of the 8 dgt shed did not change. Water shed 021401050730 changed from category 3a to category 2 and supports 8 dgt listing.	nc	3a to 2
STCL-051-S-2001	5	3.67	St. Clements Bay	02140105	021401050730	021401050730	3a	235.57	Assessment of the 8 dgt shed did not change. Water shed 021401050730 changed from category 3a to category 2 and supports 8 dgt listing.	nc	3a to 2
STCL-051-S-2004	5	3.67	St. Clements Bay	02140105	021401050730	021401050730	3a	235.57	Assessment of the 8 dgt shed did not change.	nc	3a to 2

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									Water shed 021401050730 changed from category 3a to category 2 and supports 8 dgt listing.		
STCL-051-S-2000	4.43	3.33	St. Clements Bay	02140105	021401050730	021401050730	3a	235.57	Assessment of the 8 dgt shed did not change. Water shed 021401050730 changed from category 3a to category 2 and supports 8 dgt listing.	nc	3a to 2
STCL-051-S-2002	4.14	3.33	St. Clements Bay	02140105	021401050730	021401050730	3a	235.57	Assessment of the 8 dgt shed did not change. Water shed 021401050730 changed from category 3a to category 2 and supports 8 dgt listing.	nc	3a to 2
PAXL-115-R-2004	4.14	3.33	Patuxent River lower	02131101		021311010887	3a	289	Assessment of the 8 digit shed did not change but		3a to 2

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SITE	BIBI Results	FIBI Results	Basin Name	Basin Code	303(d) List_Subbasin Code	303(d) Data Sources Subbasin Code	Listing Category	acres	Correction made	8 digit	12 digit
									scores were recalculated. Shed 021311010887 changes from Category 3a to Cat 2.		
BRET-101-R-2002	4.71	3.33	Breton Bay	02140104		021401040720	3a	289.3	Assessment of the 8 digit shed did not change. Shed 021401040720 changes from category 3a to category 2.		3a to 2

**PART K: APPENDIX 6 - TMDLs AND WQAs APPROVED AFTER THE
PUBLIC COMMENT PERIOD FOR THE DRAFT INTEGRATED REPORT**

Listing Year	Basin Name	Basin Code	Subbasin Name	Subbasin Code	Status	Listing Category
1996	Breton Bay	02140104			TMDL approved	4a
1996	Magothy River	02131001	TAR COVE	021310011004	TMDL approved	4a
1996	Magothy River	02131001	MAGOTHY RIVER		TMDL approved	4a
1996	Magothy River	02131001	FORKED CREEK	021310011003	TMDL approved	4a
1996	West River	02131004	PARISH CREEK	021310040984	TMDL approved	4a
1996	West River	02131004	WEST RIVER		TMDL approved	4a
1996	West River	02131004	BEAR NECK CREEK	021310040986	TMDL approved	4a
1996	West River	02131004	CADLE CREEK	021310040986	TMDL approved	4a
1996	Manokin River	02130208	ST. PETER'S CREEK	021302080657	TMDL approved	4a
1996	Manokin River	02130208	MANOKIN RIVER		TMDL approved	4a
1998	Other West Chesapeake Bay	02131005	TRACY CR. AND ROCKHOLD CR. At CONFLUENCE OF HERRING BAY		TMDL approved	4a
1996	Honga River	02130401	BACK CREEK	021304010446	TMDL approved	4a
1996	Evitts Creek	02141002			WQA Approved	2
1996	Wills Creek	02141003			WQA Approved	2
1996	Lower Susquehanna River	02120201			WQA Approved	2

**PART L: APPENDIX 7 - PUBLIC COMMENT DOCUMENT AND MDE
RESPONSES**

List of Commentors

Author	Affiliation	Date
Larry Merrill	United States Environmental Protection Agency	January 23, 2006
Robert Boone	Anacostia Watershed Citizens Advisory Committee	March 2, 2006
Delegate Victor R. Ramirez	The Maryland House of Delegates	March 7, 2006
Lee J. Beetschen	Cabe Associates, Inc. Consulting Engineers	March 8, 2006
Congressman Chris Van Hollen	Congress of the United States. House of Representatives	March 8, 2006
Jennifer Murphy	Mid-Atlantic Environmental Law Center	March 8, 2006
Ann Rose	St. Mary's County Health Department	March 8, 2006
Carol J. Cain	Maryland Coastal Bays Program	March 10, 2006*
Kim Coble	Chesapeake Bay Foundation	March 10, 2006*
Senator Paul G. Pinsky	The Senate of Maryland	March 13, 2006*
Delegate Joanne C. Benson	The Maryland House of Delegates	March 28, 2006*
Councilman William Campos	Prince George's County Council	March 28, 2006*
Delegate Barbara A. Frush	The Maryland House of Delegates	March 28, 2006*
Delegate Carol S. Petzold	The Maryland House of Delegates	March 29, 2006*

*Submitted after March 8th, 2006 deadline for public comments.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION III
1650 Arch Street, Philadelphia, PA 19103, Larry Merrill, Acting Branch Chief
Watershed Restoration Branch 215-814-5776 crawford.tiffany@epa.gov

Comments:

1. Recreational Waters (B.3.2.1.3.1)

In the Recreational Waters section of the background and methodology for the Integrated Report, it states ... “data shall be collected from samples collected during steady state, dry weather conditions ...” The term “dry” is undefined by State regulations. Please clarify.

MDE Response: The term “dry” was inadvertently used and has since been removed from this sentence.

2. Executive Summary Page 7

Fill in the water to which Herbert Run is a tributary.

MDE Response: The Executive summary has been shortened in the final report to exclude a specific reference to Herbert Run. Herbert Run is a tributary to the Patapsco River Lower North Branch, basin code 02130906.

3. Water Clarity and the SAV Restoration Goal (A.1.1.1.2)

MDE has the responsibility for gathering and assessing readily available data, which would include (but not be limited to) Chesapeake Bay Program data. The sentence should be recharacterized as “there is insufficient existing and readily available data ...”

MDE Response: This sentence now reads - “As a result, unless the SAV acreage is already meeting the restoration goal, there are insufficient data this reporting cycle to assess whether the SAV use is attained.”

4. Assessment Units (B.2)

The statement ... “Maryland maintains the flexibility to assess water bodies at a scale appropriate to their designated use”... is rather ambiguous with respect to MD’s watershed code scheme (8 or 12-digit ...). Please Clarify.

MDE Response: The referenced language has been clarified to state - “Maryland maintains the flexibility to assess water bodies at a scale that is appropriate for the designated use, the spatial extent of the impairment, and tailored to a management scale that facilitates accurate loading analyses and effective implementation. The listing scale must also take into account the heterogeneous nature of the impaired watershed as well as the chemical and physical properties of the impairing substance. For water contact recreation, this could mean 1,000 linear feet of swimming beach while for shellfish harvesting the assessment unit could comprise a mapped reef area or harvest zone.

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Despite the size of the assessed area, however, the State includes a watershed code (8 or 12-digit – Figures 2 and 3) as the larger frame of reference for modeling purposes, public outreach and consistency with EPA’s ‘Watershed Approach’ to water quality management.

This year, the Chesapeake Bay Program introduced a new segmentation for Chesapeake Bay based upon the salinity regime of a given tidal segment. In the past Maryland has used a segmentation scheme based on a specified drainage area. As a result, in many cases the watershed and salinity-based boundaries do not align. To address this issue in the short-term, Maryland is maintaining separate lists of Bay segments and watersheds in this transition Integrated report. It is anticipated that the technical integration of segments and watersheds will be complete by the 2008 report.”

5. Maryland’s Watershed-based Assessment Units (B.2.1)

It is noted that with the exception of Chesapeake Bay and its adjoining tidal waters (Section C2.2) MD identifies watersheds using the Maryland 8 and 12 digit watershed scheme. Is this consistent with the discussion that follows on pages 21-26 for the Bay this cycle?

MDE Response: Since MDE is still using the 8-digit codes for Ches. Bay waters during this transition, the exception language for Ches. Bay was removed from this sentence. It now reads – “Although a new salinity based segmentation has been adopted for Chesapeake Bay and its tidal tributaries, Maryland will continue to identify watersheds in this reporting cycle using the Maryland 8 and 12-digit watershed scheme.”

6. Chesapeake Bay Salinity-based Assessment Units (B.2.2)

There seem to be some inconsistencies in the message relayed in the text, and table illustrations (see Table 5). Please clarify.

MDE Response: The caption for Table 5 has been further clarified to read – “New Chesapeake Bay segmentation compared to Maryland’s 8-digit watershed planning units. Close inspection of this table reveals that an 8-digit watershed can span multiple Chesapeake Bay segments. See Figure 5 above for a graphical illustration.”

7. Data Sources and Minimum Requirements for Listing (B.3.1)

In 2004, MDE said that Quality Assurance/Quality Control (QA/QC) must be consistent with the EPA guidance, but did not specifically require a Quality Assurance Project Plan (QAPP). Please clarify how this is consistent with EPA guidance.

MDE Response: In the 2004 Integrated Report we stated the following – “the QA/QC required for data considered under these protocols is listed under (Guidance for Quality Assurance Project Plans. Dec 2002. EPA /240/R-02/009) at <http://www.epa.gov/quality/qs-docs/g5-final.pdf>.” However, we would not necessarily have to have a full QAPP, assuming that some Standard Operating Procedures are in place that document QA/QC measures. The sentence was loosened somewhat to read –

“These data should be accompanied by a Quality Assurance Project Plan (QAPP) consistent with EPA data guidance specified in *Guidance for Quality Assurance Project Plans*.”

8. MDE’s statement...“With the growing number of biological impairments in Category 5 of the List, Maryland will be relying more heavily on land use analyses, GIS modeling, etc.”, could imply that Maryland has not relied on those types of data/analyses for prior listings. Please clarify.

MDE Response: We mention in this section how we have relied heavily on the Chesapeake Bay model for loading allocations, TMDLs, etc. We are also using the interpolator for Chesapeake Bay assessments. However, we wanted to indicate that in the future, we anticipate increased use of innovative tools and modeling approaches for assessing water resource conditions. This may not necessarily be on the listing end, but perhaps for identifying causes of biological impairments, developing TMDLs etc.

9. Introduction (B.3.2.1.1)

MDE stated ... “Although in each case a bacteriological indicator applies, the criterion and in some cases the indicator itself differs according to the requirements of the National Shellfish Sanitation Program (NSSP), water quality standards, or public health requirements.” To the extent a methodology or interpretation is based on NSSP or public health, please clarify this statement to ensure that the associated methodology/ interpretation link back to the WQS.

MDE Response: The language was revised to read – “In each case a bacteriological indicator applies according to the nature of use.”

Further, the following paragraph was clarified to state – “Those areas restricted to shellfish harvesting because they do not meet the strict requirements under the National Shellfish Sanitation Program (NSSP) are listed. These requirements are found in the *National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish*, 2003 revision. Copies can be obtained from the U.S. Department of Health and Human Services, PHS, FDA or on FDA’s website: USFDA/CFSAN NSSP- Guide for the Control of Molluscan shellfish 2003. Data used to determine these restrictions include routine bacteriological water quality sampling, sanitary survey, and strict adherence to the NSSP procedures, protocols and requirements.”

10. Recreational Waters (B.3.2.1.3.1)

It is unclear if calculating the geometric mean using 5 samples over one beach season is consistent with the standard.

MDE Response: Yes, this is consistent with the standard. This is the minimum number of samples cited by statisticians as necessary to calculate a geometric mean.

11. Beaches (B.3.2.1.3.2)

MDE states ...“The single sample maximum criteria applies only to beaches and is to be used for closure and advisory decisions based on short term exceedances of the geometric mean portion of the standard.” Please clarify the reference to short term exceedances of the geometric mean. Identify the associated language in Maryland’s WQS that supports the position that the instantaneous maximum is relevant to beach closures and not for 303(d) impairment decisions?

MDE Response: Inadvertently used the term “geometric mean” in the sentence. Sentence revised to read – “The single sample maximum criteria apply only to beaches and are to be used by the local health department for closure and advisory decisions based on short-term exceedances of the standard during the bathing season.”

Consistent with COMAR 26.08.08.01-08 and COMAR 26.08.02.03-3 MDE has delegated the approving authority for beaches to the local health department. The single sample maximum is an important tool for beach managers and is used to determine human health risk for swimming, but is not an adequate measure for assessing attainment of water quality criteria over the long term. The analysis used to determine bacteria levels is not a direct count but a statistical estimation subject to a high degree of variability. For listing purposes, MDE has determined that the long-term geometric mean is more representative for assessing bacteriological criteria and that the single sample maximum is more applicable to making management decisions to protect swimmers at designated bathing beaches. Further, if the instantaneous maximum is exceeded more than occasionally, those values will be captured and reflected in the geometric mean, thus these values are appropriately weighted in considering the attainment status of the water.

12. Reporting (G.1.4)

Please clarify how biological impairment based on inconclusive data will be listed.

MDE Response: This sentence has been clarified to read – “A watershed determined to meet criteria or for which the data are inconclusive based on biological data will be identified in the 303(d) List in categories 2 or 3, respectively.”

13. Listing Methodology for pH and Mine Impacted Waters (G.4)

The methodology for pH waters seems restrictive. Please clarify.

MDE Response: This section has been clarified by removing from the methodology the sentence “Waterbodies displaying acidic conditions...”.

The following eight parties submitted a similar comment that was addressed via a single response outlined below.

Robert Boone ANACOSTIA WATERSHED CITIZENS ADVISORY COMMITTEE 4302 Baltimore Ave., Bladensburg, MD 20710, 301-699-6204, (fax) 301-699-3317 www.anacostiaws.org

Delegate Victor Ramirez THE MARYLAND HOUSE OF DELEGATES DISTRICT 47 203C Lowe House Office Building, Annapolis, MD 21401, 301-858-3326, (fax) 410-841-3239 victor_Ramirez@house.state.md.us

Congressman Chris Van Hollen CONGRESS OF THE UNITED STATES HOUSE OF REPRESENTATIVES 1419 Longworth House Office Building, Washington, DC 20515, 202-225-5341, (fax) 202-225-0375 www.house.gov/vanhollen

**Senator Paul G. Pinsky The Senate of Maryland District 22 220 James Senate Office Building, Annapolis, MD 21401, 301-858-3155, (fax) 410-841-3155
Paul_Pinsky@senate.state.md.us**

Delegate Joanne C. Benson THE MARYLAND HOUSE OF DELEGATES DISTRICT 24 204 Lowe House Office Building, Annapolis, MD 21401, 301-858-3065, joanne_benson@house.state.md.us

Councilman William Campos PRINCE GEORGE'S COUNTY COUNCIL District 2 County Administration Building, Upper Marlboro, MD 20772, 301-952-4436

Delegate Barbara A. Frush THE MARYLAND HOUSE OF DELEGATES DISTRICT 21 210 Lowe House Office Building, Annapolis, MD 21401-1991, 301-858-3114, Barbara_Frush@house.state.md.us

Delegate Carol S. Petzold THE MARYLAND HOUSE OF DELEGATES DISTRICT 19 222 Lowe House Office Building, Annapolis, MD 21401-1991, 301-858-3001, carol_petzold@house.state.md.us

Comment:

1. In summary, these eight parties request that the Anacostia River and its tributaries be listed as impaired for trash, and that a process is started for developing a total maximum daily load (TMDL) for trash on the Anacostia. This would comply with Maryland state law that has established a water quality criterion that prevents waters of the State from being polluted by floating debris and excessive accumulations of trash or garbage. (COMAR § 26.08.02.03(B)(2). & MD Code § 20-301(a)(8).

MDE Response¹⁰: The Maryland Department of the Environment (MDE) appreciates the concern and advocacy for the Anacostia River watershed expressed in these letters regarding our proposed list of impaired waters. The issue of excessive trash accumulation in the Anacostia River has been brought to MDE's attention several times in the past month. Although there is general consensus that trash is a problem worthy of some action, there is a concern that the Total Maximum Daily Load process that is being employed to document pollutant sources may not be the most effective means of addressing this problem. To this end, MDE has met with key stakeholders and come to agreement that it will be listed on Part 4b, pending EPA approval. However, substantial progress will need to be demonstrated prior to the next list, or it will become a Part 5 listing.

MDE has provided substantial funding for trash collection systems in the area over the past several years, but also recognizes that the solution will require changes in business practices and societal behaviors which do not lend themselves to typical regulatory processes. MDE will work with the existing organizations in the Anacostia watershed to explore the various approaches and innovative solutions to the trash problem. MDE realizes that this is a multi-jurisdictional problem requiring a multi-jurisdictional solution.

¹⁰ Upon review of Maryland's final Integrated Report, EPA requested that Maryland place the Anacostia River in category 5 as impaired and needing a TMDL. As a result, this revised final list now has the Anacostia listed as impaired (Category 5)

Comments:

1. The Lower North Branch should not be listed on Maryland's 303(d) as being impaired by sediments because:
 - A. Maryland's listing methodology for sediments does not meet the requirements of the Clean Water Act.
 - B. The 1996 305(b) Report does not support listing the Lower North Branch as being impaired for sediments.

MDE Response: Maryland's current sediment listing methodology has not yet been applied. The sediment listing for the Lower North Branch Potomac (LNBP) was originally based on EPA guidance designed to protect downstream waters (e.g., Chesapeake Bay) and their designated uses. In this type of assessment, States were encouraged to list waters that were likely to be impaired based on factors such as land use and the assessor's experience. Now that these waters are listed, the Department must show credible evidence, based on §130.7 "good cause" provision to de-list.

MDE is currently developing a stressor identification methodology to support the development of a sediment TMDL for the Lower North Branch Potomac. The commentor's contact information has been forwarded to the TMDL Outreach Division so that the commentor will be notified when the draft TMDL is released for public review.

2. The Lower North Branch should not be listed on Maryland's 303(d) list as being impaired by nutrients because:
 - A. MDE failed to document or explain its basis for listing the Lower North Branch for nutrients.
 - B. Maryland does not have nutrient criteria for freshwater in its water quality standards. Therefore, in listing the Lower North Branch as nutrient impaired, MDE is enforcing standards that are either inapplicable to the Lower North Branch or have not been through any rulemaking or been officially adopted by the State.
 - C. The 1996 305(b) Report does not support listing the Lower North Branch as being impaired for nutrients.

MDE Response: Maryland listed the Lower North Branch Potomac for nutrients for the same reason that it was listed for sediments – to protect downstream water quality in Chesapeake Bay. Now that these waters are listed, the Department must show credible evidence, based on §130.7 "good cause" provision to de-list.

In Comment 2B the commentor has failed to acknowledge Maryland's narrative water quality criteria. Non-numeric or narrative water quality criteria are enforceable components of the State's water quality standards. MDE developed biocriteria protocols in order to determine attainment of narrative water quality standards for the protection of aquatic life and water contact recreation. In accordance with these protocols, qualitative or narrative water quality data (i.e., excess periphyton growth, etc.) associated with these biological impairments can be used identify nutrients as the cause or pollutant.

The commentor argues that the 1996 305(b) Report does not support listing the Lower North Branch. However, language in the 1996 305(b) Report identifies "high orthophosphate levels" as an impairing substance in the Lower North Branch.

3. MDE has not examined all available data in violation of EPA regulations.

MDE Response: The commentor claims that MDE did not examine data from the Chesapeake Bay Program's Water Quality Database (1984-present). This claim is false. MDE not only examined data from this database but, as appropriate, has also used it to support several listings including a Category 5 listing for bacteria in the Lower North Branch. The data submitted by the commentor has already been reviewed during the assessment process. This dataset was not comprehensive enough, with respect to nutrient and sediment data, to warrant de-listing the Lower North Branch for either substance.

4. Based on readily available water quality data collected during 2002-2005, the Lower North Branch has no eutrophication water quality problems, and should not be listed on Maryland's 2006 303(d) list for nutrients.

MDE Response: The commentor submitted a water quality analysis citing dissolved oxygen (DO) data from three stations within the Lower North Branch Potomac watershed. The commentor attempted to draw a comparison between this dataset and that used to delist the Savage River (Water Quality Analysis (WQA) of Eutrophication of the Savage River, Garrett County, Maryland MDE, EPA Concurrence April 16, 2001). However, this comparison is flawed due to the disparity of landuse characteristics between these two watersheds. In addition, the dataset cited by the commentor was not as comprehensive as the one used for the Savage River delisting. The commentor's dataset lacked chlorophyll *a* readings as were provided in the Savage River WQA. A comprehensive review of all available water quality data within the Lower North Branch Potomac watershed indicates that there are sufficiently high levels of chlorophyll *a* to justify the Lower North Branch remaining on Part 5 of the Integrated Report. MDE invites the commentor's assistance in gathering additional water quality data that might help to better characterize the condition of this watershed.

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Widener University School of Law, 4601 Concord Pike, P.O. Box 7474, Wilmington,
DE 19803, 302-477-2167, (fax) 302-477-2032 www.maelc.org**

Comments:

1. The Listing Methodologies proposed in the 2006 303(d) list may be Water Quality Standards that require an EPA review for consistency with the Clean Water Act (CWA). As with the eight listing methodologies that were published in concert with the 2004 303(d) list, MDE is providing a 45 day public review and implies that it will respond to all related comments and concerns in a comment-response document as it did with the 2004 listing methodologies. However, nowhere in the Draft 2006 documents does Maryland indicate that it will be presenting any and/or all of the new methodologies- the 2004 or 2006 – to the U.S. Environmental Protection Agency for review for consistency with the Clean Water Act as required for any change to water quality standards. We request MDE to take this opportunity to evaluate whether the listing methodologies in the 2004 list and the Draft 2006 list, in applying the Eleventh Circuit effects test, are indeed changes to Water Quality Standards that require 303(c) review by EPA for consistency with the CWA.

MDE Response: Prior to the official public comment period (January 20 – March 8), MDE submitted a preliminary draft Integrated Report to EPA for review and comment. MDE does this as a matter of course to ensure that EPA has no substantial comments that should be addressed before full public review. All listing methodologies were included in this preliminary review and were thus evaluated with respect to consistency with the CWA.

However, neither EPA (as indicated in their 2006, and earlier, Integrated Report guidance document - <http://www.epa.gov/owow/tmdl/2006IRG/report/2006irg-sec4.pdf>) nor MDE consider listing methodologies as regulation. The intent behind MDE's listing methodologies is not to make water quality standards more or less stringent but to determine compliance with existing standards and to provide a transparent decision making process for the public's understanding. In some cases new listing methodologies simply formalize a decision making process that has already been in use. Accordingly, the methodologies are not regulations within the meaning of the Maryland Administrative Procedures Act (APA).

2. The Draft 2006 303(d) List does not clearly layout a completion schedule for the development of the TMDLs for the impaired waters.

MDE Response: This is incorrect. Part H Appendix 3 provides a table listing TMDLs scheduled for completion for Federal Fiscal Year (FFY) 2006 and 2007. In addition, there is a check box included with each individual listing denoting whether or not it will be addressed in the next two years.

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healthdept@smhd.com**

Comments:

B.3.2.1 Revised Listing Methodology for Identifying Waters Impaired by Bacteria on Maryland's 303(d) List

B.3.2.1.1 Introduction

Page 30 notes data is "collected and analyzed using approved methods and in accordance with strict QA/QC guidelines."

1. Please define the approved methods.

MDE Response: Please see *EPA National Beach guidance and Performance Criteria for Grants and Guidance for County Recreational Water Quality Monitoring and Notification Programs* - <http://www.epa.gov/waterscience/beaches/grants/guidance/all.pdf>

2. Please provide the strict Quality Assurance/Quality Control guidelines.

MDE Response: These are available from the Department of Health & Mental Hygiene, Laboratories Administration - www.dhmh.state.md.us. Also, please see *EPA National Beach guidance and Performance Criteria for Grants and Guidance for County Recreational Water Quality Monitoring and Notification Programs* - <http://www.epa.gov/waterscience/beaches/grants/guidance/all.pdf>

3. Please indicate how results for Most Probable Number (MPN) are managed in data analysis when the MPN is reported as less than a whole number (i.e. <10).

MDE Response: For the purpose of analysis, 9 cfu/ml is assumed.

4. Please indicate how many decimal places are considered in the calculation and use of geomean results?

MDE Response: Decimal places are not considered in the calculation and use of geometric mean results.

5. Please indicate if geomean results are rounded or truncated.

MDE Response: Geometric mean results are neither rounded nor truncated.

B.3.2.1.3 Interpretation of Bacteria Data for General Recreational Use

Page 31 in the third paragraph of this section references indicators inform on “potential health risks associated with swimming and other primary water contact recreation activities when the criterion is exceeded.”

6. Please define or provide other examples of primary water contact recreation activities.

MDE Response: Please see *EPA National Beach guidance and Performance Criteria for Grants and Guidance for County Recreational Water Quality Monitoring and Notification Programs* -

<http://www.epa.gov/waterscience/beaches/grants/guidance/all.pdf> and COMAR

26.08.09.01

7. Please make distinctions between the following uses: a beach, recreation water contact, and primary water contact recreation activities.

MDE Response: These terms all refer to the same Use Classification, Use I, where the public is involved in any of the recreational activities mentioned in our response to comment 6 above or similar activities. Please see COMAR 26.08.02.02

8. Please indicate if the sample collection locations are to correspond directly to beach areas where the qualifying beach use or activity is occurring.

MDE Response: Yes, sample collection locations do correspond directly to beach areas. Please see COMAR 26.08.09

B.3.2.1.3.1 Recreational Waters

Page 31 describes in general terms the methodology of data analysis for recreational waters.

9. Please provide the methodology or reference the standard method of data analysis.

MDE Response: Please see COMAR 26.08.02.03-3

B.3.2.1.3.2 Beaches

Page 32 in the first paragraph of this section notes “Low priority beaches will be re-evaluated regularly to determine if they should be prioritized higher or removed from the list of beaches.”

10. Please provide a case scenario where a low priority beach is removed from the list of beaches.

MDE Response: This information comes directly from the local health departments who prioritize beaches based on beach use and pollution sources.

11. Please provide an example of a justification when a low priority beach is removed from the list of beaches.

MDE Response: MDE recognizes that beach usage and/or pollution sources can change. An example of this scenario might include a beach that is no longer used due to a landuse change. As a result, this beach would be removed from the list of beaches. The local health department documents this information.

Page 32 in the third paragraph of this section notes “The listing methodology for general recreational use also applies to beaches (Section 4.4.3).”

12. Please confirm the page number or location in the draft of Section 4.4.3.

MDE Response: The sentence has been corrected to read (Section B.3.2.1.3.1).

13. Please confirm the methodology.

MDE Response: The methodology for beaches is identical to what is discussed in Section B.3.2.1.3.1 Recreational Waters.

B.3.2.1.4 Discussion

Page 32 of this section notes indicator “densities are for steady state dry weather conditions.”

14. Please provide the MDE sampling protocol that defines suitable dry weather conditions.

MDE Response: There is not an MDE sampling protocol because local health departments sample on a schedule based on their own discretion and the guidance for a tiered monitoring approach. Please see EPA’s *Ambient Water Quality Criteria for Bacteria - 1986*

C.2.1.2 Bathing Beaches

Page 66 in the first paragraph of this section notes samples collected within 48 hours of a greater than 1” rainfall based on a national weather rainfall resource were excluded from the data set.

15. Please confirm if any sampling results were excluded from the analysis of St. Mary’s beach monitoring data.

MDE Response: All of the available sampling data was considered.

16. Please confirm the specific dates of sample collection that were used in the assessment of data for St. Mary's beaches.

MDE Response: MDE received all of the available sampling data, including the dates of sample collection, directly from the St. Mary's County Health Department.

General comments

17. Please comment on how identification of a beach as impaired affects its priority designation (i.e. Tier rating).

MDE Response: The identification of a beach as impaired does not have an affect on the Tier rating of that beach. The Tier rating for a beach is determined by the local health department according to the frequency of use and the potential risk to swimmers due to known pollution sources.

18. Please comment on how identification of a beach as impaired affects its monitoring status in the year the list is published and in subsequent seasons.

MDE Response: There is no effect. See response to Comment 17.

19. If a beach is listed as impaired and continues to be monitored, please address what happens when subsequent sampling indicates the 303(d) listed beach is no longer impaired.

MDE Response: The beach will be removed from category 5 of the list.

20. The MDE beach program staff is respectfully requested to exchange information with identified local health department beach program contacts specific to the draft 303(d) list in a timely manner.

MDE Response: MDE's Beach Program receives the information from the counties, there is no other information to exchange with St. Mary's County.

Comments:

1. Data access through a centralized hub should be given high priority for coordination and tracking purposes (ie. Water quality indicators, wetland impacts/mitigation, BMP installation, NPDES discharges, etc.). The degree of impairment of each water quality limited segment can help prioritize remediation efforts. We hope that state agencies will fast track efforts and assistance to the Maryland Water Monitoring Council to establish a centralized hub.

MDE Response: MDE agrees that a centralized data hub for a suite of water quality data and information is of tremendous value to the Department, as well as interested stakeholders. Towards this end, MDE staff have been and will continue to be key players in development of the Maryland Water Monitoring Council's Web-based clearinghouse. MDE is currently partnering with the University of Maryland Baltimore County's Center for Urban Environmental Research and Education and developing grant proposals to bring long-term funding to this effort.

MDE is also implementing two major data centralization systems internally; the Enterprise Environmental Management System (EEMS) and the Environmental Protection Agency's STORET database. The EEMS is oriented towards tracking environmental permitting, compliance and enforcement activities while STORET is used for storing ambient water quality monitoring data and information. These two systems can be integrated once the EEMS system is functional. MDE's STORET data is currently available at www.epa.gov/storet.

2. Worcester County staff has been told that the MDE is reversing the policy of local responsibility for developing ways to reach the nutrient reduction goals and requiring all counties to implement strategies developed internally by MDE staff. Please clarify the state policy on TMDL implementation and outline local jurisdictional responsibilities. Of particular interest;
 - a. **Conversion of industrial wastewater treatment facilities for residential development.** Since localities are required by State law to develop comprehensive plans and sewer and water plans, MDE should coordinate permits with the County in allocation of discharge capacities so development does not occur at rates inconsistent with both planning documents.
 - b. **Increasing point source discharges without requiring offsets.** Meeting non point source allocations will be extremely difficult. Why allow for an increase in point source discharges, or conversely not require spray irrigation as a nutrient reduction option, when considering wastewater

treatment plant upgrades? Will offsets be required when the discharge permits are renewed?

- c. **Bay restoration funding.** Several local wastewater treatment plants are eligible for capacity expansions and want to use some of that capacity to hookup existing septic tanks, only to find many of our septic tank users are in income categories that cannot afford the costs of the initial hookup. We have been told bay restoration funds cannot be used for that purpose. Can MDE and the County cooperate in an effort to get this policy changed?

MDE Response: MDE has not reversed any policies on local government responsibilities regarding Total Maximum Daily Load (TMDL) implementation. Managing water quality is the cooperative responsibility of all levels of government. The following response addresses the general issue of TMDL implementation responsibility, TMDL implementation plans, and the three specific issues raised in the comment.

In addition to certain specific responsibilities noted below, local government's current responsibility is to work in partnership with the State to implement TMDLs according to "Maryland's 2006 TMDL Implementation Guidance for Local Governments." Although the federal government bears the legal responsibility for ensuring protection of water quality standards, many responsibilities are formally delegated to the State of Maryland. The State accepts these responsibilities because it is in the public's best interest. Similarly, local governments are likely to accept certain TMDL implementation responsibilities that are in their best interest and the interest of local stakeholders.

Local governments, with varying involvement of State and rural agencies (e.g., Soil Conservation Districts), manage numerous programs that have a role in TMDL implementation. This includes comprehensive planning, adoption and implementation of zoning and subdivision regulations, water and sewer planning, coastal zone programs, Critical Areas Law planning, Forest Conservation Act plan reviews, wetlands and floodplain management programs, management of capital programs necessary to support various regulatory programs, grading and building permits, soil and erosion control programs, stormwater management programs, bacteria monitoring and beach closure authority, among others. All play a role in TMDL implementation.

In addition to institutionalizing TMDL implementation decisions within routine governmental operations, TMDL implementation plans will play a role. Section 4.3.1 of "Maryland's 2006 TMDL Implementation Guidance for Local Governments" says, "Local governments will have an opportunity to play a lead role in developing [TMDL implementation] plans if they so choose. The specifics will be worked out in consultation with individual local governments and others."

Comment 2.a. highlights the need for local governments and the State to coordinate on the management of TMDL allocations. It also exemplifies the importance of balancing local land use and TMDL implementation decisions.

MDE is conscious of the issues raised in Comment 2.b. The phosphorus limit in the recent Ocean Pines WWTP permit was less than the TMDL allocation, which reflects MDE's recognition of the challenges in meeting the NPS allocation. The State and Worcester County are actively working to refine NPS load management estimates. This information will support future decisions regarding spray irrigation and point source allocations.

In regard to comment 2.c., MDE is unlikely to pursue changes to the BRF legislation to allow the funding of hookups. MDE, the Maryland Department of Housing and Community Development and the U.S. Department of Agriculture have a variety of grant and loan programs that might accommodate such a need. For more information regarding the onsite sewage disposal portion of the Bay Restoration Fund, contact John Boris (410) 537-4195. For all other participating agencies, please contact them directly for application requirements and assistance.

Comments:

1. We do not agree with MDE's claim that the additional listings only "reflect increased monitoring...rather than a decline in water quality" (p.6).

MDE Response: This language has been revised to read – "The additional impairment listings reflect, at least in part, increased monitoring, newer water quality or resource data, and new improvements in assessment techniques, rather than a decline in water quality."

2. MDE proposes to list seasonal shallow water submerged vegetation (SAV) use segments as Category 3 a (inconclusive) instead of Category 5 (impaired) if the SAV acreage goal is not met and no water clarity data are available. The SAV acreage goal is a type of biological criteria; therefore, non-attainment of this criterion should result in a Category 5 (impaired) listing for the segment, regardless of the availability of water clarity data.

MDE Response: MDE interprets impairment with respect to the SAV designated use according to Maryland water quality standards in COMAR 26.08.02.03-3C9a. This states that "The attainment of the water clarity criteria for a given Bay segment can be determined using any of the following methods:

- (i) Shallow-water acreage meets or exceeds the percent-light-through-water (PLW) criteria expressed in Secchi depth equivalence (Table 1) at the segment specific application depth specified in Regulation .08 of this chapter (excludes no grow zones);
- (ii) Submerged aquatic vegetation (SAV) acreage meets or exceeds the acreage restoration goal (Table 2); or
- (iii) Shallow-water acreage meeting or exceeding the secchi depth requirements in combination with actual SAV acreage equal or exceed the SAV restoration goal acreage.

This method of assessment was chosen because it does not bias the assessment in cases of stochastic events (i.e., hurricanes, extremely wet years, etc) that might smother SAV beds in the short term, but ultimately, are not a reflection of overall long-term water quality. SAV may take several years to grow back after an event of this nature. As a result, it is possible that SAV acreage may not meet the restoration goal during the 3-year assessment window when in fact water quality may have been adequate to reach the goal had the anomalous event not occurred. MDE feels that using only SAV acreage to judge attainment creates an inaccurate assessment. However, by using water clarity in conjunction with SAV acreage this bias is minimized. Water clarity can improve much more rapidly after a storm event or rainy season. Thus, by measuring water clarity, one can determine whether suitable conditions exist to support the future growth and

propagation of SAV beds. MDE and the Chesapeake Bay Program feel that the nature of these new criteria is for the purpose of assessing the long-term health of the Chesapeake Bay estuary. In summary, MDE feels that it cannot fully assess attainment or impairment for the SAV designated use until the full suite of data is available.

3. MDE is proposing to list swimming beaches as being impaired if the steady state geometric mean for at least 5 representative sampling events exceeds the state bacteria indicator criteria for E. coli and enterococci, but apparently will not list segments if they exceed the single sample maximum criteria. Since the single sample maximum criteria are part of the state's water quality standards, in order to be consistent with 40 CFR 130.7, these values should also be used to assess attainment/nonattainment.

MDE Response: Consistent with COMAR 26.08.08.01-08 and COMAR 26.08.02.03-3 MDE has delegated the approving authority for beaches to the local health department. The single sample maximum is an important tool for beach managers and is used to determine human health risk for swimming and is not an adequate measure for assessing attainment of water quality criteria over the long term. All data collected over the beach season is used in the water quality assessment for listing impaired beaches. The analysis used to determine bacteria levels is not a direct count but a statistical estimation subject to a high degree of variability. For listing purposes, MDE has determined that the long-term geometric mean is more representative for assessing bacteriological criteria and that the single sample maximum is more applicable to making management decisions to protect swimmers at designated bathing beaches. Further, if the instantaneous maximum is exceeded more than occasionally, those values will be captured and reflected in the geometric mean, thus these values are appropriately weighted in considering the attainment status of the water.

4. We believe there should be additional justification for using the Bootstrap statistical analysis instead of the Wilcoxon Rank Sum Test to determine impairment. The technical document describing this technique indicates that of the Bay segments with sufficient sample size, more segments would be defined as impaired using the Wilcoxon Rank Sum Test, 27, versus 22 for the Bootstrap method (Llanso et al. 2005). A closer examination of the five segments for which the attainment/nonattainment designations differed between the two methods indicates the mean B-IBI at three of the five stations was less than 3, the commonly used "break-point" between degraded and non-degraded sites. In addition, a preponderance of stations in these segments had B-BIBI values less than three. We note that MDE lists as an advantage of the bootstrap method the ability to identify the potential causes of impairment. It is our understanding that this diagnostic analysis could be conducted regardless of which method is used to assess attainment, if so, we suggest deleting this language from the text.

MDE Response: Generally, MDE as well as Virginia's Department of Environmental Quality feel that that the Bootstrap method of analysis better incorporates the natural variability inherent in the benthic communities of Chesapeake Bay. A major flaw of the

Wilcoxon Rank Sum Test was that it tended to be “sensitive to small shifts in the B-IBI scores relative to the reference condition” (Llanso et al. 2005). As such, the Wilcoxon method suggested impairment in several cases when the benthic community was more likely to be healthy. Additional justification for using the Bootstrap analytical method can be found in “2006 303(D) Assessment Methods For Chesapeake Bay Benthos, Final Report Submitted to: Virginia Department of Environmental Quality, Roberto J. Llansó, Jon H. Vølstad Versar, Inc., Daniel M. Dauer Michael F. Lane, Old Dominion University, September 2005.”
http://www.baybenthos.versar.com/Docs/IBI_DecProc_Alt.pdf.

5. It is unclear why the tidal portion of the lower Susquehanna River (basin code 02120201) listing for nutrients is included in Category 2. The justification appears to be that the segment “corresponds to CB1TF”, but all other segments that are cross-referenced to bay segments are listed in Category 5. MDE did propose to de-list this segment through a WQA; however, EPA has not yet approved this action, therefore the segment should still be listed as impaired in Category 5.

MDE Response: EPA approved the WQA on January 11, 2006 thus justifying the delisting of this segment.

6. According to Category 6 the Draft 2004 List of Impaired Surface Waters [303(d)] and Integrated Assessment of Water Quality in Maryland, the justification for de-listing Antietam Creek was provided in a Water Quality Analysis (WQA) approved by the U.S. Environmental Protection Agency on September 16, 2002. This document describes the Total Maximum Daily Load for carbonaceous and nitrogenous biochemical oxygen demand, not the WQA for nutrients. In fact, the document specifically states that “...a nutrient TMDL may yet be developed if the results of chlorophyll-a sampling indicate the need to do so.” (p.1) This issue has still not been resolved. Antietam is not currently listed in Category 5 as impaired for nutrients, nor has there been any document justifying its removal from the 2004 list.

MDE Response: This has been corrected.

7. Finally, we note that the Baltimore Harbor listings for metals remain in Category 5, pending results of the stressor identification study. CBF re-iterates our interest in reviewing those results when they become available.

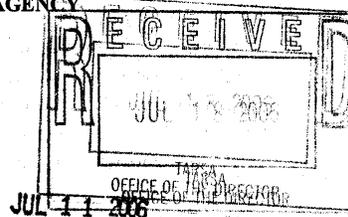
MDE Response: Results from this study will be made available to the public.

**PART M: APPENDIX 8 - EPA Memo Requesting Revised Final Integrated Report
with the Anacostia River in Category 5 for Trash**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029



Mr. Richard Eskin, Ph.D.
Technical and Regulatory Services Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

Dear Mr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III received the Final 2006 List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality in Maryland," submitted by Maryland Department of the Environment (MDE) on May 11, 2006, and is currently in the process of review.

During the public comment period on Maryland's 2006 list pursuant to Section 303(d) of the Clean Water Act, MDE was provided with data in February 2006 from a coalition of 24 non-profits and signatories that indicated that the Anacostia River is impaired because of the presence of large amounts of trash. Based on this information, and similar public comment provided by seven other parties, MDE determined that the Anacostia River is impaired because of the presence of large amounts of trash. This determination was made under the water quality standards (WQS) in COMAR 26.08.02.03(B). As a result, MDE has proposed to list the Anacostia River as impaired for trash under Category 4b of Maryland's 2006 List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality in Maryland. Category 4b identifies waters that are impaired, but do not require a total maximum daily load (TMDL). MDE asserts that pollution control initiatives other than a TMDL, such as control efforts implemented as part of the Trash Free Potomac Watershed Initiative, will more effectively resolve the Anacostia River's trash impairments.

Pursuant to 40 CFR 130.7(b): "(1) Each State shall identify those water quality limited segments still requiring TMDLs within its boundaries for which: (i) technology based effluent limitations required by Sections 301(b), 306, 307 or other sections of the Act; (ii) more stringent effluent limitations ... required by either state or local authority preserved by Section 510 of the Act or federal authority ... and (iii) other pollution control requirements (e.g., best management practices) required by local, state or federal authority are not stringent enough to implement any water quality standards (WQS) applicable to such waters."

EPA's *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305 (b) and 314 of the Clean Water Act (July 29, 2005)* provides factors to be considered when considering a 4b assessment decision. In evaluating whether a particular set of pollution controls are in fact 'requirements' as specified in EPA's regulation cited above, the Agency will consider a number of factors, including: (1) authority (local, state, federal) under

which the controls are required and implemented with respect to sources contributing to the water quality impairment (examples may include self-executing or local regulations, permits, contracts and grant/funding agreements that require implementation of necessary controls), (2) existing commitments made by the sources to implementation of the controls (including an analysis of actual implementation that has already occurred), (3) the availability of dedicated funding for the implementation of the controls, and (4) other relevant factors as determined by EPA depending on case-specific circumstances.

EPA agrees that, once the Trash Free Potomac Watershed Initiative is more fully realized, the Anacostia River trash impairment may be a good candidate for inclusion in Category 4b. However, at this time, the precise actions that will be taken by the various participants pursuant to the Trash Free Potomac Watershed Initiative are not yet clearly identified. For example, EPA and MDE will jointly be inviting key senior decision-makers from the District of Columbia, Prince George's County and Montgomery County to meet to discuss a coordinated approach to removing the Anacostia River trash impairment, including implementation targets and commitments, such as budgetary obligations, permit conditions, and new ordinances that will lead to trash loading reductions.

Accordingly, EPA strongly urges that Maryland include the Anacostia River trash impairment in Category 5 (i.e., the Section 303(d) List) in 2006. EPA agrees that, in 2008 and beyond that, MDE and EPA should revisit the Anacostia River trash impairment to consider whether to move it to Category 4b based on the progress being made under the Trash Free Potomac Watershed Initiative.

We appreciate the efforts and willingness of MDE to work with EPA and the District of Columbia on this multi-jurisdictional issue. In addition to the requested categorical revision of the trash impairment listings for the Anacostia River, EPA would also like the opportunity to discuss minor inconsistencies discovered to date between the 2004 and 2006 303(d) list submissions in the near future. It should be noted that EPA reserves the right to provide additional comments with the revised final Integrated Report or upon review of the draft or final Section 303(d) lists received from neighboring states with shared waterbodies. If you have any questions regarding the information provided please contact me or Robert Koroncai at (215) 814-5730 or via email at Koroncai.Robert@epa.gov.

Sincerely,



Jon M. Capacasa, Director
Water Protection Division

PART N: Appendix 9 - Listings that were modified in response to final EPA review.

303(d) Listing Year	Basin Name	Basin Code Waterbody Type	Subbasin Name Subbasin Code	Listing Category	Impairment Category	Revisions made following EPA comment	EPA TMDL Approval Date
1998	Chincoteague Bay	02130106 Impoundment	Big Mill Pond	4a	Sediments	Sediment listing added to Category 4a.	4/4/2002
1998	Lower Wicomico River	02130301 Impoundment	Tony Tank Lake	4a	Nutrients	Added TMDL approval date to listing.	12/10/1999
2002	Lower Choptank River	02130403 Tidal portion	Town Creek	4a	Biochemical Oxygen Demand	Added TMDL approval date to listing.	10/16/2003
1996	Eastern Bay	02130501 Tidal Shellfish	Little Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Miles River	02130502 Tidal Shellfish		4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Miles River	02130502 Tidal Shellfish	Leeds Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Corsica River	02130507 Tidal Shellfish		4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/4/2005
2002	Liberty Reservoir	02130907 Impoundment		4a - 5	Methylmercury - fish tissue	This listing was properly placed back into Category 5 (impaired).	N/A
1996	Patuxent River lower	02131101 Tidal Shellfish	Cockholds Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Patuxent River lower	02131101 Tidal Shellfish	Solomons Island Harbor	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Patuxent River lower	02131101 Tidal Shellfish	Washington Creek, Persimmons Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	9/27/2005
1996	Patuxent River lower	02131101 Tidal Shellfish	Trent Hall Creek	4a	Fecal Coliform	This listing was properly placed in Category 4a.	5/25/2005

303(d) Listing Year	Basin Name	Basin Code Waterbody Type	Subbasin Name Subbasin Code	Listing Category	Impairment Category	Revisions made following EPA comment	EPA TMDL Approval Date
2002	St. Mary's River	02140103 Impoundment	St. Mary's Lake	4a	Methylmercury - fish tissue	Added TMDL approval date to listing.	2/23/2004
1996	Breton Bay	02140104 Tidal Shellfish	Cherry Cove Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/21/2005
1996	St. Clements Bay	02140105 Tidal Shellfish	Charleston Creek	4a	Fecal Coliform	This bacteria listing was relisted under the proper 8-digit watershed, Wicomico River.	5/25/2005
1996	Wicomico River	02140106 Tidal Shellfish	Charleston Creek	4a	Fecal Coliform	This listing was properly placed in Category 4a.	5/25/2005
1996	Conocheague Creek	02140504 Non-tidal		4a	Biochemical Oxygen Demand	This listing was properly placed in Category 4a.	2/2/2001
1996	Town Creek	02140512 Non-tidal		4a	Nutrients	Added TMDL approval date to listing.	10/16/2003
2002	Savage River	02141006 Impoundment		4a	Methylmercury - fish tissue	Added TMDL approval date to listing.	1/29/2004
2002	Deep Creek Lake	05020203 Impoundment		4a	Methylmercury - fish tissue	Added TMDL approval date to listing.	2/18/2004
2002	Casselman River	05020204 Impoundment	Big Piney Reservoir	4a	Methylmercury - fish tissue	Added TMDL approval date to listing.	2/18/2004
1996	Jones Falls	02130904 Non-tidal	Lake Roland	4a	Chlordane	Corrected TMDL approval date added to listing.	3/23/2001
1996	South River	02131003 Tidal Shellfish		4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/4/2005
1996	South River	02131003 Tidal Shellfish	Duvall Creek	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/4/2005

303(d) Listing Year	Basin Name	Basin Code Waterbody Type	Subbasin Name Subbasin Code	Listing Category	Impairment Category	Revisions made following EPA comment	EPA TMDL Approval Date
1996	South River	02131003 Tidal Shellfish	Selby Bay	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/4/2005
1996	South River	02131003 Tidal Shellfish	Ramsey Lake	4a	Fecal Coliform	Corrected TMDL approval date added to listing.	11/4/2005
2002	Lower Choptank River	02130403 Non-tidal	021304030463 UN TRIB TO TRAPPE CR	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2002	Lower Choptank River	02130403 Non-tidal	021304030464 UN TRIB TO WINDMILL BR	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2002	Other West Chesapeake Bay Drainages	02131005 Non-tidal	021310050976 PARKER CR, UN TRIB TO PARKER CR	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2002	Other West Chesapeake Bay Drainages	02131005 Non-tidal	021310050977 UN TRIB TO PLUM POINT CR, PLUM POINT CR	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2002	Other West Chesapeake Bay Drainages	02131005 Non-tidal	021310050978 UN TRIB TO FISHING CR, FISHING CR	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2002	St. Mary's River	02140103 Non-tidal	021401030716 PENBROOK RUN	5	Biological	Properly listed back in Category 5 (impaired).	N/A
2004	Upper Pocomoke River	02130203 Non-tidal	021302030640 FIVEMILE BR	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A
2004	Upper Pocomoke River	02130203 Non-tidal	021302030643 OLD MILL BR	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A

303(d) Listing Year	Basin Name	Basin Code Waterbody Type	Subbasin Name Subbasin Code	Listing Category	Impairment Category	Revisions made following EPA comment	EPA TMDL Approval Date
2004	Wicomico River Headwaters	02130304 Non- tidal	021303040568 LEONARD POND RUN	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A
2004	Southeast Creek	02130508 Non- tidal	021305080399 GRANNY FINLEY BR, UT1 GRANNY FINLEY BR	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A
2004	Youghiogheny River	05020201 Non- tidal	050202010008 MILLERS RUN	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A
2004	Upper Pocomoke River	02130203 Non-tidal	021302030653 AYDYLOTTE BR	3	Biological	Properly listed back in Category 3a (insufficient data).	N/A