

P. O. Box 539
Ophelia VA 22530
Feb. 17, 2006

Mr. Chris French
Piedmont Regional Office, DEQ
4949-A Cox Rd.
Glen Allen VA 23060

Dear Mr. French:

This letter constitutes my public comments regarding the Bacterial TMDL Development for Shellfish Waters in Northumberland County. I have attended all the public meetings held in Northumberland County. These comments apply to all the waterways DEQ has addressed in the County and to all waterways DEQ intends to address in the County in the future. There is no evidence that the causes of bacterial contamination vary significantly among waterways, irrespective of septic system density. There is no scientific reason to deal with waterways on a piecemeal basis.

As a senior scientist, it is my professional opinion that:

- 1) The reason for poor water quality (impairment) in local waterways has nothing to do with bacteria. Impairment is due to eutrophication, or the input of too much nitrate and phosphate into the water, primarily as the result of groundwater flow from agricultural areas. In summer, the bottom water in small waterways, like the open Bay, is commonly anoxic/hypoxic in violation of the Clean Water Act. EPA and DEQ are responsible for the charade claiming that waterways are impaired because of shellfish closings, thus avoiding having to take action to reduce eutrophication;
- 2) The BST (MST) methodology DEQ is using to identify the source of bacteria is inadequate;
- 3) A source of bacteria, namely the anoxic sediment, has been ignored; and
- 4) No attempt has been made to determine the runoff load of bacteria or its BST signal.

I previously addressed some of these issues in a letter to Mr. Peter Gold of EPA, dated 03/16/05. A copy of that letter is attached and I request it be included as part of these public comments. I will briefly elaborate on the four points stated above.

1) An oyster ground in the Little Wicomico River (near Day Marker 21) was recently tonged, and produced two live oysters. The oyster ground is within sight of “Taylor” floats where citizens grow oysters with few problems, and within sight of one of the locations being used by VMRC/VIMS for *C. ariakensis* experiments. Obviously, oysters grow reasonably well in surface water, but not on the bottom. The reason is outlined in my letter to Mr. Gold, and this is the same area where I measure bottom water for dissolved oxygen each summer. **“At 7 feet of water depth, the water was not "fishable" according to the Clean Water Act, and it is no wonder that the oyster grounds in the vicinity are mostly dead.”** The summer water anoxia/hypoxia and the anoxic bottom sediment are caused by excess nitrate and phosphate entering the water as the result of groundwater flow. One agricultural field adjacent to this location is tilled right up to the edge of the cliff, in violation of the Bay Act, which is not being enforced. Ground water from two shallow domestic water wells within sight of this location, both down-flow from agricultural fields, contains more than 7 mg/l nitrate according to my measurements. There is no doubt that agricultural practices are responsible for the high nitrate values, and for the over-production of phytoplankton and consequent summer anoxia/hypoxia. It is worth pointing out that in summer, when stratification develops, the organic-rich anoxic mud acts like an “oxygen sponge” and it is the oxygen demand of the stinking black sediment, not respiration by the nekton/benthos, that is the primary reason for the bottom water anoxia/hypoxia.

2) In my letter to Mr. Gold I cited a peer-reviewed scientific publication stating that BST (MST) methods being used to identify the source of bacteria “... may be insufficient to accomplish many goals of MST” Recent discussions with individuals working in this field convince me that, if anything, that statement is overly optimistic. As I pointed out in the letter to Mr. Gold, your conclusions based solely on the Antibiotic Resistance method of BST will not hold up in a court of law. No single technique such as Antibiotic Resistance is reliable at the current state-of-the art. If multiple techniques are used, and are in agreement, BST might provide reliable results. Any Technical Advisory Committee that is established should include competent BST (MST) academic/government researchers not involved in providing data for DEQ.

3) It is now well established that coliform bacteria are resident in the anoxic mud that characterizes the bottom of impaired waterways (e.g. <http://www.vwrrc.vt.edu/Proceedings/Symp%2005%20Proceedings.pdf> p. 44-53 and references cited therein). This being true, even if all new bacterial input was curtailed, the waterways would still be contaminated.

4) I recently sampled a local mill pond, and informed Dr. Croonenberghs and Mr. Bigelow of the results by email:

Last Thursday (07/07/05) I recorded 4 inches of rain in my rain gauge at Ophelia from tropical storm Cindy. The next day I sampled Sydnor's Millpond, which feeds into Hull Creek, in Northumberland County. The flow rate was extensive, as would be expected. A water sample was analyzed by Mid-Atlantic labs, the same laboratory we use to analyze potable water samples. The total coliform level was greater than 4000 MPN and E. coli was 291 MPN. There are only three houses near the pond. One old house is near the mill race but I have been told it has no indoor plumbing and has not been occupied in many years. The two occupied houses on Sydnor's Mill Road closest to the pond are at elevations of about 50 or 60 feet, according to the USGS Heathsville Quad sheet, whereas the pond elevation is about 15 feet above sea level. According to the County "911" map, one house is about 200 feet from the pond and the other is about 500 feet from the pond. There are few other houses in the watershed of the pond, all at similar elevations and all at considerable distance from the pond or the creeks feeding it. I submit that the fecal coliform level observed could not possibly come from occupied houses, especially considering the likely thickness of the unsaturated zone between septic systems and the water table, and the distances involved. Thus the fecal coliform contamination is certainly of animal origin, and the pond is a massive source for bacterial discharge to Hull Creek. This is another line of evidence suggesting that the bacterial contamination responsible for shellfish restrictions is of natural origin. DEQ must determine whether runoff, with or without the presence of a pond, is or is not a significant source of bacterial contamination of marine estuaries into which the runoff discharges. Without this information it is impossible to identify the source of bacteria with sufficient certainty to require remedial action.

There are several actions that should be taken with regard to human and animal contamination. Wildlife are “not actionable” and in a rural setting like Northumberland County, neither are dogs. Leash laws exist in some communities, but are preposterous in the remainder of the County. There are few cattle/horses/swine in Northumberland County, and none in the watershed of some restricted waterways. Even so, restricting the access of animals to tidal water and intermittent streams is desirable. Presuming that human feces may contribute to the pollution, two actions should be taken:

- 1) Septic systems must be inspected and pumped as outlined in the existing and un-enforced County Bay Act ordinance. Two voiced objections as to why enforcement has not materialized are that “there is no place to take it” and that poor people would face a massive financial burden if their septic system failed inspection. The first objection is false, as septic tank sludge is currently disposed out-of-county. The Reedville sewage treatment facility has adequate capacity but was never designed to accept septic tank sludge. Any redesign that is mandated in order to reduce point-source nitrate/phosphate discharge should also include the ability for the plant (and other plants, like the one in Kilmarnock) to accept septic tank sludge. It is true that the cost of repairing/replacing a septic system would be onerous for someone living near or below the poverty level, and this must be addressed. Some of these septic systems are very old, but most of these cases are not adjacent to water, where the problem is most critical. The pump-out ordinance should be phased-in beginning with septic systems near the water where the poverty problem will not be severe.
- 2) The land-application of Class B municipal sewage sludge must be banned from all counties where waterways are restricted for the harvesting of shellfish because of high fecal coliform levels. It is well known that “birds follow the plow” and it is an absolute certainty that the gulls foraging on fields where Class B municipal sewage sludge has recently been applied are contaminated with human pathogens. The birds fly to water after feeding, and contamination of the water is guaranteed. Attached is a bibliography previously supplied to Dr. Stroube and others on 06/06/02 documenting birds as vectors of contamination. This is not an issue that needs further “research” and any competent microbiologist will confirm this assertion. I request that this bibliography and the cover letter to Dr. Stroube be incorporated in these public comments. Previous correspondence on this issue and the photographs mentioned in the letter are available upon request, and some of it is posted at www.napsva.org.

In conclusion, I believe DEQ has not made a scientifically credible case for the source of bacteria, in which case it is impossible to take rational action to reduce bacterial contamination of waterways. In my professional opinion, most of the contamination is likely from wildlife, especially raccoons, deer and birds. An interesting case study, where initial assumptions about human contamination proved incorrect, can be found at: <http://lakes.chebucto.org/H-2/bst.html>. “Inactionable” sources of contamination from wildlife and dogs, coupled with the contaminated bottom sediment, mean that there is probably nothing that can be done to decontaminate the waterways. More important, impairment because of bacteria is inconsequential relative to impairment because of excess nutrients (nitrate and phosphate) that enter waterways, primarily as a result of agricultural practices, especially the use of animal waste (poultry litter, sewage sludge and manure) as “free” fertilizer. High nutrient loads to the waterways are the reason the bottom water is “not fishable” in summer. The summer anoxia/hypoxia, along with over-harvesting and diseases, has virtually wiped out commercial oyster beds in the waterways under consideration. There aren’t any oysters to harvest, bacterially contaminated or not, and there won’t be any oysters of any species to harvest until the summer hypoxia/anoxia ceases and the bottom becomes habitable year-round. The “TMDL Process” as currently being practiced by DEQ, as dictated by EPA, is an exercise in futility, wastes taxpayer money and does not address the most important issue, agricultural pollution.

Yours sincerely,

Dr. Lynton S. Land
Emeritus Prof. Geological Sciences and E. Allday
Centennial Chair in Subsurface Geology,
University of Texas at Austin

Three attachments

cc: Robert Wayland III, EPA; Peter Gold, EPA; Rep Jo Ann Davis; Gov. Kaine; Sen. Chichester; Del. Whittman; Kenny Eades, No. Co. Administrator; Jack Larson, Lanc. Co. Administrator