

TMDL comments

At the meeting held in Kilmarnock September 29, 2008, regarding the bacterial impairment of Indian, Dymer, Tabbs, and Antipoison Creeks, DEQ summarized their suggestions as to the sources of the bacteria but failed to present any plan of action to reduce bacterial levels.

Scientifically, it is clear that the method of “Bacterial Source Tracking” (BST) or “Microbial Source Tracking” (MST) chosen, namely “Antibiotic Resistance Analysis” (ARA) is not sufficiently reliable to identify the sources of bacteria with confidence. Stoeckel et al. (2004, Env. Sci. Tech 38: 6109-6117) stated that “Pulsed-field gel electrophoresis was able to correctly identify all replicates The other protocols classified fewer than 60% of the replicates to the correct host species.” Ritter et al. (2003, J. Water and Health 1: 209-224) stated “... library-dependent methods as currently applied often assigned a large proportion of the isolates to an “unknown” category, and there was no reliable relation between proportion of bacteria associated with each host and the known composition of the samples.” Stewart et al. (2003, J. Water and Health 1: 225-231) concluded “Despite a number of successful applications, MST techniques are still under development.” Additionally, and importantly, Stewart et al. state “The financial implications of incorrectly identifying the presence of human source material and taking management actions in response can be serious.” Until the identification of the source of bacteria is sufficiently certain to withstand scrutiny in a court-of-law, the ARA results can only be considered as suggestive.

The results for Indian, Dymer, Tabbs, and Antipoison Creeks are very similar to the results presented recently for Lower Machodoc Creek in Westmoreland and Cockrell Creek in Northumberland Counties. There are only small differences in land-use in the watersheds of the numerous impaired creeks in the entire Northern Neck. The most significant difference in land use between various creeks is the intensity of residential shoreline development, which typically increases toward the mouths of the creeks whereas bacterial concentrations always increase toward the headwaters of the creeks. In Northumberland County, half the land (101 square miles) is forested and one-third (60 square miles) is agricultural (Northumberland County Comprehensive Plan, p. 3:4), leaving about 62 square miles as residential or “urban.” These numbers are similar to those presented for Indian, Dymer, Tabbs, and Antipoison Creeks (Figs 3.2 through 3.5), for Lower Machodoc Creek (Fig 3.2) and for Cockrell’s Creek, although the latter is more residential (with a wastewater treatment plant) than the others. The similar land-use for the impaired water bodies throughout the Northern Neck leads to my first question:

- 1) Why does DEQ persist in dealing with this issue creek-by-creek? Excepting those creeks where discharge permits exist (Cockrell’s Creek, Indian Creek, etc.), the land-use differences between the various creeks are small, and the inaccuracy of the ARA data precludes identifying bacterial sources with an accuracy similar to the small differences in land use between creeks.**

DEQ could save a lot of time, and a lot of taxpayer money, by simply treating all the creeks, except those with discharge permits, similarly.

DEQ has never proposed solutions to the bacterial impairment. Most, roughly three-quarters, of the land-use is forest and agricultural, and therefore wildlife, without question, must contribute significantly to the bacterial contamination. There is nothing

that can be done about wildlife contamination, as DEQ has stated. Likewise, contamination from pets, primarily dogs, cannot be significantly reduced. Leash laws can be (and in cases, have been) enacted in some developments and in urbanized areas, but only a small fraction of the land is affected. Although feral dogs should be controlled, the rural nature of the county dictates that many people, like myself, want their dogs to run free to provide security, vermin control, etc. There are few livestock in the Northern Neck, and it would be simple to mandate that they be fenced out of the 100-foot RPA defined by the "Bay Act." This should be done, despite the objections of a very few property owners, but because of the paucity of livestock such action is unlikely to reduce bacterial levels significantly. As for human contamination, what can be done to reduce contamination in addition to the existing "shoreline surveys" conducted regularly by VDH and the mandatory septic system inspection and pump-out, if necessary, that is currently beginning to be enforced by the counties? This leads to my second question:

2) Other than fencing livestock out of areas of standing and running water, what meaningful practical actions can DEQ take to significantly reduce fecal coliform bacterial contamination of impaired waterways?

The entire issue of bacterial contamination of waterways being a violation of the Clean Water Act can also be questioned. It is certain that much of the contamination is from wildlife, and there is nothing that can be done about it. It is also true that fecal coliform bacteria are resident in the anoxic bottom sediment that characterizes all our creeks (Kator et al., 2005, Shellfish TMDLs in Virginia: Sediment as a reservoir of fecal coliforms? Proc. Va. Water Research Symposium, p. 10-12) and constitutes a reservoir of contamination that cannot be eliminated. It is impossible that the bacterial contamination of local creeks can be eliminated, and it is doubtful that it can even be significantly reduced. Additionally, what harm to the public exists as a result of the contamination? The Virginia Administrative Code (4VAC20-310-10ff) is clear how shellfish grown in impaired waters can be relayed so as to safely enter the commercial shellfish market. To my knowledge no case of food poisoning from shellfish has ever been documented when the law has been followed. This leads to my third and final question:

3) Given that it is impossible to eliminate bacterial contamination from wildlife and from bacteria already resident in the sediment, and given that human health is protected by strict, effective laws relating to (the very few!) shellfish grown in restricted waters, why is bacterial impairment a problem?

In fact, our creeks are impaired because of eutrophication, or the discharge of too much nitrogen and phosphorus, leading to abysmal water quality including turbidity that prevents the growth of Submerged Aquatic Vegetation and anoxic zones. DEQ and EPA should concentrate their efforts on the real problem, eutrophication, caused mostly by inefficient agricultural fertilization practices. Bacterial impairment cannot be eliminated and does not cause any significant health or environmental problem.

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