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To Whom It May Concern:

These comments on the NOIRA relative to 4VAC5-15 are similar to comments I submitted regarding the Eastern Shore Tributary Strategy. Northumberland County, where I live, constitutes a very small fraction of the Shenandoah/Potomac watershed, and the topography, hydrogeology and land use are similar to the Eastern Shore. Future plans regarding agricultural controls in the Northern Neck and Middle Peninsula should be included along with the Eastern Shore.

The strategies elucidate the problem satisfactorily, but then proceed to allocate funds in a manner that will have little impact on the Bay. Funding should be allocated proportionately to pollution. Agriculture is, by far, the primary polluter. The following table summarizes the pollution source (averages of nitrate and phosphate from 1985 and 2002, pages 18 and 19) and the proposed allocation of funds (Table 4-3, p. 31).

	% pollution	%$ allocated
Agriculture	71	18
Point source	10	22
Urban + Mixed open	11	44
Septic	2	16
Forest + precipitation	5	

There is absolutely no excuse for spending nearly as much money on improving septic systems (2% of the pollution) as on agriculture (71% of the pollution.) Agriculture is the largest source of pollution and must be seriously addressed now, or cleaning up the Bay will be impossible. Two steps are necessary: 1) **mandated nutrient management plans for both nitrogen and phosphorus**, and 2) mandated 100 foot buffers ultimately consisting of mature trees alongside all waterways.

On p. 35 the Eastern Shore Tributary Strategy posed several specific questions. Here are my responses to those questions that involve nutrient management:

How can consistent and comprehensive application of nutrient management plans on both agricultural and urban lands be achieved?

Nutrient management plans for nitrogen and phosphorous should be mandated for all agricultural land throughout the watershed and certainly within all RMAs. Limits should be based on

available science, updated as appropriate, and not be put off using the need for "better science" (e.g. PI) as an excuse. Urban nutrient management is vastly less important.

The placement of sewage sludge (sometimes called "bio-solids") on agricultural lands is increasing. Are programs currently in place sufficient to address the impacts of this source of nutrients?

Current programs are unsatisfactory because they guarantee phosphorus pollution. Sewage sludge should be treated like any other kind of phosphorus-rich animal waste and be subject to mandatory nutrient management plans for both nitrogen and phosphorus (see #1).

The "Bay Act" contains too much permissive wording and at least one egregious omission. In the Coastal Plain, groundwater discharge, not runoff, constitutes the largest source of pollution. Given 42 inches of annual rainfall, and 1/3 infiltration (2/3 evapotranspiration), 3.25 x 10^7 cubic feet of water (5280 * 5280* 42/12*1/3) infiltrates to the water table each year, dissolving excess fertilizer and additionally incorporating the discharge from drainfields. Virtually all that water flows underground "downhill" toward the nearest waterway (a small fraction recharges the deep aquifers) and discharges into the nearest waterway. The arithmetic works out to about 666,000 gallons of water each day for each square mile. Two studies of nitrate in shallow groundwater in Northumberland County found high nitrate levels, derived mostly from agricultural over-fertilization.

We must not only reduce the concentrations of nitrate and phosphate in the groundwater (**via nutrient management plans**), but remove as much nitrate and phosphate as possible before the water can discharge into the waterway. 100 foot buffers consisting (eventually) of mature trees are the only known way to cost-effectively remove nutrients from the groundwater. Large trees, having a overlapping leaf canopy (and overlapping root mass) with deep roots, especially trees that can tolerate saturated conditions part of the year, are far more effective than grasses and shrubs in tapping the groundwater directly. Not only do the trees consume nutrients, but the root mass promotes denitrification (BNR). Marsh grasses perform a similar function. Groundwater can flow long distances and is most effectively cleansed at the point of discharge – alongside waterways.

The Bay Act has failed to improve water quality in Chesapeake Bay after nearly 15 years. The "dead zone" was the largest on record in 2003. Submerged Aquatic Vegetation has not improved significantly on a regional basis. These two "end result" indicators of oxygen demand and water clarity both result from over-fertilization, and both are in complete accord. The Bay Act must be strengthened and enforced if the Bay is to improve in the face of continued population growth. Existing wording is insufficiently strict, as the last 15 years have proven. Below are some of the changes I suggested with regard to nutrient management, and their justification. My focus is on Coastal Plain settings such as Northumberland County. The goal is to require complete

compliance to the 100-foot vegetated buffer, consisting (eventually) of large trees. Additional suggested wording is in **bold face**; deleted wording is ~~struck through~~. The numbers are keyed to comments at the end, justifying the changes. All references are to 5VAC 10-20.

1) **–120-9** Land upon which agricultural activities are being conducted **within the RMA,** including….
2) **–120-9-2** ~~For~~ **N**utrient management~~, whenever nutrient management~~ plans are ~~developed~~ **required for both nitrogen and phosphorous, and** the operator or landowner must provide **the county with** soil test……
3) **–130-3** To minimize the adverse effects of human activities on the other components of the RPA, state waters, and aquatic life, 100-foot buffer area of vegetation **and large trees (upon maturity)** that is effective in retarding runoff, preventing erosion, and filtering nonpoint source pollution from runoff **and subsurface groundwater discharge** shall be retained…….
~~4)~~ **–130-5-b** On agricultural lands the agricultural buffer area shall **be no less than 100 feet in width, shall be designed to consist of large trees (upon maturity) and** shall be managed to prevent concentrated flows of surface water **and subsurface groundwater** from breaching……All permissive wording allowing buffer areas narrower than 100 feet, ~~(1) through (5)~~, should be deleted.

Justifications:

1) and 2) In order to reduce nitrate and phosphate additions to local waterways, the amounts of both nutrients added by surface and subsurface flow from fertilization must be reduced.
3) The nutrient-rich groundwater must be intercepted by buffer strips and by marshes if possible to reduce the concentrations of the nutrients nitrate and phosphate that enter the waterway. The deep roots of large trees, tolerant of saturated soil conditions, are most efficient in removing nutrients from the groundwater and in promoting microbial denitrification. Ignoring groundwater as the major source of nonpoint source pollution is an egregious omission of the Bay Act.
4) Mandated nutrient management plans for nitrogen and phosphorus and 100-foot buffer strips are the only non-draconian steps that can be taken to reduce the most important source of nonpoint source pollution from agriculture. A 25-foot buffer (130-5-b-2) accomplishes very little, if anything, in reducing nonpoint source pollution by groundwater and all the leniencies in this section permitting buffer strips narrower than 100 feet should be stricken.

Yours sincerely,

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