

125 Airstrip Lane  
P. O. Box 539  
Ophelia VA 22530  
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Tributary Comments  
Virginia Department of Conservation and Recreation  
203 Governor Street, Suite 213  
Richmond VA 23219.

To Whom It May Concern:

These comments, to which I would appreciate a response suitable for distribution to the membership of NAPS (Northumberland Association for Progressive Stewardship – [www.napsva.org](http://www.napsva.org)), relate to the Eastern Shore 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. In future plans the Northern Neck and Middle Peninsula should probably be included along with the Eastern Shore in a single strategy.

The strategy elucidates the problem satisfactorily, but then proceeds 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).

	<u>% pollution</u>	<u> '%\$ allocated</u>
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 several specific questions are posed. Here are my responses:

How can consistent and comprehensive application of nutrient management plans on both agricultural and urban lands be achieved? Are there improvements that can be made to current agriculture nonpoint source control programs to better address nutrient issues?

**Nutrient management plans for nitrogen and phosphorous should be mandated immediately 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” as an excuse.**

Septic systems are currently an uncontrolled source of nitrogen. Should all newly installed septic systems and replacement systems be required incorporate processes to remove nitrogen from effluent?

**Virginia must modernize its grey water policy. Septic tanks should not receive any discharge except from toilets. Garbage disposals should be banned so as to reduce the solids load to septic systems. Septic system maintenance should be enforced (Northumberland County’s ordinance has required inspection and pump-out for 14 years but has never been implemented.) New developments should not use individual drainfields, but rather they should be constructed using “pocket” treatment facilities, or at least pooled oxidation facilities that incorporate BNR. Constructed wetlands would also be desirable.**

Beneficial uses of animal and poultry waste must be more aggressively pursued. Value added products produced from animal or poultry waste or “waste to energy” facilities can help address nutrient issues. How can these approaches be broadly implemented in Virginia?

**Market forces will dictate beneficial uses of waste. Government’s function should only be to ensure that the wastes cause no environmental harm.**

Buffers along streams and rivers have proven to be an effective practice to reduce nutrients and sediments. In addition to programs such as the Conservation Reserve Enhancement Program that establish buffers on agricultural lands, programs such as the Chesapeake Bay Preservation Act require buffers along perennial streams in Eastern Virginia. What can be done to accelerate the establishment of buffers along Virginia’s streams and rivers?

**Permissive wording in the Bay Act needs to be changed so as to require buffers consisting of mature trees within 100 feet of all waterways. Suggested changes are outlined below.**

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),  $3.25 \times 10^7$  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. There have been two studies of nitrate in shallow groundwater in Northumberland County. In 1979, Household Water Quality Series #28 (VA Tech) found an average of 4.5 ppm nitrate in the groundwater (see [www.napsva.org](http://www.napsva.org) for a compilation of the data). Last year a study in which I participated found an average of 2 ppm nitrate, with a strong correlation to proximity to agricultural practices. An immense flux of nutrients enters our waterways, and the Bay, as the result of groundwater flow.

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, and more emphasis needs to be placed on establishing marsh grasses along shorelines where possible. 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. The changes suggested and justified below focus on Northumberland County VA but apply to tidewater counties in general. 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) ~~-80-B-5~~. A buffer area not less than 100 feet in width, **measured in plan or map projection**, located.....
  - 2) ~~-120-9~~ Land upon which agricultural activities are being conducted **within the RMA**, including....
  - 3) ~~-120-9-2~~ For Nutrient 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.....
  - 4) ~~-120-10~~ Silvicultural activities in ~~Chesapeake Bay Preservation Areas~~ **the RPA are prohibited. Silvicultural activities in the RMA** are exempt.....
  - 5) ~~-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.....
  - 6) ~~-130-4-a-1~~ Encroachments into the buffer area shall ~~be the minimum necessary to achieve a reasonable buildable area for a principal structure and necessary utilities~~ **not be allowed. An owner must comply with the buffer requirements (and reserve drainfield requirement if possible), even if the owner's right to use of the property might otherwise be vested under a traditional vesting analysis.**
  - 7) ~~-130-5-a-2~~ Any path shall be constructed and surfaced **with pervious material** so as to effectively control erosion.
  - 8) ~~-130-5-a-3~~ ....and thinning **and pruning** of trees...
  - 9) ~~-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.....
- ~~(1) through (5) should be struck through~~

Justifications:

- 1) Measurement from the water's edge, up a cliff and then onto the land adjacent to the water must be prevented.
- 2) see 3).
- 3) In order to reduce nitrate and phosphate additions to local waterways, the amounts of both nutrients added by surface or subsurface flow from fertilization must be reduced. There is no disagreement that agriculture is the largest source of nonpoint source pollution, accounting for roughly 70% of all "actionable" pollution. Counties must bear part of the responsibility in enforcing the regulations and must be informed of steps taken toward compliance.
- 4) Modern silvicultural activities use very large equipment that results in massive land disturbance and the virtual certainty of sediment pollution.

- 5) Most of the nitrate and phosphate that enters local waterways does so by subsurface groundwater flow, not by surface runoff. The 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.
- 6) All new construction should conform to the 100-foot buffer requirements irrespective of when the lot was platted. Septic systems other than the traditional septic tank and drainfield(s) should be permitted as approved by VDH.
- 7) To prevent runoff.
- 8) Property owners should be required to grow large trees adjacent to the water. Even though there may be no local agricultural activity, groundwater derived from higher elevations may be polluted with nutrients. Pruning lower limbs permits sight-lines to be established while still maintaining the large root mass necessary to consume nitrate and phosphate from the groundwater and encourage denitrification.
- 9) See 5) and 8). 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 should be stricken.

Yours sincerely,

Dr. Lynton S. Land  
Emeritus Prof. Geol. Sci. and E. Allday  
Centennial Chair, U Texas Austin  
Vice-president NAPS ([www.napsva.org](http://www.napsva.org))  
Email: [JandL@rivnet.net](mailto:JandL@rivnet.net)  
(804) 453-6605 voice and fax

cc: Sen. John Chichester, Del. Albert Pollard, Sec. Tayloe Murphy, EPA, CBF