

Duke University

Kenneth H. Reckhow, Professor
Nicholas School of the Environment
Durham North Carolina 27708-0328

August 13, 2010

John Huisman
NC DWQ
1617 Mail Service Center
Raleigh, NC 27699-1617

RE: Comments on Falls Rules

Dear Mr. Huisman,

As you may know, I have devoted much of my professional life to the issues of modeling and assessment of nutrient enrichment in lakes to achieve water quality goals. I would like to offer the following comments and observations regarding the proposed Falls Rules. It appears that there is public confusion concerning the North Carolina regulations under the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) as they apply to Falls Reservoir. Chlorophyll a violations within Falls Reservoir relate to the CWA regulations and primarily reflect aquatic life and recreation; they do not relate to the SDWA regulations governing Raleigh's treated drinking water. By law, Raleigh must provide treated water to its customers that meets the drinking water standards, and these drinking water standards do not include chlorophyll. The concern that Raleigh has with chlorophyll levels in Falls Reservoir near its drinking water intake is associated with water filtration costs and taste & odor, not with compliance with the drinking water standards. In other words, the primary concern with chlorophyll violations in Falls Reservoir, leading to the proposed controls on phosphorus and nitrogen, is to protect the aquatic life and recreational uses of the water.

So, why should Raleigh citizens be concerned about chlorophyll in Falls Reservoir affecting their drinking water? The cost of treatment for extra filtration and possible taste & odor problems is the answer. An equitable approach to address this concern is to determine the source of nitrogen, phosphorus, and chlorophyll at Raleigh's intake and apportion control costs according to relative contribution. It is well-known that, in an elongated reservoir like Falls, the adjacent sources of contaminants have a greater impact on water quality than do remote sources. This is particularly true for reservoirs such as Falls that have constrictions between basins. Thus, even though most of the water in Falls Lake is coming from the upper Falls, the relative impact of phosphorus and nitrogen contributions that affect Raleigh's intake will be larger from Wake County than from the

counties in the upper watershed (e.g., Granville, Durham, and Person). Therefore, an approach which focuses on the upper Falls to reduce nitrogen and phosphorus, or chlorophyll a in the lower Falls, particularly near Raleigh's water intake, is not scientifically sound.

Independent of Raleigh's drinking water, there remains the regulation governing chlorophyll a in Falls Reservoir to protect aquatic life and recreation and the proposed reductions in phosphorus and nitrogen to achieve compliance with the chlorophyll water quality criterion. Unfortunately, given the current sources of phosphorus and nitrogen and given the estimated magnitude of the reductions required, I question the technical ability (and cringe at the cost) to achieve compliance. In 2001, I chaired the Congressionally-mandated National Academy of Sciences Review Panel for the EPA-required Total Maximum Daily Load (TMDL) program. Our Review Panel noted that, in some cases, water quality standards may not be achievable within the TMDL program. To address this concern, EPA had previously established an option for "use attainability analysis" (UAA) which would allow the states to modify a water quality standard if it could be shown that the designated use is not attainable through implementation of a TMDL. Our review panel recommended that this option be considered in selected situations. Given the history of Falls Reservoir, and the shallow and eutrophic conditions of the upper reservoir, I believe that a UAA should be undertaken for the basins in the upper end of Falls Reservoir, given the uncertainties in achieving compliance. This UAA should be undertaken sooner rather than later, given the massive expenditures required in the Falls Rules. Given the limited modeling that supports the Falls rules, and the massive expenditures required, this UAA should be undertaken prior to the Stage 2 program going into effect. It should be a necessary precondition prior to the implementation of Stage 2.

Finally, I believe that staging the implementation of nutrient control measures for Falls Reservoir is a good idea, as it allows, with a thoughtfully-crafted monitoring program, the opportunity to assess the effectiveness of implemented measures using adaptive management. Unfortunately, the Falls Rules do not truly incorporate adaptive management that they profess to use. I am currently chairing the National Academy of Sciences Review Panel for the Chesapeake Bay Program; an important element of our panel's work is to distinguish ad hoc modifications from actual adaptive management ("learning by doing"). Currently, the Falls Reservoir simply stages or delays implementation of controls. The Falls Rules should be modified to take a more flexible and truly "adaptive" approach.

Sincerely yours,



Kenneth H. Reckhow