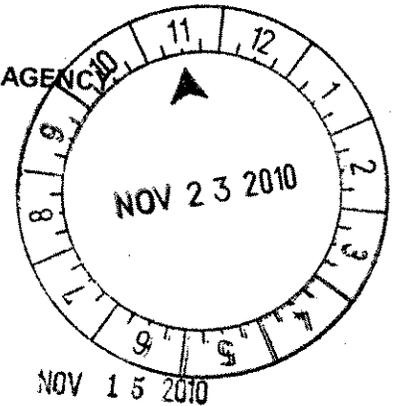




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029



Ellen Gilinsky, Ph.D., Director
Division of Water Quality Programs
Virginia Department of Environmental Quality
629 E. Main Street
P.O. Box 1105
Richmond, Virginia 23218

Dear Dr. Gilinsky:

The U.S. Environmental Protection Agency (EPA) has reviewed the Virginia Department of Environmental Quality's (VADEQ) request to reclassify the dissolved oxygen impairments in the Pocomoke River from Category 5A "Impaired Needing a Total Maximum Daily Load" (TMDL) to Category 4C "Impaired Due to Natural Conditions" on the 2010 Virginia Section 305(b)/303(d) Integrated Report. VADEQ's re-classification request was supported by an attached assessment report, *Natural Conditions Assessment of Low Dissolved Oxygen in the Virginia Portion of the CBP Segment POCOH (Pocomoke Sound)*, which was submitted to EPA for review on October 6, 2010. The Pocomoke River was originally listed as impaired for dissolved oxygen impairments on Virginia's 2006 305(b)/303(d) Integrated Report (a complete listing history is included in Enclosure 1).

The tidally influenced Pocomoke River is classified as an "Open Water" in Virginia's Water Quality Standards. Based on the requirements promulgated under the Clean Water Act, waters designated as Open Waters in the State of Virginia are required to meet the dissolved oxygen criterion, listed in Enclosure 2, for that use. As indicated in VADEQ's letter, the Pocomoke River has been identified by the State as failing to meet the Open Water designated use as assessed by the thirty-day dissolved oxygen criteria during the 2006 summer assessment period. Therefore, the *Procedure for Natural Condition Assessment of low pH and low DO in Virginia Streams* was conducted to determine the cause(s) of the dissolved oxygen impairments in the Pocomoke River. The following findings from the procedure below indicate that the assessed impairment is strongly influenced by natural conditions; and thus, does not require the development of a TMDL.

Step 1. Determine if wetlands are present through slope/flow measures.

Streams that have naturally low dissolved oxygen concentrations are characterized by decaying vegetation, low slopes and low velocity flows.

Findings:

The flow of the Pocomoke River was evaluated based on model simulations which showed that the residence time for the Pocomoke River is approximately 10.5 days under mean flow and tide range conditions. The relatively long residence time is analogous to low velocity flows in streams, suggesting that organic matter will be transported into the

Pocomoke River and will remain there until it undergoes decay.

Step 2. Determine nutrient levels and compare with U.S. Geological Survey (USGS) background concentrations.

High nutrient levels are an indication of anthropogenic inputs of nitrogen and phosphorus.

Findings:

There are no available national background concentrations for tidal rivers. Therefore, the Pocomoke River was compared to the Pamunkey and Mattaponi River which is a similar wetland-dominated system that can be characterized as having naturally low dissolved oxygen concentrations, as indicated in Table VI-2 of the *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tributaries-2004 Addendum*. The results of the comparison showed that the total nitrogen (TN) concentration in the Pocomoke River ranges from 1.2 to 1.5 mg/L, which is higher than the TN concentration of 0.5-1.0 mg/L in the Pamunkey and Mattaponi Rivers. Total phosphorus concentrations were in the same range as those in the Pamunkey and Mattaponi Rivers.

Step 3. Determine degree of seasonal fluctuation of dissolved oxygen levels.

Anthropogenic impacts will likely disrupt the typical seasonal fluctuation of dissolved oxygen concentrations in streams. A seasonal analysis should be conducted to verify that dissolved oxygen concentrations are depressed in the summer months and recover during the winter, as would be expected in a natural system.

Findings:

Seasonal fluctuations were assessed in the Pocomoke River by monitoring data collected from 1991 to 2010 for dissolved oxygen. As illustrated in Enclosure 3, dissolved oxygen concentrations in the Pocomoke River showed consistent seasonality.

Step 4. Determine anthropogenic impacts.

Every effort should be made to identify human impacts that could exacerbate low dissolved oxygen levels.

Findings:

There are no wastewater treatment facilities in the Virginia portion of the watershed that discharge to the Pocomoke River. There are, however, two small facilities with a total design flow of 0.03 MGD. According to the watershed model V5.3 of the Chesapeake Bay Program, nonpoint sources were found to be the dominant force behind the water quality impairments in the Pocomoke River.

The Chesapeake Bay Program's modeling scenarios were used to determine the extent of the anthropogenic influences on the dissolved oxygen concentrations in the Pocomoke River. The results of the scenarios showed that under an "all forested condition" loading scenario, the Pocomoke River would still be impaired under the current water quality standards for dissolved oxygen.

In addition to the modeling, the dissolved oxygen deficit was measured in the Pocomoke River to determine if the anthropogenic impacts in the watershed are effecting oxygen concentrations. The results showed that oxygen concentrations persist under a saturation level with constant oxygen deficit; this is opposed to the boom-bust characteristics of an anthropogenically eutrophic-dominated system.

Upon review of VADEQ's *Natural Conditions Assessment of Low Dissolved Oxygen in the Virginia Portion of the CBP Segment POCOH (Pocomoke Sound)*, EPA approves VADEQ's request to place the dissolved oxygen impairments in the Pocomoke River under Category 4C on Virginia's 2010 Section 305(b)/303(d) Integrated Report. VADEQ has demonstrated that the dissolved oxygen impairments are occurring naturally and therefore, will not warrant the development of a TMDL. Once the Pocomoke River is reclassified under Category 4C on Virginia's 2010 Section 305(b)/303(d) Integrated Report, it is EPA's understanding that VADEQ will develop a site-specific dissolved oxygen criterion for the Pocomoke River which will be based on the dissolved oxygen concentrations of a site influenced by natural conditions.

If you have any questions or comments please call me, or contact Greg Voigt, Virginia TMDL Coordinator, at 215-814-5737.

Sincerely,



Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: David Lazarus, VADEQ

**Pocomoke River
Section 305(b)/303(d) Listing History**

| Impaired Stream | Impairment | 1998 303(d) ID | 2002 303(d) ID | 2004 303(d) ID | 2006 303(d) ID | 2008 303(d) ID | 2008 305(b) ID | 2010 303(d) ID | 2010 305(b) ID |
|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|----------------|---|----------------|--|
| Pocomoke River | Dissolved Oxygen | NA | NA | NA | 76079 | POCOH-DO-BAY | VAT-C09E_POC01A06 VAT-C09E_POC02A08 VAT-C09E_PTT01A06 VAT-C09E_BLB01A06 VAT-C09E_ZZZ01A06 VAT-C10E_POC01B08 VAT-C10E_POC01A08 VAT-C10E_HLD01A06 VAT-C10E_HLD02A06 | POCOH-DO-BAY | VAT-C09E_POC01A06 VAT-C09E_POC02A08 VAT-C09E_PTT01A06 VAT-C09E_PTT01B10 VAT-C09E_BLB01A06 VAT-C09E_ZZZ01A06 VAT-C10E_POC01B08 VAT-C10E_POC01A08 VAT-C10E_HLD01A06 VAT-C10E_HLD02A06 |

Enclosure 1

Pocomoke River
Section 305(b)/303(d) Listing History

| Impaired Stream | Impairment | 1998 303(d) ID | 2002 303(d) ID | 2004 303(d) ID | 2006 303(d) ID | 2008 303(d) ID | 2008 305(b) ID | 2010 303(d) ID | 2010 305(b) ID |
|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|----------------|---|----------------|--|
| Pocomoke River | Dissolved Oxygen | NA | NA | NA | 76079 | POCOH-DO-BAY | VAT-C09E_POC01A06 VAT-C09E_POC02A08 VAT-C09E_PTT01A06 VAT-C09E_BLB01A06 VAT-C09E_ZZZ01A06 VAT-C10E_POC01B08 VAT-C10E_POC01A08 VAT-C10E_HLD01A06 VAT-C10E_HLD02A06 | POCOH-DO-BAY | VAT-C09E_POC01A06 VAT-C09E_POC02A08 VAT-C09E_PTT01A06 VAT-C09E_PTT01B10 VAT-C09E_BLB01A06 VAT-C09E_ZZZ01A06 VAT-C10E_POC01B08 VAT-C10E_POC01A08 VAT-C10E_HLD01A06 VAT-C10E_HLD02A06 |

Enclosure 2

Virginia's Water Quality Standards for Open-Water Dissolved Oxygen

| Designated Use | Criteria Concentration/Duration | Temporal Application |
|-----------------------|--|-----------------------------|
| Open Water | 30-day mean > 5.5 mg/l (tidal habitats with 0-0.5 ppt salinity) | Year-round |
| | 30-day mean > 5 mg/l (tidal habitats with > 0.5 ppt salinity) | |
| | 7-day mean > 4 mg/l | |
| | Instantaneous minimum > 3,2 mg/l at temperatures < 29C Instantaneous minimum > 4.3 mg/l at temperatures > 29C | |

Enclosure 3

Modeled and Observed Dissolved Oxygen in the Pocomoke River

