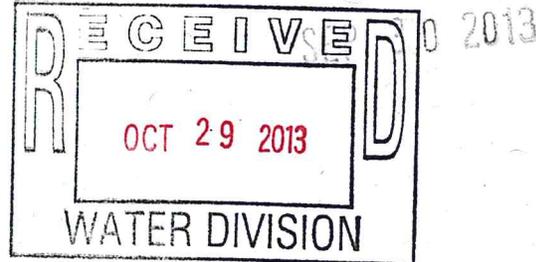




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Ms. Melanie Davenport, Director
Division of Water Quality Programs
Virginia Department of Environmental Quality
629 E. Main Street
P.O. Box 1105
Richmond, Virginia 23218

Dear *Melanie* Davenport:



The U.S. Environmental Protection Agency (EPA) has reviewed the Virginia Department of Environmental Quality's (VADEQ) request to reclassify the pH and dissolved oxygen impairments in Goldenvale Creek from Category 5A "Impaired Needing a Total Maximum Daily Load" (TMDL) to Category 4C "Impaired Due to Natural Conditions" and anticipates this change on the 2014 Virginia Section 305(b)/303(d) Integrated Report. VADEQ's re-classification request was supported by an attached assessment report, *Natural Conditions Assessment for Low pH and Dissolved Oxygen in Goldenvale Creek, Caroline County, Virginia*, which was submitted to EPA for review on July 31, 2013. Goldenvale Creek was originally listed as impaired for pH and dissolved oxygen impairments on Virginia's 2008 305(b)/303(d) Integrated Report (a complete listing history is included in Enclosure 1).

Goldenvale Creek is classified as a "Class III" or Nontidal (Coastal and Piedmont Zones) Water in Virginia's Water Quality Standards. Based on the requirements promulgated under the Clean Water Act, waters designated as Class III in the State of Virginia are required to meet the dissolved oxygen and pH criteria, listed in Enclosure 2, for that use. As indicated in VADEQ's attached assessment report, Goldenvale Creek has been identified by the State as failing to meet the Class III designated use as assessed by the dissolved oxygen and pH criteria during the 2008 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 pH and dissolved oxygen impairments in Goldenvale Creek. 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 pH and dissolved oxygen concentrations resulting from characteristic decaying vegetation, low slopes and low velocity flows.

Findings:
The slope of Goldenvale Creek from its headwaters to the confluence with the Rappahannock River is 0.32%, which is considered a low slope. National Hydrography Dataset (NHD) GIS and USGS topographical data show significant swampy waters along

the Goldenvale Creek stream corridor and aerial photos of the watershed confirm the mapping data.

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:

The average nutrient concentrations in Goldenvale Creek are well below the natural background nutrient concentrations for streams in undeveloped areas, as described by the USGS (TN < 1.0 mg/L and TP < 0.1 mg/L). The low nutrient concentrations shown in Table 4 of the attached assessment report, *Natural Conditions Assessment for Low pH and Dissolved Oxygen in Goldenvale Creek, Caroline County, Virginia* (18 samples averaged to total phosphorus concentrations of 0.098 mg/L and total nitrogen concentrations of 0.603 mg/L) are not indicative of anthropogenic nutrient inputs.

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:

Goldenvale Creek exhibits natural seasonal DO fluctuation due to the inverse relationship between water temperature and DO. DO is high in the winter months while water temperatures are low, and low in the summer months when water temperatures are high. Figure 12 of the attached assessment report, *Natural Conditions Assessment for Low pH and Dissolved Oxygen in Goldenvale Creek, Caroline County, Virginia* shows the month when the samples were collected and the dissolved oxygen value collected at each month that was sampled. Figure 12 provides evidence that dissolved oxygen concentrations in the Goldenvale Creek show consistent seasonality.

Step 4. Determine anthropogenic impacts.

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

Findings:

There are no Virginia Pollutant Discharge Elimination System (VPDES) facilities in the Goldenvale Creek watershed. The vast majority of the watershed is forested. Ambient nutrient concentrations are well below natural background. Goldenvale Creek exhibits natural seasonal DO fluctuation due to the inverse relationship between water temperature and DO. DO is high in the winter months while water temperatures are low, and low in the summer months when water temperatures are high. There is not a close correlation between precipitation amounts and field pH at DEQ ambient water quality monitoring stations. Analyses do not show a strong correlation between rainfall events and low pH in Goldenvale Creek. There are large inputs of decaying vegetation into Goldenvale Creek from the adjacent swampy areas and other areas of forested land with heavy tree canopy throughout the watershed. This decaying vegetation produces acids which in turn can lead to lower pH values.

Upon review of VADEQ's *Natural Conditions Assessment for Low pH and Dissolved Oxygen in Goldenvale Creek, Caroline County, Virginia*, EPA approves VADEQ's request to place the pH and dissolved oxygen impairments in Goldenvale Creek under Category 4C on Virginia's 2014 Section 305(b)/303(d) Integrated Report. VADEQ has demonstrated that the pH and dissolved oxygen impairments are occurring naturally and therefore, will not warrant the development of a TMDL. Once the Goldenvale Creek is reclassified under Category 4C on Virginia's 2014 Section 305(b)/303(d) Integrated Report, it is EPA's understanding that VADEQ will develop a site-specific pH and dissolved oxygen criterion for the Goldenvale Creek which will be based on the pH and dissolved oxygen concentrations of a site influenced by natural conditions.

If you have any questions or comments please call me, or contact Elizabeth Gaige, Virginia TMDL Coordinator, at 215-814-5676.

Sincerely,

A handwritten signature in black ink, appearing to read "Jon M. Capacasa". The signature is fluid and cursive, with a large initial "J" and "M".

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Elizabeth McKercher, VADEQ

Enclosure 1

**Goldenvale Creek
Section 305(b)/303(d) Listing History**

Waterbody name	Listed Impairment	TMDL pollutant	1998 303(d) ID	2002 303(d) ID	2004 303(d) ID	2006 303(d) ID	2008 303(d) ID	2010 303(d) ID	2012 303(d) ID	305(b) ID
Goldenvale Creek	Dissolved Oxygen	N/A - Natural Conditions	n/a	n/a	n/a	n/a	E21R-08-DO	E21R-08-DO	E21R-08-DO	VAN-E21R_GLL01A08
Goldenvale Creek	pH	N/A - Natural Conditions	n/a	n/a	n/a	n/a	E21R-08-PH	E21R-08-PH	E21R-08-PH	VAN-E21R_GLL01A08

Enclosure 2

**Virginia's Water Quality Standards for Dissolved Oxygen and pH
for Nontidal Waters from 9VAC25-260-50**

CLASS	DESCRIPTION OF WATERS	DISSOLVED OXYGEN (mg/l)****		pH	Max. Temp. (°C)
		Min.	Daily Avg.		
III	Nontidal Waters (Coastal and Piedmont Zones)	4.0	5.0	6.0-9.0	32