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

SEP 23 2014

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 Ms. Davenport:

On December 12, 2013, the U.S. Environmental Protection Agency (EPA) partially approved the Virginia Department of Environmental Quality's (VADEQ) 2012 Section 303(d) list but took no action on the assessment status related to algal growth impacts to recreation uses in the North Fork Shenandoah River, South Fork Shenandoah River and mainstem Shenandoah River. EPA has completed its review of this issue. For the reasons set forth in the enclosed Rationale, EPA approves Virginia's 2012 Section 303(d) list including the previously deferred segments North Fork Shenandoah River, South Fork Shenandoah River and mainstem Shenandoah River.

EPA's decision to defer action on algal impacts to recreation uses in the Shenandoah River was, in part, to allow EPA more time to evaluate information submitted by the Shenandoah Riverkeeper and other available information. The Riverkeeper's information, in the form of visual observations and statements of users of the River, warrants serious consideration and further investigation and EPA has been working closely with the Commonwealth to ensure this occurs. EPA has requested that VADEQ work towards developing an assessment methodology and impairment threshold to evaluate algal impacts to recreation uses of Virginia's rivers and streams that can be used for future Integrated Reports.

EPA is aware that VADEQ is preparing the 2014 Section 303(d) list for public review. As we have for other cycles, EPA will be providing comments to Virginia on the draft 2014 list. EPA expects VADEQ to evaluate all readily available and applicable water quality information including information related to excess algal growth on North Fork Shenandoah River, South Fork Shenandoah River and mainstem Shenandoah River.

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We appreciate the continued cooperation from VADEQ staff in evaluating the water quality issues in the Shenandoah Basin. If you have any questions, please feel free to contact me, or have your staff call Ms. Evelyn MacKnight at (215) 814-5717 or Mr. Bill Richardson at (215) 814-5675.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

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RATIONALE FOR APPROVAL OF
VIRGINA DEPARTMENT OF ENVIRONMENTAL QUALITY
2012 SECTION 303(d) LIST

I. Purpose

On December 12, 2013, the U.S. Environmental Protection Agency (EPA) partially approved the Virginia Department of Environmental Quality's (VADEQ) 2012 Section 303(d) list. EPA conducted a review of Virginia's 2012 Section 303(d) list and supporting documentation and information. Based on that review, with the exception of the assessment status related to algal growth impacts to recreation uses in the North Fork Shenandoah River, South Fork Shenandoah River and mainstem Shenandoah River (collectively referred to as the Shenandoah River), EPA determined that the Commonwealth's list of water quality limited segments (WQLSs) still requiring Total Daily Maximum Loads (TMDLs) met the requirements of Section 303(d) of the Clean Water Act (CWA or the Act) and EPA's implementing regulations. At that time, EPA deferred its final decision on the Section 303(d) listing status of the Shenandoah River with respect to algal growth impacts to recreation uses.

This constitutes EPA's rationale for approving the remainder of VADEQ's 2012 Section 303(d) list, specifically, the listing status of the Shenandoah River with respect to algal growth impacts to recreation uses. Parts I-III of EPA's December 12, 2013 Rationale for Approval of Virginia Department of Environmental Quality 2012 Section 303(d) List is incorporated herein by reference.

IV. Assessment Status of the Shenandoah River Related to Recreation Use as Impacted by Algal Growth

The Shenandoah River is located in northern Virginia and drains 1,955,982 acres of land. Land use is dominated by forest (56.0%) and agriculture (33.4%) with a portion of developed land (9.6%). The Shenandoah River basin is composed of three subbasins (8-digit United States Geologic Survey Hydrologic Unit Codes (HUC)). The three subbasins are the South Fork of the Shenandoah River (HUC 02070005), North Fork of the Shenandoah River (HUC 02070006), and the Shenandoah River (HUC 02070007). The North Fork Shenandoah River and South Fork Shenandoah River join in Front Royal, Virginia to form the Shenandoah River. The Shenandoah River flows into the Potomac River at Harpers Ferry, West Virginia. The Potomac River eventually drains to the Chesapeake Bay.

As part of the public comment process on VADEQ's draft 2012 Section 303(d) List, on April 23, 2012 the Shenandoah Riverkeeper provided VADEQ with information purporting to demonstrate impairment of Virginia's recreational (primary and secondary contact) use and a portion of Virginia's narrative water quality criteria due to excessive algal growth in the Shenandoah River and/or its North and South Forks (collectively "the River"). Subsequently, on October 16, 2012, the Shenandoah Riverkeeper and Earthjustice Legal Defense Fund (Earthjustice) provided the same information to EPA. The Shenandoah Riverkeeper and

Earthjustice then provided to EPA additional information that had not been provided to VADEQ on October 31, 2012, September 23, 2013 and November 7, 2013.

The additional information provided to EPA not provided to VADEQ consisted of a large number of photographs depicting what appear to be substantial algal growth at various locations on the River. The Riverkeeper's photographs include photographs taken along or in the river and aerial photographs. The Riverkeeper also provided statements by approximately 80 stakeholders asserting that their use and enjoyment of the River have been diminished by algal growth. The stakeholder statements were also supplied to VADEQ during the public comment period. The concerns expressed by the stakeholders include decreased fish population,[1] algal clumps on lures, fishing lines and hooks, slippery river bottom making wading difficult, difficulty kayaking, unpleasant aesthetic appearance, and unpleasant odor.

The Shenandoah Riverkeeper asserts that the photographs and testimonials establish that the Shenandoah River is impaired for primary and secondary recreation use as defined below, and does not achieve the following portions of Virginia's water quality standards:

> 9VAC25-260-5
>
> "Primary contact recreation" means any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water (examples include but are not limited to swimming, water skiing, canoeing and kayaking).
>
> Secondary contact recreation" means a water-based form of recreation, the practice of which has a low probability for total body immersion or ingestion of waters (examples include but are not limited to wading, boating and fishing).
>
> 9VAC25-260-20. General criteria.
>
> A. State waters, including wetlands, shall be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or interfere directly or indirectly with designated uses of such water or which are inimical or harmful to human, animal, plant, or aquatic life.
>
> Specific substances to be controlled include, but are not limited to: floating debris, oil, scum, and other floating materials; toxic substances (including those which bioaccumulate); substances that produce color, tastes, turbidity, odors, or settle to form sludge deposits; and substances which nourish undesirable or nuisance aquatic plant life. Effluents which tend to raise the temperature of the receiving water will also be

[1] While a number of the testimonials attached to the Riverkeeper's letter refer to fish kills, the Riverkeeper does not appear to be asserting that the algal blooms are causing an aquatic life impairment or are responsible for fish kills. TMDLs for PCBs and mercury to address fish consumption have been established for portions of the mainstem Shenandoah River and the North and South Forks, and Virginia's Section 303(d) list identifies other portions of the South Fork as impaired for fish consumption due to PCBs and mercury and in need of a TMDL.

controlled. Conditions within mixing zones established according to 9VAC25-260-20 B do not violate the provisions of this subsection.

V. Status of Algal Growth Impacts on Recreation in Shenandoah River on VADEQ's 2012 Integrated Report

For purposes of its 2012 Integrated Report, VADEQ identified the impact of algal growth on recreation use of the Shenandoah River under Part 2(B), which identifies "waters [that] are of concern to the state but no water quality standard exists for a specific pollutant, or the water exceeds a state screening value or toxicity test." Waters in this category remain a priority for monitoring and assessment.

In response to the information provided by the Shenandoah Riverkeeper as part of the public process, VADEQ stated that its approach for purposes of assessing the recreational use is based upon human health concerns and therefore is focused on bacteria levels.[2] Indeed, TMDLs for bacteria have been prepared for portions of the North and South Forks and mainstem Shenandoah River, while other portions remain listed as impaired for the recreation use due to excessive levels of bacteria. DEQ noted that the Riverkeeper was not asserting a human health concern, but rather advocating listing based upon an aesthetic component of the recreational use. DEQ asserted that it does not have a systematic method for collecting and evaluating the presence of algal growth to determine whether there is a subjective nuisance.

DEQ further noted that low levels of dissolved oxygen often are associated with excessive algal growth and that the low levels of dissolved oxygen that would be expected to accompany excessive algal growth were not documented in the River. According to DEQ, trends analysis indicated that levels of nutrients in the River (nitrogen and/or phosphorus, which are often a causative factor of excessive algal growth) were either stable or trending downward. DEQ stated that it was in the process of developing riverine freshwater nutrient standards that, once established, would facilitate identification and restoration of waters subject to excessive algal growth.

DEQ identified 17 TMDLs for tributaries to the Shenandoah River addressing either nutrients or sediment which, when fully implemented, would lower causative factors and therefore decrease algal growth in the River. In addition, DEQ pointed out that that the Chesapeake Bay TMDL includes allocations for individual and aggregate sources of nutrients to the Shenandoah River, and that Virginia's Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL calls for controls of point and nonpoint sources of nitrogen, phosphorus and sediment to the Shenandoah River watershed to achieve those TMDL allocations. While intended to address the impairments to the downstream Chesapeake Bay, the Chesapeake Bay TMDL and WIP controls should reduce sources of sediment and nutrients to the River and thus decrease causative factors for algal growth. DEQ noted that in 2011, the first year for compliance with Virginia's Chesapeake Bay Nutrient Discharge Watershed General Permit, "the Shenandoah basin's significant dischargers achieved substantial nutrient reductions. The total

[2] EPA guidance in its Water Quality Standards Handbook (2d ed.) (Section 2.1.3) focuses on bacteria in connection with protecting the recreational use.

nutrient loads discharged were well below their aggregate annual WLA -- Total Nitrogen (TN) was only 48% of the annual WLA and Total Phosphorus (TP) was just 67% of the annual WLA. Comparing 2011 to 2009 discharge figures, the TN load was reduced by 561,000 pounds per year; the TP load was 169,000 pounds per year lower." DEQ also described controls expected to be implemented by non-point sources that also should have the effect of lowering nutrient availability in the watershed.

Finally, due to lack of methodology and rigorous quality assurance/quality controls, DEQ categorized the Riverkeeper's information as Level II citizen monitoring data. As stated in VADEQ's *2012 Water Quality Assessment Guidance Manual*, only Level III data is used in Virginia for listing determinations. Level II data may be used to establish an observable effect. In this case, DEQ stated: "We believe it is appropriate to recognize these sections of the river as having an observed effect of aquatic algae. Therefore, we propose to modify the 2012 Draft Water Quality 305(b)/303(d) Integrated Report accordingly and list these waters under VA Category 2B ("*waters are of concern to the state but no water quality standard exists for a specific pollutant, or the water exceeds a state screening value or toxicity test*") for the recreational use. This designation means that these areas will remain a priority for monitoring and assessment in the future and will be evaluated when water quality standards related to nutrients and supporting indicators are available for free flowing rivers and streams."

VI. EPA's Actions Taken in Response to Shenandoah Riverkeeper's Concerns

To improve data and information on water quality and address the need for an assessment methodology to evaluate algal impacts to recreation uses, VADEQ and EPA have agreed to cooperate in a pilot study to develop a means to evaluate spatial and temporal extent of algal growth in Virginia's non-tidal flowing waters in a quantitative and repeatable way. EPA has provided $80,000 in funding for the study, which is ongoing and being performed by the Interstate Commission for the Potomac River Basin (ICPRB) and be conducted on the Shenandoah River. ICPRB is utilizing citizen scientists to collect algal cover data at pilot sites on the Shenandoah River in an effort to develop a repeatable assessment methodology that will provide data that can be used to systematically assess algal impacts to the recreation use. To date, ICPRB has trained members of the Friends of the Shenandoah River and Friends of the North Fork (Shenandoah River) on algal cover measurement techniques and the volunteers have been collecting algal cover data throughout the summer of 2014. ICPRB staff are in regular contact with citizen scientists to track progress and answer questions. A final report that includes results of the pilot study and an assessment methodology that can utilized by VADEQ is expected by early 2015. The assessment technique being developed by ICPRB is using a similar methodology that was developed for West Virginia as a model. West Virginia has successfully employed the approach for assessing algal impacts to recreation uses on four West Virginia waterbodies. EPA recommends and has offered to fund a Virginia specific user survey to better understand the amount and duration of algal growth that impacts recreation of the river user population as a whole.

VII. Analysis of Algal Growth Impact on the Shenandoah River for VADEQ's 2012 Section 303(d) List

In compiling their Section 303(d) lists, States must assemble and evaluate all existing and readily available data (40 C.F.R. 130.7(b)(5)); identify all waterbodies that fail to meet currently applicable water quality standards (33 U.S.C. 1313(d)(1)(A)); and submit a biennial list of such waters to EPA for approval (40 C.F.R. 130.7(d)(1)). *Cf. Sierra Club, Inc. v. Leavitt,* 488 F.3d 904, 913-14 (11th Cir. 2007) (state cannot avoid obligation to assemble and evaluate all existing and readily available data through state law limiting age of data that can be considered). In this instance, it is unclear from DEQ's response whether it has evaluated the information provided by the Riverkeeper. On the one hand, it appears that VADEQ identified an observable effect and placed the River in Category 2(B) of its Integrated Report based upon the Riverkeeper's information. On the other hand, VADEQ also appears to have stated that it declined to evaluate the information due to lack of a systematic way to identify and evaluate data on algal blooms and due to a policy decision to limit assessment of the recreation use to human health, rather than aesthetic, concerns.

While a State has discretion on how to consider the value (weight) of certain data based upon issues such as a lack of quality assurance/quality control, the State may not decline to evaluate data at all. Since it is unclear whether DEQ has evaluated the Riverkeeper's information as required by 40 CFR 130.7(b)(5), EPA has an obligation to take action to ensure that the federal requirement that all data be evaluated is satisfied.

Accordingly, EPA has evaluated the information provided by the Riverkeeper. Certain information provided to EPA was <u>not</u> provided to VADEQ as part of the public notice process. VADEQ gives members of the public at least two opportunities to submit data in connection with every Section 303(d) list cycle: an initial data call prior to development of the draft list and public notice and comment on the draft list. EPA strongly encourages members of the public to avail themselves of the processes provided by VADEQ. Circumstances where information is given to EPA for consideration outside the processes provided by VADEQ should be limited so as to preserve the integrity of the established public process.[3]

For the reasons set forth herein, EPA does not believe that the information provided in connection with the 2012 Section 303(d) List by the Riverkeeper provides an adequate record to support a determination by EPA to disapprove Virginia's 2012 Section 303(d) List. As further described below, however, EPA expects that DEQ make material progress toward identifying a means for evaluating information on algal growth in the Shenandoah River against the applicable water quality standards. If additional necessary information is provided in future listing cycles, and DEQ has not made progress toward identifying a means to evaluate that information, EPA will consider those factors in future Section 303(d) list reviews.

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[3] EPA also notes that, for purposes of its 2012 Section 303(d) List, Virginia sought data reflecting water quality conditions for the time period through December 31, 2010. Some of the information provided by the Riverkeeper purports to represent river conditions outside the time period covered by Virginia's 2012 Section 303(d) List.

As a general matter, EPA agrees that visual observation and statements by water users can support a determination that one or more narrative criteria or designated uses are not being achieved, provided there is sufficient information to allow the State or EPA to identify the spatial and temporal extent of the impairment and provided such evidence is generally consistent with other evidence in the record. In this instance, however, the existing and readily available information when viewed as a whole presents a mixed picture. The materials supplied by the Riverkeeper provide information that there are at certain times substantial algal growth at certain locations in the River and that certain users have experienced diminished use and enjoyment of certain areas within the River. Other information, however, indicates that at least some portions of the River do not appear to suffer from excessive algal growth. Specifically, conditions consistent with what would be expected to occur in association with the types of large, long-lasting algal growth, described by the Riverkeeper's submission do not appear present in portions of the River. In addition, aerial photographs provided by the Shenandoah Riverkeeper, while providing supporting evidence, do not by themselves establish algal presence as it is difficult to distinguish in aerial photographs potentially impairing algal growth from beneficial submerged aquatic vegetation.

EPA recognizes that ambient water quality sampling locations may not fully coincide with the locations of algal growth depicted in the information supplied by the Riverkeeper. Nevertheless, the existing and readily available information presents a mixed picture. On the one hand, the Riverkeeper asserts the entire 244 miles that comprise the Shenandoah mainstem and its North and South Forks are impaired by substantial algal growth. On the other hand, other data, such as information related to dissolved oxygen levels in portions of the River, appear inconsistent with the effects of long-term and substantial algal growth at certain locations. Written and verbal statements provided by the Riverkeeper also present a mixed picture. On the one hand, the Riverkeeper has provided statements by stakeholders that the algal growth lasts for long periods of time and that their use and enjoyment of the River have been diminished. On the other hand, the Riverkeeper acknowledges that portions of the River continue to be used for fishing, boating and swimming. The existing and readily available information does not provide EPA with a basis for determining spatial and temporal extent of impairment, including which portions of the River suffer from the effects of long-term substantial algal growth and which do not.

VADQ has established 43 assessment units along the 244 miles of the mainstem Shenandoah River, North Fork Shenandoah River and South Fork Shenandoah River. There are eight assessment units on the mainstem Shenandoah River comprising a total of approximately 38 river miles. The South Fork Shenandoah River contains 13 assessment units along approximately 101 river miles. The North Fork Shenandoah River contains 22 assessment units encompassing approximately 105 river miles.

The Riverkeeper has not asserted that the algal growth presents a threat to human health, nor is EPA aware of any potential human health threat. Rather, the Riverkeeper asserts that the impairment of the aesthetic component of the narrative water quality criteria has diminished recreational use and enjoyment of the River ("interfere … with designated uses"; "undesirable or nuisance aquatic plant life"). EPA generally agrees that the views of users of a waterbody may be considered in determining whether the aesthetic enjoyment of the waterbody has been so

impaired as to interfere with a designated recreational use. Different individuals, however, may have different tolerance levels for the presence of excess algal growth when engaged in recreational activities. Accordingly, different individuals may consider different amounts of algae as interfering with their use and enjoyment of the River or as presenting a nuisance. Here, the Riverkeeper has presented communications from approximately 80 individuals who responded to outreach from the Riverkeeper. The approximate population living in counties surrounding the River is 370,000 people, and that number likely is increased with users who live outside these counties and travel to utilize the River. It is unclear whether the method used by the Shenandoah Riverkeeper to collect these 80 user statements yields a representative sample of the views of the general population of users of the River. This is one reason why EPA proposes that a user survey be conducted. In addition, while the Riverkeeper has provided a map showing the locations of complaints regarding river conditions received and the seasons in which those complaints occurred, there is little information to determine the temporal duration of the observations, as it is acknowledged that rainfall generally scours algal growth.[4]

Because the concept of nuisance is one generally determined by state common law, EPA generally prefers that the State make determinations in the first instance related to whether subjective and aesthetic water quality conditions are being achieved or whether levels of algae present a "nuisance" or "interfere .... with" the recreational use of their waters by their citizens.[5] Nevertheless,, states may not indefinitely defer making such a determination by postponing methodology development, especially when presented with evidence that there may be adverse water quality conditions.

Accordingly, EPA has evaluated the information supplied by the Riverkeeper and determined that it provides evidence of substantial algal growth at certain locations for an unclear duration. Other information would seem to indicate that certain portions of the River do not appear to reflect conditions indicative of excessive algal growth. It remains unclear whether the views of the individuals submitted by the Riverkeeper are representative of those of the general population of users of the River.

The Riverkeeper's information warrants serious consideration and further investigation. Moreover, this is the second list cycle in which the Riverkeeper has presented information. Virginia may not indefinitely postpone evaluation of use impairment when it is presented with information in the form of visual observations and statements by users of the River. EPA anticipates that the Riverkeeper may provide additional information as part of the 2014 and 2016 listing cycles that will address some of the record issues identified here by EPA. It is EPA's expectation that Virginia will take concrete steps toward developing a method to evaluate the visual and testimonial information related to excess algal growth on the Shenandoah mainstem and its North and South Forks that may be provided for the 2014 and future list cycles. If information sufficient to determine the spatial and temporal extent of substantial algal growth

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[4] EPA does agree that some evidence of duration can be inferred where the size of the algal bloom can be ascertained from the photographs.

[5] In this way, measurement of the recreational use differs from the aquatic life use. As to aquatic life, there are measures, such as multi-metric indices, which allow impacts to the naturally occurring aquatic community to be objectively measured.

and substantial interference with primary and secondary contact recreation by the general population of users is provided and Virginia has not made substantial progress toward developing a method for evaluating such information, EPA will consider those factors in connection with future Section 303(d) lists.

EPA anticipates that ICPRB will outline an assessment methodology that will improve EPA and DEQ's ability to evaluate spatial and temporal extent of algal growth and its impact on River enjoyment and can be applicable to other non-tidal flowing waters in Virginia.
In any case, it is EPA's expectation that DEQ will commit to taking concrete steps and develop a timeline for evaluating algal growth impacts on the recreation use in flowing non-tidal waters. Such steps could include incorporating the assessment methodology provided by ICPRB into DEQ's assessment methodology that is used for Section 303(d) Listing. For an assessment methodology that evaluates algal impacts to recreation uses to be complete, EPA encourages VADEQ to develop an impairment threshold that can be used as part of the assessment methodology for 303(d) listing decisions.