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Ref: 8WD-CWQ

L. Scott Baird, Executive Director, Department of Environmental Quality
195 North 1950 West, 4th Floor
P.O. Box 144810
Salt Lake City, Utah 84114-4810

Re: EPA's Action on Revisions to UAC R317-2 *Standards of Quality for Waters of the State*

Dear Mr. Baird:

The U.S. Environmental Protection Agency (EPA) Region 8 has completed its review of the revisions to Utah Administrative Code (UAC) R317-2 *Standards of Quality for Waters of the State* adopting a combined nutrient criterion to Utah Category 1 and 2 (headwater) streams. The Utah Water Quality Board (Board) adopted the revised water quality standards (WQS) on June 26, 2019, with an effective date of July 1, 2019, and submitted the revisions to the EPA for review on March 6, 2020. The submittal package included: (1) the June 26, 2019 memorandum to the Board that includes documentation of the rationale for the combined nutrient criterion, mark-up of the rule, public participation record, and the combined nutrient criterion for headwater streams adopted at the June 26, 2019 Board meeting; (2) Proposed Combined Nutrient Criterion: Utah Headwater Streams: Application of Stressor-Response Models and Multiple Lines of Evidence (Proposal); (3) Technical Support Document: Utah Nutrient Strategy: Scientific Investigations to Support Utah's Nutrient Reduction Program (TSD); (4) Utah Attorney General certification that the WQS were adopted in accordance with Utah Law; and (5) additional supporting documentation. Receipt of the submittal package on March 6, 2020 initiated the EPA's review pursuant to Section 303(c) of the Clean Water Act (CWA or the Act) and the implementing federal WQS Regulation (40 C.F.R. Part 131).

Clean Water Act Review Requirements

The CWA § 303(c)(2), requires states and authorized Indian tribes[1] to submit new or revised WQS to the EPA for review. The EPA is required to review and approve, or disapprove, the submitted standards. Pursuant to CWA § 303(c)(3), if the EPA determines that any standard is not consistent with the applicable requirements of the Act, the Agency shall, not later than the ninetieth day after the date of submission, notify the state or authorized tribe and specify the changes to meet the requirements. If such changes are not adopted by the state or authorized tribe within ninety days after the date of notification, the EPA is to propose and promulgate such standard pursuant to CWA § 303(c)(4). The Region's goal has been, and will continue to be, to work closely with states and authorized tribes throughout the WQS revision process so that submitted revisions can be approved by the EPA. Pursuant to 40 C.F.R. § 131.21(c), new or revised WQS submitted to the EPA after May 30, 2000, are not effective for CWA purposes until approved by the EPA.

[1] CWA § 518(e) specifically authorizes the EPA to treat eligible Indian tribes in the same manner as states for purposes of CWA § 303. See also 40 C.F.R. § 131.8.

Today's Action

Today the EPA is approving the following revision to UAC R317-2 *Standards of Quality for Waters of the State* adopted by the Board on June 26, 2019:

R317-2-14 Numeric Criteria:

- Table 2.14.7 Nutrient Criteria for [Recreation Use] Classes 2A and 2B in Category 1 and 2 surface waters.

- Table 2.14.8 Nutrient Criteria for [Aquatic Life Use] Classes 3A, 3B, 3C and 3D in Category 1 and 2 surface waters.

These revisions are approved under CWA § 303(c). The rationale for the EPA's action is discussed in detail in the enclosure.

Endangered Species Act Requirements

The EPA's approval of Utah's revisions to its WQS pertaining to a combined nutrient criterion for protection of aquatic life uses in Category 1 and 2 streams is considered a federal action subject to the Section 7(a)(2) consultation requirements of the Endangered Species Act (ESA). Section 7(a)(2) of the ESA states "each federal agency … shall …insure that any action authorized, funded or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical…" Accordingly, the EPA initiated consultation with the U.S. Fish and Wildlife Service (USFWS) regarding our action on this revision to Utah's WQS. The EPA transmitted a biological evaluation to the USFWS that analyzed whether the Agency's approval action may affect federally-listed species or designated critical habitat. Under the ESA regulations, consultation is only required for actions that "may affect" listed species or critical habitat. 50 C.F.R. § 402.14. On April 28, 2020 the USFWS concurred with the EPA's conclusion that approval of Utah's numeric nutrient criterion for headwater streams was Not Likely to Adversely Affect ESA-listed species. The USFWS concurrence completes the ESA Section 7(a)(2) consultation process for the EPA's approval of the combined nutrient criterion for protection of aquatic life uses in Category 1 and 2 streams. Hence, the EPA is approving this revision, after completing consultation as required under Section 7(a)(2) of the ESA.

Indian Country

The EPA's approval of Utah's submitted WQS does not extend to Indian country as defined in 18 U.S.C. Section 1151. Indian country in Utah generally includes (1) lands within the exterior boundaries of the following Indian reservations located within Utah, in part or in full: the Goshute Reservation, the Navajo Indian Reservation, the reservation lands of the Paiute Indian Tribe of Utah (Cedar Band of Paiutes, Kanosh Band of Paiutes, Koosharem Band of Paiutes, Indian Peaks Band of Paiutes, and Shivwits Band of Paiutes), the Skull Valley Indian Reservation, the Uintah and Ouray Reservation (subject to federal court decisions removing certain lands from Indian country status within the Uintah and Ouray Reservation), and the Washakie Reservation; (2) any land held in trust by the United States for an Indian tribe; and (3) any other areas that are "Indian country" within the meaning of 18 U.S.C. Section 1151. The EPA, or eligible Indian tribes, as appropriate, will retain responsibilities under CWA

Section 303 for WQS in Indian country. Today's action is not intended as an action to approve or disapprove WQS applying to waters within Indian country.

Conclusion

The EPA thanks the Utah Department of Environmental Quality, the Utah Division of Water Quality and the Utah Water Quality Board for their efforts to review and revise the State's WQS that adopt water quality criteria for the protection of recreation uses and a combined nutrient criterion for the protection of aquatic life in Category 1 and 2 streams. This revision updates and complements Utah's existing regulations and improves the State's water quality program. The EPA looks forward to working with the Department and Board to make additional improvements to the State's WQS. If you or your staff have any questions, please contact me at (303) 312-6392 or Oconnor.Darcy@epa.gov.

Sincerely,

DARCY OCONNOR

Digitally signed by DARCY OCONNOR
Date: 2020.05.01 09:27:22 -06'00'

Darcy O'Connor, Director
Water Division

Enclosure

cc: Dr. Erica Gaddis, Director, Division of Water Quality
Ben Holcomb, Division of Water Quality
Jeff Ostermiller, Division of Water Quality

RATIONALE FOR THE EPA'S ACTION ON THE REVISIONS TO UTAH'S WQS ADOPTED BY THE UTAH WATER QUALITY BOARD ON JUNE 26, 2019

Pursuant to Clean Water Act (CWA) § 303(c) the U.S. Environmental Protection Agency (EPA) is acting on Utah's new numeric water quality criteria for the protection of recreation uses and a combined nutrient criterion for the protection of aquatic life uses in Category 1 and 2 waters in Utah Administrative Code (UAC) R317-2 *Standards of Quality for Waters of the State* adopted by the Utah Water Quality Board (Board) on June 26, 2019 with an effective date of July 1, 2019. This enclosure provides a discussion of the EPA's rationale for action on these new water quality standards (WQS). In reviewing these WQS revisions, the EPA considered information and data from a range of documents and materials, including but not limited to: 1) Proposed Combined Nutrient Criterion: Utah Headwater Streams: Application of Stressor-Response Models and Multiple Lines of Evidence (Proposal); 2) Technical Support Document: Utah Nutrient Strategy: Scientific Investigations to Support Utah's Nutrient Reduction Program (TSD); 3) adopted WQS revisions to rule language at UAC R317-2.14.7 and 2.14.8; 4) supporting documentation submitted by the Utah Division of Water Quality (UDWQ); 5) published EPA guidance documents and regulations; 6) previous EPA comments and recommendations on the adopted WQS revisions; and 7) additional relevant information.

R317-2-14 Numeric Criteria: Adding Table 2.14.7 Nutrient Criteria for Classes 2A and 2B[2]

The Board adopted Table 2.14.7 that includes numeric criteria for benthic algae (125 mg chl-a/m^2 benthic chlorophyll-a or 49 g/m^2 Ash Free Dry Mass (AFDM)) that are not to be exceeded. These criteria apply to all Category 1 and 2 (headwater) streams, with the exception of three stream segments.[3]

The chlorophyll-a criteria for rivers and streams (not to exceed 125 mg chl-a/m^2) is for protection of recreational uses and is based on a user perception survey conducted by the Utah Division of Water Quality (UDWQ). The purpose of the survey was to identify thresholds for excess algal growth (using chlorophyll-a and AFDM as surrogate metrics) above which recreational users are averse to recreating in a river or stream. The survey asked citizens to review photographs of streams with varying quantities of algae growth and to evaluate whether or not the conditions represented "desirable" or "undesirable" recreational conditions. Results showed that citizens ranked streams as not "desirable" for recreation as filamentous algae concentrations increased from 110 to 200 mg chl-a/m^2.[4]

The premise of this approach is that when algal abundance becomes excessive, the visual appearance of the stream (i.e., its color or "greenness") discourages recreation and impairs recreation designated uses. A key conclusion of the survey was that Utah streams are considered "desirable" for recreational uses when benthic chlorophyll-a levels are less than 125 mg chl-a/m^2 or the equivalent 49 g AFDM/m^2.[5] Based on these results, UDWQ developed a benthic algae concentration of 125 mg chl-a/m^2 or AFDM criterion of less than 49 g/m^2 as numeric criteria protective of recreational uses in headwater streams.

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[2] Class 2A and 2B waters are waters protected for frequent primary and infrequent primary contact recreation.
[3] Excludes segments of Quitchupah Creek; Huntington Creek and Crandall Creek (see Table 2.14.7 footnote (1) for details).
[4] TSD. Page 112. Additional supporting information is included in Chapter 8 of Utah's TSD and Pages 19-20 and 31 of the Proposal.
[5] *Ibid.*

EPA Action on Utah's Criteria for Recreational Use Protection

The EPA concludes that the new benthic chlorophyll-a and AFDM criteria adopted under Table 2.14.7: Nutrient Criteria for Classes 2A and 2B are protective of recreational uses assigned to Category 1 and 2 Utah streams. The EPA concludes that these criteria are supported by sound scientific rationale and demonstrated to be protective of the recreational use and thus are consistent with the requirements of the CWA and EPA's WQS Regulation at 40 C.F.R. § 131.11(a)(1). Accordingly, these criteria are approved.

R317-2-14 Numeric Criteria: Adding Table 2.14.8 Nutrient Criteria for Classes 3A, 3B, 3C and 3D

The Board adopted Table 2.14.8 Nutrient Criteria for Classes 3A, 3B, 3C and 3D[6] as new numeric water quality criteria protective of aquatic life uses in Utah Category 1 and 2 surface streams. Table 12.1[7] below presents the numeric nutrient criteria and their associated ecological response indicators while the decision matrix[8] incorporated by reference in rule[9] identifies assessment decisions that apply (e.g., impaired, not impaired) based on whether the criteria and/or associated ecological response indicator is exceeded.

The Board adopted a combined nutrient criterion for the protection of aquatic life uses that applies a lower and an upper bound for total nitrogen (TN) and total phosphorus (TP). The lower thresholds for TN and TP were established based on consideration of the 90th percentile nutrient concentrations among Utah reference streams;[10] modeled stream background nutrient concentration;[11] and thresholds derived from a variety of response indicators.[12] The upper thresholds were set at concentrations observed at the 95th percentile of all monitoring locations,[13] and at concentrations that "were highly likely to be reflective of impaired conditions (adverse effects to aquatic life uses)."[14] Stream concentrations exceeding these upper thresholds are considered as "failing to support aquatic life uses irrespective of the availability of ecological response information."[15]

Within the middle range of nutrient concentrations, the combined nutrient criterion relies on a combination of numeric nutrient criteria thresholds and ecological response indicators (i.e., gross primary production (GPP)[16], percent filamentous algae cover, and ecosystem respiration (ER)[17]) to protect aquatic life uses in Utah's headwater streams. Thresholds for GPP and ER were derived using deviance reduction models that identified three groups with similar means and variance for GPP and ER. More information on the 33% filamentous algae threshold is described in detail later in this letter. These ecological response indicators apply when concentrations of total nitrogen (TN) and total phosphorus (TP) are observed within the following ranges (TN= 0.40-0.80 mg/L and TP=0.035-0.080 mg/L). Table

[6] Class 3A,3B, 3C, and 3D waters are protected for aquatic, waterfowl, shorebirds, and other wildlife uses.
[7] TSD. Chapter 12, page 141.
[8] Proposal, Table 8, page 43.
[9] Table 2.14.8, Footnote 2.
[10] TSD, Chapter 11, pages 130-132.
[11] *Ibid*. Page 135.
[12] TSD, Executive Summary; Figure ES-2; page ES-4.
[13] TSD, Chapter 12, pages 139-140.
[14] *Ibid*. Page 142.
[15] *Ibid*,. Page 139.
[16] GPP is a stream metabolism metric that measures oxygen production in the stream.
[17] ER is a stream metabolism metric that measures oxygen consumption in the stream.

12.1 (replicated from Utah's TSD) below identifies the thresholds adopted for TN, TP and the three ecological response indicators.

Table 12.1.[18] Numeric Nutrient Criteria and Associated Ecological Responses (Bioconfirmation Criteria) Proposed to Protect Aquatic Life Uses in Antidegradation Category 1 and 2 (UAC R317-2-12) Headwater Perennial Streams[19]

Low Nutrient Enrichment at Headwater Streams: No Ecological Responses			
Summertime Average Nutrients			Assessment Notes
TN < 0.40 mg/L		TP < 0.035 mg/L	Fully supporting aquatic life uses if the average of ≥ 4 summertime samples for both TN and TP fall below the specified nutrient concentrations. However, it is not supporting aquatic life uses, cause unknown, if the ecological responses specified for moderate enrichment streams are exceeded. Sites with fewer samples, or those without TN and TP growing season averages, will not be assessed for nutrients.
Moderate Nutrient Enrichment at Headwater Streams and Ecological Responses			
Summertime Average Nutrients		Ecological Responses	Assessment Notes
TN 0.40-0.80 mg/L	TP 0.035-0.080 mg/L	< 1/3 or more filamentous algae cover or GPP < 6 $g/O_2/m^2/day$ or ER< 5 $g/O_2/m^2/day$	Headwater streams within this range of nutrient concentrations will be considered impaired (not supporting for nutrients) if any of the Ecological Responses exceeds defined thresholds. Streams without response data will be listed as having insufficient data and prioritized for additional monitoring if either TN or TP falls within the specified range.
High Nutrient Enrichment at Headwater Streams: No Ecological Responses			
Summertime Average Nutrients			Assessment Notes
TN > 0.80 mg/L		TP > 0.080 mg/L	Streams over these thresholds will initially be placed on Utah's CWA Section 303(d) list as threatened. Threatened streams will be further evaluated using additional data such as nutrient responses, biological assessments, or nutrient-related water quality criteria (e.g., pH and DO) both locally and in downstream waters.

EPA Review of Utah's Combined Nutrient Criterion

40 C.F.R. § 131.11(a) requires that "criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use." The EPA's guidance on development of combined criteria recommends that "[combined] criteria should demonstrate the sensitivity of the response indicator(s) to increased nutrient concentrations and quantify how these nutrient-response linkages will achieve the goal of protecting and maintaining aquatic communities."[20] The EPA's combined criteria guidance states that response indicator thresholds should be linked to

[18] TSD. Chapter 12, page 141.
[19] Excludes segments of Quitchupah Creek; Huntington Creek and Crandall Creek (see Table 2.14.8 footnote (1) for details).
[20] See: Guiding Principles on an Optional Approach for Developing and Implementing a Numeric Nutrient Criterion that Integrates Causal and Response Parameters. 2013. EPA-820-F-13-039. Available on the EPA's website at: https://www.epa.gov/sites/production/files/2013-09/documents/guiding-principles.pdf.

nutrient concentrations and demonstrated to protect uses (i.e., aquatic life uses).[21] Without this quantified relationship, response indicator thresholds may be unable to ensure use protection.

UDWQ initiated studies in 2010 designed to work toward development of a combined nutrient criterion. Specifically, UDWQ sampled non-headwater streams including 17 reference sites and 18 sites upstream and downstream of publicly owned treatment works in central and northern Utah, in a study designed to select response indicators and derive thresholds for those indicators.[22] UDWQ then used data from these streams to select the response indicators (i.e., GPP and ER), evaluate their sensitivity, and establish thresholds.[23] Results indicated a relationship between the GPP and ER indicators and levels of TN and TP. [24] UDWQ evaluated its statistically-derived thresholds for GPP and ER by comparing them to excursions of established dissolved oxygen criteria in the study streams. This evaluation indicated that sites below UDWQ's ER (and to a lesser extent GPP) thresholds generally did not have excursions of dissolved oxygen criteria yet did have excursions to varying extents above the thresholds. In particular, the results indicated an increase in the proportion of site observations below (exceeding) Utah's 30-day average dissolved oxygen criteria when the threshold for ER was crossed.[25] These results demonstrate that for the study streams, the response indicators and thresholds selected for the combined nutrient criterion are related to protection of aquatic life uses.

In the 2010 statewide study, UDWQ also examined the effects of multiple physical and chemical variables on the expression of GPP and ER. Through this Random Forest analysis of covariates, UDWQ asserted that "[v]ariables with a larger increase in the mean squared error (MSE) are more important determinants of metabolic rates relative to others".[26] UDWQ found that TN and TP were among the most important contributors to GPP and ER expression, yet channel shading and slope were the most important variables for GPP and of similar importance as TN for ER.

UDWQ noted that they further explored the influence of relevant covariates (stream slope, shading, TN, and TP) for both response indicators to improve the accuracy of the metabolism results:

> NDR [nonparametric deviance reduction] revealed significant thresholds at ~1% slope for both ER and GPP. GPP and ER thresholds were also found for percent channel shading, where streams with channel shading less than ~11% had greater mean daily rates of GPP (9.3 ± 5.6 to 3.99 ± 4.1) and ER (8.10 ± 5.5 to 4.31 ± 4.1).[27]

UDWQ used results from this 2010 statewide study to derive Utah's combined nutrient criterion for headwater streams. Because the State's combined nutrient criterion approach places additional weight on the ecological response indicators for intermediate nutrient concentrations, the sensitivity of the ecological response indicators and accuracy of the thresholds is important to ensuring protection of aquatic life uses. Therefore, the EPA's review focused on performance of the response indicator results in these headwater ecosystems.

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[21] *Ibid*. Page 2.
[22] TSD. Chapter 3.
[23] TSD. Chapter 5.
[24] TSD. Chapter 5. Figure 5-2, page 55; Figure 5.3, page 57.
[25] TSD. Chapter 5. Figure 5.5, page 61.
[26] TSD. Chapter 5. Table 5.1, page 53.
[27] TSD. Chapter 5, page 61.

In its discussion of physical covariates, UDWQ explained that stream slope and nutrient enrichment co-vary with each other and that this might be expected because anthropogenic activity that contributes nutrients generally occurs more frequently around lower-gradient streams (such as the study streams). UDWQ also added that a steeper slope could affect GPP and ER by reducing nutrient residence times and facilitating algae scour (reducing GPP) and organic matter exportation (reducing ER). UDWQ further noted that channel shading does not correlate with nutrient enrichment but instead affects GPP directly through light limitation on photosynthesis (that may also reduce the ecologically coupled ER process).[28]

Information presented in the TSD documented that the majority of the *headwater* streams sampled in 2015[29] have slopes that exceed 1% and shading greater than 11%.

> Canopy cover (shading of the stream channel by riparian vegetation) averaged about 50% but ranged from 3% to 87%. Sites were generally of high gradient, averaging about 5% slope, with a range from < 0.5% to just over 20% among all streams.[30]

The influence of physical characteristics on metabolic responses is important because physical characteristics (e.g., slope, shading) tend to differ greatly between the streams used to select the proposed response indicators and establish thresholds and the headwater streams to which the combined criterion is being applied. The State's documentation that GPP and ER values are generally far lower under higher gradient and shadier conditions prevalent in headwater streams regardless of nutrient concentrations demonstrates a relative insensitivity to nutrient enrichment.

The TSD recognizes the limitations in the relationship between the adopted metabolism indicators and nutrients concentrations:

> When GPP and ER rates were compared across the range of nutrients that occur throughout Utah, GPP and ER were found to be relatively robust indicators of enrichment, particularly when channel shading and slope were accounted for (Chapter 5). However, in the lower ranges of nutrient concentrations in headwater streams, <u>these responses were not particularly sensitive measures of enrichment</u>. <u>This follow-up investigation did not document a single stream with elevated GPP, and one stream with elevated ER was identified</u>.[31] [emphasis added]

Additionally, data collected in 2015 from headwater streams showed that the GPP and ER stream metabolism metrics could not be calculated at approximately 40% of sites. UDWQ responded that these situations are equivalent to "non-detects" and "are reflective of circumstances where elevated GPP and ER are not reflective of adverse conditions."[32] UDWQ further stated that "if streams have physical attributes that make them naturally protected from the adverse effects typically caused by nutrient enrichment, the inability to easily measure GPP and ER does not diminish the protectiveness of the headwater criteria."[33]

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[28] TSD, Chapter 5, page 64.
[29] UDWQ's 2015 study sampled moderate to enriched headwater streams to test the functionality of the combined criterion.
[30] TSD. Chapter 13. Page 162.
[31] TSD. Chapter 13. Page 169.
[32] Division of Water Quality Response to EPA Comments (May 1, 2019). Response to comment 2B, page 8.
[33] Division of Water Quality Response to EPA Comments (May 1, 2019). Response to comment 2A, page 7.

In the supporting materials for this combined criterion adoption, UDWQ acknowledges the circumstances, such as high canopy cover (channel shading) and slope, that make some streams naturally tolerant of nutrient enrichment. UDWQ also discusses ecological theory that predicts that upstream locations should be net heterotrophic (ER > GPP) and then transition to a net autotropic condition (GPP > ER) further downstream. UDWQ explains that this shift occurs as the canopy opens and stream primary production shifts from the benthos to the water column.[34] This rationale helps explain why ER may be relatively more sensitive than GPP in headwater streams.

The combined criterion also establishes a threshold of less than 33% filamentous algae cover (based on a visual estimate of percent cover). UDWQ did not empirically derive the proposed filamentous algae threshold but instead cited two studies available in the scientific literature[35] that primarily identify impacts based on aesthetics.[36] Beyond these literature citations, the proposal provides the following justification for selecting the 33% threshold:

> [U]DWQ recommends a criterion of maximum filamentous algae cover of 1/3 of the stream bed. While this number is at the upper end of concentrations that others have suggested as protective of stream aquatic life uses, <u>DWQ has established this threshold as protective of stream conditions because it represents the maximum filamentous algae concentration that is observed on any single collection event</u>.[37] [emphasis added]

In its response to comments, UDWQ noted that adverse impacts occur (e.g., alteration of stream food webs, shifts in diatom composition, impacts to instream habitat) when filamentous algae cover exceeds 50% aerial cover. UDWQ further explained that "any value less than 50% is considered to be protective" and that Utah used "20% to demarcate the upper limit of naturally-occurring conditions."[38] In its transmission document to the EPA, UDWQ suggests that these thresholds are based on "expert judgment" and a risk-based management decision."[39] The EPA agrees that filamentous algae cover is a useful response indicator because it is a measure of primary production. However, the lack of a more definitive threshold related to adverse effects to aquatic life supports a conclusion that this parameter is best used in combination with other response indicators (i.e., GPP and ER) and supports the use of a combined criterion approach.

<u>EPA Action on Utah's Combined Nutrient Criterion</u>

Today, the EPA is acting on UDWQ's combined criterion in totality including the lower and upper TN and TP thresholds and the combined criterion which includes a moderate range of TN and TP concentrations coupled with ER, GPP and filamentous algae cover as response indicators. Based on the EPA's review of UDWQ's combined nutrient criterion, the EPA has determined that the lower

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[34] TSD. Chapter 13. Pages 169-170.

[35] Biggs B.J. 2000. New Zealand periphyton guideline. Detecting, Monitoring and Managing Enrichment of Streams. NIWA. Christchurch and Dodds, W.K., and E.B. Welch. 2000. Establishing nutrient criteria in streams. Journal of the North American Benthological Society 19(1):186-196.

[36] TSD. Chapter 8, page 112.

[37] Proposal, page 28.

[38] Division of Water Quality Response to EPA Comments (May 1, 2019). Response to comment 7B, page 27.

[39] Page 4. Transmission of Revisions to Utah's Water Quality Standards to add numeric nutrient criteria for headwater streams, effective July 1, 2019, for US Environmental Protection Agency (EPA) approval.

thresholds for TN and TP reflect nutrient concentrations similar to reference conditions. Because these TN and TP concentrations represent minimally disturbed conditions, these lower criteria for TN and TP will ensure protection of aquatic life uses in Utah headwater streams. The upper thresholds, reflective of the upper tail of the distribution of nutrient enrichment observed in Utah streams, are at levels where it is reasonable to conclude impairment and that confirmation with response indicators is not necessary.

The response indicators (ER, GPP, and filamentous algae) serve an essential function in the moderate range of TN and TP values in the combined criterion (serving to confirm impairment when the lower TN or TP thresholds are exceeded). For filamentous algae, the EPA remains concerned that the 33% filamentous algae threshold is not protective of aquatic life uses in headwater streams as a sole measure of nutrient enrichment but is a reasonable response indicator to be used *in conjunction with* other measures of adverse effects. In other words, the EPA views the data and analysis UDWQ submitted as supporting the construction of the combined criterion that includes the threshold for filamentous algae cover as a component of the full suite of all three response variables to determine that a stream fully supports its aquatic life uses.[40] For GPP and ER, results from the 2010 statewide study demonstrated that GPP and ER responded to increasing nutrient concentrations in situations where the influence of physical covariates was *minimized*. The technical rationale for the combined nutrient criterion describes a sound scientific basis for the selection of thresholds and demonstrates a linkage to protection of aquatic life uses in streams.

The EPA concludes that the combined nutrient criterion, adopted under Table R317-2.14.8 Nutrient Criteria for Classes 3A, 3B, 3C and 3D, meets the requirements of the CWA and 40 C.F.R. § 131.11. Accordingly, this revision is approved.

The EPA remains concerned about the protection of waters downstream from headwater stream segments where the combined criterion applies. Nutrient concentrations that fall below the upper thresholds for TN and TP but are not associated with measured excursions of GPP or ER or filamentous algae cover thresholds in headwaters, could cause impacts in downstream locations where channel shading or stream slope conditions do not mitigate those impacts. Federal regulations at 40 C.F.R. 131.10(b) states: "[i]n designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters." Additionally, Utah Admin Code R317-2-7.2 Narrative Standards prohibits, in pertinent part, "concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects…" The supporting materials produced by UDWQ demonstrate that the combined criterion was developed for and is protective of stream segments generally in Utah, including downstream locations where stream segments are flatter and less shaded than headwaters. Therefore, the EPA recommends UDWQ apply the combined nutrient criterion as a method for interpreting the existing narrative standards for protection of aquatic life uses in stream segments downstream from headwater streams where the combined criterion applies.

[40] The EPA interprets Table 8: Decision Matrix That Will Be Used to Assess Support of Headwater Aquatic Life Uses for Nutrient-related Water Quality Problems (Proposal, page 43) as requiring that all three response indicators thresholds must be met for a stream to be considered as fully supporting when the TN and TP concentrations are "between the lower and upper thresholds."