



Water Quality Standards Revisions Supporting Documentation **Proposed Amendments to R317-1, Definitions and R317-2, Standards of Quality for Waters of the State Published in the April 1, 2019 Utah Bulletin**

Note: This document is intended as a companion document to the information published in the April 1, 2019 Utah Bulletin. This document provides supplemental information for a subset of the proposed amendments to R317-1 and R317-2 described in the April 1, 2019 Utah Bulletin. Additional information on the proposed headwaters nutrient criteria and a copy of the markup submitted for publication in the Utah Bulletin are also available on the DWQ website <http://www.waterquality.utah.gov/rules/rulechange.htm>. The information in the Utah Bulletin prevails should any unintentional discrepancies occur between these documents and the Utah Bulletin

Comments will be accepted until 5:00 PM, May 3, 2019. Comments should be mailed to Christopher Bittner, Utah Division of Water Quality, P.O. Box 144870, SLC, UT 84114-4870 or e-mailed to cbittner@utah.gov. Comments can be received by phone at 801-536-4371. Comments will also be accepted at the public hearing. The public hearings will be preceded by one hour for DWQ staff to provide additional information and answer general questions. The public hearings to receive comments will be held for a minimum of one hour at the following time and location:

PUBLIC HEARING DATE	TIME	LOCATION
Wednesday, May 1, 2019	6:00 PM	Utah Department of Environmental Quality Multi-State Agency Office Building, Board Room 195 N. 1950 W Salt Lake City, UT 84116

Proposed Standards Revisions

- 1) In R317-1-1, Definitions, the proposed change is to define “Ecosystem Respiration”, “Filamentous Algae Cover”, and “Gross Primary Production”. These terms are only used in Section R317-2-14, proposed Tables 2.14.7 and 2.14.8. These specific changes are identified in companion document: DWQ-2019-002321.

- 2) In R317-2-10, Laboratory and Field Analyses, a clause was added to provide flexibility of field methods that are different than Division of Water Quality standard procedures. These specific changes are identified in companion document: DWQ-2019-002322.

- 3) In R317-2-14, Numeric Criteria, Table 2.14.7 was added for nutrient criteria applicable to Antidegradation Category 1 and 2 waters statewide. These criteria are needed to ensure that Utah’s headwaters continue to deliver high quality water to, for instance, drinking water.

Nitrogen and phosphorus (nutrients) criteria were developed and applied to Category 1 and Category 2 waters in new Tables 2.14.7 and 2.14.8. These specific changes are identified in companion document: DWQ-2019-002322.

Summary of Proposed Nutrient Criteria for Headwater Streams

The following summary includes excerpts from *Proposed Nutrient Criteria: Utah Headwater Streams, March 2019* (See Attachment 1). This document provides additional details on the background and rationale for the proposed numeric nutrient criteria (NNC), including: (i) a summary of the underlying scientific investigations used to establish NNC thresholds, (ii) a rationale for the thresholds that were selected, and (iii) considerations for integration of the criteria into existing DWQ programs. A companion document, *Technical Support Document: Utah's Nutrient Reduction Program*, provides details with respect to the scientific underpinnings of the NNC. This document is readily accessible at this location or click link for pdf:

<https://deq.utah.gov/legacy/pollutants/n/nutrients/headwater-criteria.htm>

Tiered NNC are proposed to protect aquatic life uses in headwater streams that place streams into one of three enrichment tiers depending on whether or not ambient nutrient concentrations exceed either of two nutrient concentration thresholds (Table 1). Under this proposal, the lower criteria of 0.4 mg/L for total nitrogen (TN) and 0.035 mg/L for total phosphorus (TP) differentiate between low and moderate enrichment streams. A higher threshold of 0.80 mg/L for TN and 0.080 mg/L for TP differentiates between moderate and high enrichment streams. Moderate enrichment streams, with nutrient concentrations between the upper and lower thresholds, require measures of ecological condition to determine whether or not enrichment is impairing or threatening the designated uses of the stream.

Nutrients can degrade aquatic life uses via mechanisms related to increased growth of plants/algae (autotrophs) and/or microbes/fungi (heterotrophs). DWQ selected bioconfirmation criteria (ecological responses) to address both mechanisms. In the case of plant/algae growth, two ecological responses are not-to-be-exceeded over a season at any headwater stream: (1) a daily gross primary production (GPP) rate higher than 6 g O₂/m²/day or (2) an aerial percent filamentous algae cover exceeding 1/3 of the stream bed. Linkages among microbes/fungi, nutrients, and aquatic life uses are less well understood, in part because these processes are more difficult to observe or measure. However, it is possible to measure ecosystem respiration (ER), which captures the net metabolic activities of all stream biota. DWQ proposes a not-to-be-exceeded seasonal rate for ER of 5 g O₂/m²/day.

Nutrients can also degrade recreation uses. To protect these uses DWQ proposes a not-to-be-exceeded benthic algae concentration of 125 mg/chlorophyll-*a* (chl-*a*)/m², or the equivalent 49 g ash free dry mass (AFDM)/m². These criteria are supported by the responses from a survey of Utah citizens who were asked whether streams with varying amounts of benthic algae cover represented “desirable” or “undesirable” conditions. These recommended criteria fall just below the point where the proportion of undesirable responses start to increase and should therefore be protective of recreation from the perspective of degraded aesthetics or other factors influencing recreational use decisions.

These NNC will apply to headwater streams that are currently protected as Antidegradation Category 1 and 2 waters (R317-2-3, Figure 1). These streams consist of waters that the Board has previously determined to be “of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection” (R317-2-3). New point source discharges of wastewater are prohibited in Category 1 waters. New point sources are allowed in Category 2 waters, but the discharge cannot degrade water quality. The proposed criteria will not affect any permitted discharges.

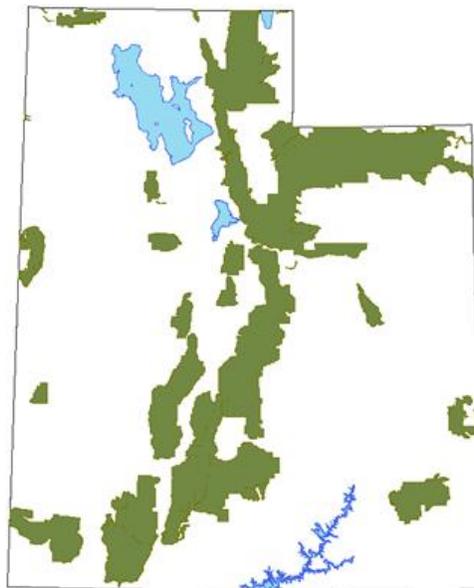


Figure 1. This map depicts Utah’s Antidegradation Category 1 and 2 boundaries in green. Division of Water Quality is proposing regional nitrogen and phosphorus numeric criteria for these waters (headwaters) prior to developing numeric nutrient criteria for all waters of the state.

Category 1 and 2 waters are identified in [R317-2-12](#) and include, among others, all stream segments within United States Forest Service (USFS) boundaries, which encompass approximately 8.2 million acres, over 15% of the acreage in Utah. The only Category 1 or 2 streams excluded from these criteria are three small sections of stream, totaling approximately nine river miles. These sections of streams have permitted facilities that were grandfathered an exclusion to the prohibition of discharges in current water quality regulations. Finally, due to the many nuances that can occur incorporating and interpreting this type of criteria, we are referencing in the proposed rule, Table 8: “Decision Matrix That Will Be Used to Assess Support of Headwater Aquatic Life Uses for Nutrient-related Water Quality Problems” found in Attachment 1, *Proposed Nutrient Criteria: Utah Headwater Streams, March 2019*. This table specifies formal water quality assessment decisions depending upon the nutrient tier and ecological responses of the headwater stream being assessed.

Table 1. 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)^f Headwater Perennial Streams

Low Nutrient Enrichment at Headwater Streams: No Ecological Responses			
Summertime Average Nutrients		Assessment Notes	
TN < 0.40 ^{a,b}	TP < 0.035 ^{a,b}	Fully supporting aquatic life uses if the average of ≥ 4 summertime samples is below the specified nutrient concentration of TN and TP unless ecological responses specified for moderate enrichment streams are exceeded that would result in a biological assessment impairment, cause unknown. Sites with fewer samples will not be assessed for nutrients.	
Moderate Nutrient Enrichment at Headwater Streams and Ecological Responses			
Summertime Average Nutrients		Ecological Response	Assessment Notes
TN 0.40–0.80 ^a	TP 0.035–0.080 ^a	Plant/Algal Growth ^c < 1/3 or more filamentous algae cover ^{d,e} OR GPP ^c of < 6 g O ₂ /m ² /day or ER ^c of < 5 g O ₂ /m ² /day	Headwater streams within this range of nutrient concentrations will be considered impaired (not supporting for nutrients) if <u>any</u> response exceeds defined thresholds. Streams <u>without response data</u> will be listed as having <u>insufficient data</u> 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 ^{a,b}	TP > 0.080 ^{a,b}	Streams over these thresholds will initially be placed on Utah's 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.	
<p>Notes: Criteria are applicable during the index period of algae growth through senescence unless more restrictive total maximum daily load (TMDL) targets have been established to ensure the attainment and maintenance of downstream waters. DO = dissolved oxygen, ER = ecosystem respiration, GPP = gross primary production, TN = total nitrogen in mg/L, and TP = total phosphorus in mg/L.</p> <p>a. Seasonal average of ≥ 4 samples collected during the index period will not be exceeded. Sites will be assessed using the higher of TN and TP threshold classifications.</p> <p>b. Response data, when available, will be used to assess aquatic life use support or as evidence for additional site-specific investigations to confirm impairment or derive and promulgate a site-specific exception to these criteria.</p> <p>c. Daily whole stream metabolism obtained using open-channel methods. Daily values are not to be exceeded on any collection event.</p> <p>d. Filamentous algae cover means patches of filamentous algae (> 1 cm in length or mats > 1 mm thick). Not to be exceeded daily stream average, based on at least 3 transects perpendicular to stream flow and spatially dispersed along a reach of at least 50 meters.</p> <p>e. Quantitative estimates are based on reach-scale averages with at least three measures from different habitat units (i.e., riffle, run) made with quantitative visual estimation methods.</p> <p>f. Excluded waters identified in UAC R317-2-14, Footnotes for Table 2.14.7 and Table 2.14.8.</p>			

ATTACHMENT 1

Proposed Nutrient Criteria: Utah Headwater Streams, March 2019

Available at this location or click link for pdf:

<https://deq.utah.gov/legacy/pollutants/n/nutrients/headwater-criteria.htm>

DWQ-2019-00234