

Nevada Surface Water Quality Regulations

Rationale for Changes to the Nevada Administrative Code revising the Nevada water quality regulations for former “Class Waters” located in the Upper Humboldt River Basin



Nevada Division of Environmental Protection
Bureau of Water Quality Planning
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located in the Upper Humboldt River Basin**

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Introduction

Nevada state law (NRS 445A.520) requires the State to establish water quality standards at a level necessary to protect beneficial uses of the surface waters of the State. Additionally, Section 303 of the Clean Water Act and 40 Code of Federal Regulations (40CFR) Part 131 require that States and authorized tribes routinely review and, as appropriate, modify surface water quality standards that protect the designated uses of a water body and provide a basis for controlling discharges or releases of pollutants. Water quality standards are composed of three parts: designated beneficial uses, water quality criteria to protect the uses, and antidegradation considerations. This rationale discusses the revisions proposed by the Nevada Division of Environmental Protection (NDEP), Bureau of Water Quality Planning (BWQP) to the water quality regulations associated with waters located in the Upper Humboldt River Basin (NAC 445A.1432 – 1578).

Background

NDEP has completed a review and evaluation of the water quality standards for waterbodies located in the Upper Humboldt River Basin (UHRB) in Elko, Eureka, and White Pine Counties (see [Figure 1](#)). For this review, the UHRB includes the headwaters, tributaries, and main stem of the Humboldt River downstream to Palisade, Nevada.

Changes are proposed to the Nevada Administrative Code (NAC) revising the Nevada water quality regulations for the former “Class Waters” located in the UHRB (see [Figure 2](#)). The specific waterbodies addressed in this petition are shown in Table 1. Table 1 also indicates whether the waterbody is classified as a Trout or Non-Trout water. The designation influences the proposed numeric criteria for nitrite, total suspended solids, and turbidity.

Prior to 2008, many waterbodies in Nevada were categorized by classes based on the degree of anthropogenic impact on the watershed. The UHRB contains former Class A, B, and C waters.

Class A waters included “waters or portions of waters located in areas of little human habitation, no industrial development or intensive agriculture and where the watershed is relatively undisturbed by man’s activity.”

Class B waters included “waters or portions of waters which are located in areas of light or moderate human habitation, little industrial development, light-to-moderate agricultural development and where the watershed is only moderately influenced by man’s activity.”

Class C waters included “waters or portions of waters which are located in areas of moderate-to-urban human habitation, where industrial development is present in moderate amounts, agricultural practices are intensive and where the watershed is considerably altered by man’s activity.”

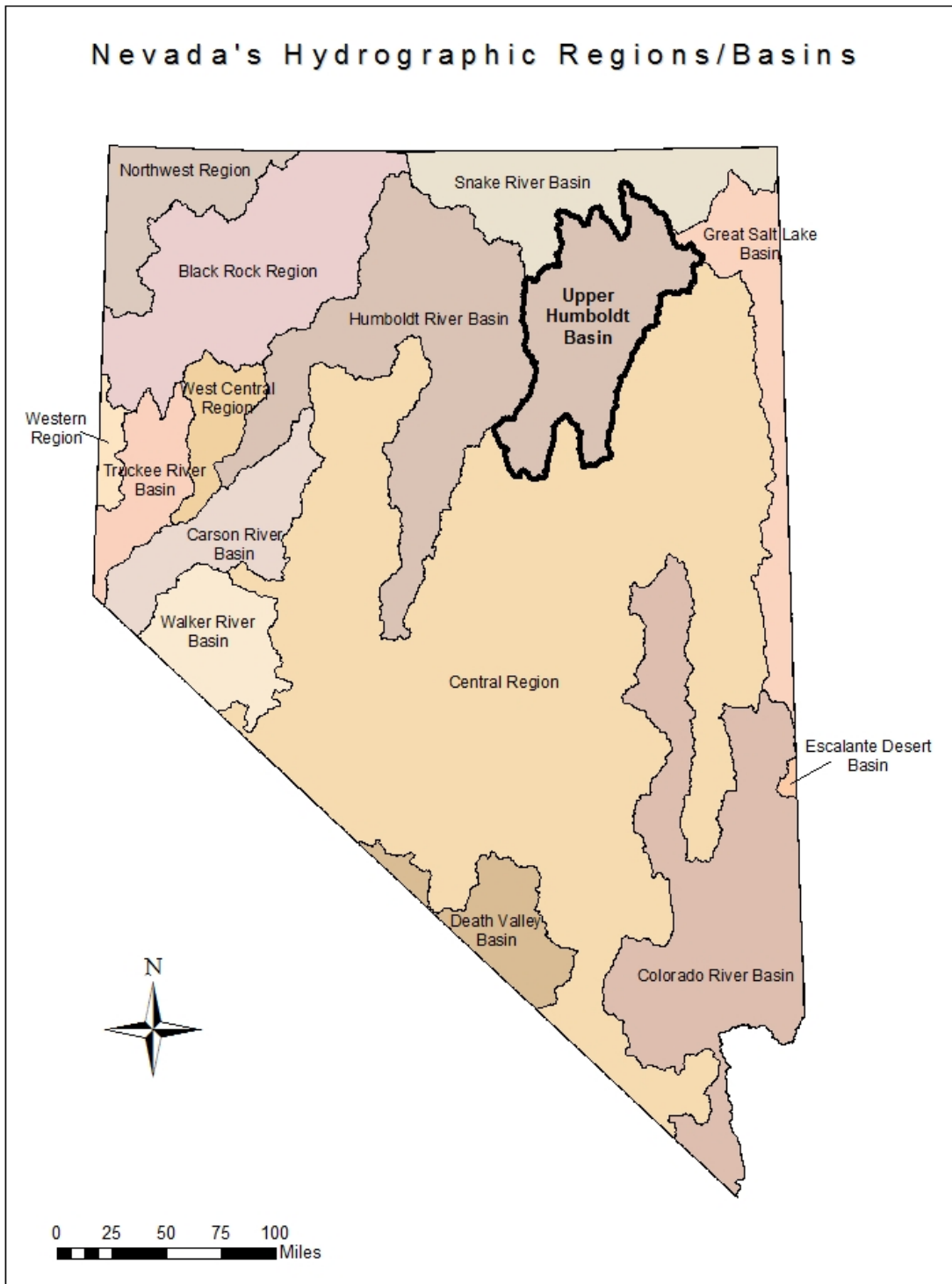


Figure 1. Upper Humboldt River Basin

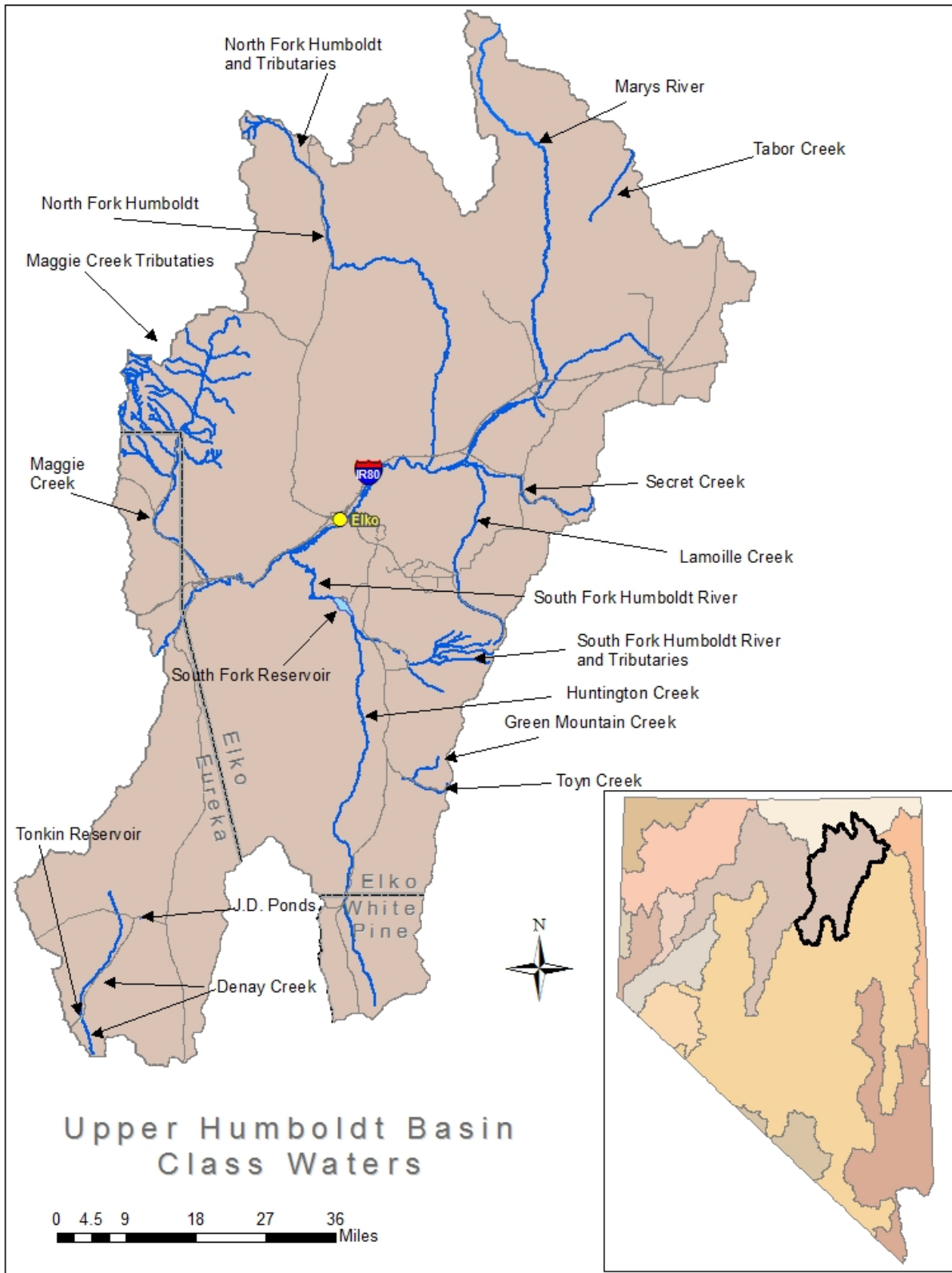


Figure 2 Former "Class Waters" in the Upper Humboldt River Basin

In 2008, the State Environmental Commission adopted revisions to the NAC which eliminated the Class structure and designated specific water quality standards for each waterbody. No changes were made in 2008 to the existing beneficial uses and no changes were made to numeric criteria except that criteria for E. coli and total ammonia were added.

NDEP is now proposing to update the beneficial uses and numeric criteria for specific waters in the UHRB for consistency with other similar types of waters throughout Nevada.

Table 1. Waters in the Upper Humboldt River Basin and Trout/Non-Trout Designation

Water Body Name	Segment Description	Aquatic Species of Concern	Water Quality Standard NAC Reference	Former Class and Trout or Non-Trout designation
Humboldt River, North Fork and tributaries at the national forest boundary	From their origin in the Independence Mountain Range to the national forest boundary.		445A.1456	A - Trout
Humboldt River, North Fork at Beaver Creek	From the national forest boundary to its confluence with Beaver Creek.	Trout	445A.1458	B - Trout
Humboldt River, North Fork at the Humboldt River	From its confluence with Beaver Creek to its confluence with the Humboldt River.		445A.1462	B - Non-Trout
Humboldt River, South Fork and tributaries at Lee	From their origin to Lee, except for the lengths of the river and tributaries within the exterior borders of the South Fork Indian Reservation.		445A.1464	A - Trout
Humboldt River, South Fork at the Humboldt River	From Lee to its confluence with the Humboldt River, except for the lengths of the river and tributaries within the exterior borders of the South Fork Indian Reservation.	Trout	445A.1466	B - Trout
Marys River, upper	From its origin to the point where the river crosses the east line of T. 42 N., R. 59 E., M.D.B. & M.		445A.1482	A - Trout
Marys River at the Humboldt River	From the east line of T. 42 N., R. 59 E., M.D.B. & M., to its confluence with the Humboldt River.	Trout	445A.1484	B - Trout
Tabor Creek	From its origin to the east line of T. 40 N., R. 60 E., M.D.B. & M.		445A.1486	A - Trout
Maggie Creek Tributaries	From their origin to the point where they become Maggie Creek or the point of their confluence with Maggie Creek.		445A.1488	A - Trout
Maggie Creek at Jack Creek	From where it is formed by the Maggie Creek tributaries to its confluence with Jack Creek.	Trout	445A.1492	B - Trout
Maggie Creek at Soap Creek	From its confluence with Jack Creek to its confluence with Soap Creek.	Trout	445A.1494	C - Trout
Maggie Creek at the Humboldt River	From its confluence with Soap Creek to its confluence with the Humboldt River.		445A.1496	C - Non-Trout
Secret Creek at the national forest boundary	From its origin to the national forest boundary.		445A.1498	A - Trout
Secret Creek at the Humboldt River	From the national forest boundary to its confluence with the Humboldt River.	Trout	445A.1502	B - Trout
Lamoille Creek at the gaging station	From its origin to gaging station number 10-316500, located in the NE 1/4 of section 6, T. 32 N., R. 58 E., M.D.B. & M.		445A.1504	A - Trout
Lamoille Creek at the Humboldt River	From gaging station number 10-316500, located in the NE 1/4 of section 6, T. 32 N., R. 58 E., M.D.B. & M., to its confluence with the Humboldt River.		445A.1506	B - Non-Trout
J.D. Ponds	The entire area.		445A.1508	C - Non-Trout
Denay Creek at Tonkin Reservoir	From its origin to Tonkin Reservoir.	Trout	445A.1512	A - Trout

Water Body Name	Segment Description	Aquatic Species of Concern	Water Quality Standard NAC Reference	Former Class and Trout or Non-Trout designation
Tonkin Reservoir	The entire reservoir.	Trout	445A.1514	A – Trout
Denay Creek below Tonkin Reservoir	Below Tonkin Reservoir.		445A.1516	B – Non-Trout
Huntington Creek at the White Pine-Elko county line	From its origin to the White Pine-Elko county line.		445A.1542	A – Trout
Huntington Creek at Smith Creek	From the White Pine-Elko county line to its confluence with Smith Creek.	Trout	445A.1544	B – Trout
Huntington Creek at the South Fork of the Humboldt River	From its confluence with Smith Creek to its confluence with the South Fork of the Humboldt River.		445A.1546	B – Non-Trout
Green Mountain Creek at the national forest boundary <i>Toyn Creek</i>	From its origin to the national forest boundary <i>to its confluence with Toyn Creek.</i>		445A.1548	A – Trout
Toyn Creek <i>at Green Mountain Creek</i>	From its origin to the national forest boundary <i>its confluence with Green Mountain Creek.</i>		445A.1554	A – Trout
Green Mountain Creek <i>Toyn Creek</i> at Corral Creek	From the national forest boundary <i>its confluence with Green Mountain Creek</i> to its confluence with Corral Creek.	Trout	445A.155 2 5	B – Trout
Starr Creek	From the confluence of Ackler and Herder Creeks to its confluence with the Humboldt River.	Trout	445A.1578	B – Trout

Summary of Proposed Revisions

- ❖ **Add Industrial Supply as a beneficial use to the waters that were formerly categorized as Class A.**
- ❖ **Correct naming error for Toyn and Green Mountain Creeks in the Ruby Mountains southeast of Jiggs as shown below.**

445A.1548 - Green Mountain Creek at ~~the national forest boundary~~ *Toyn Creek*
 From its origin ~~to the national forest boundary~~ *to its confluence with Toyn Creek.*

445A.1554 *Toyn Creek at Green Mountain Creek*
 From its origin to ~~the national forest boundary~~ *its confluence with Green Mountain Creek*

445A.155~~2~~5 ~~Green Mountain Creek~~ *Toyn Creek* at Corral Creek From ~~the national forest boundary~~ *its confluence with Green Mountain Creek* to its confluence with Corral Creek

- ❖ **Add numeric criteria for the following parameters:**
 If Trout or Non-Trout waters are not designated standard would apply to both.
 - Nitrate criterion of “S.V. ≤ 10.0 mg/l”
 - Nitrite criterion of “S.V. ≤ 0.06 mg/l” for Trout Waters
 Nitrite criterion of “S.V. ≤ 1.0 mg/l” for Non-Trout Waters

- Chloride criterion of “1-hour avg. \leq 230 mg/l; 96-hour avg. \leq 860 mg/l”
- Sulfate criterion of “S.V. \leq 250 mg/l”
- Alkalinity criterion of “S.V. \geq 20 mg/l”
- TSS criterion of “S.V. \leq 25 mg/l” for Trout Waters
TSS criterion of “S.V. \leq 80 mg/l” for Non-Trout Waters
- Turbidity criterion of “S.V. \leq 10 NTU” for Trout Waters
Turbidity criterion of “S.V. \leq 50 NTU” for Non-Trout Waters
- Color criterion of “S.V. \leq 75 PCU”

Proposed Revisions to Beneficial Uses and Reach Designations

The beneficial uses retained for each waterbody from the Class system are shown in Table 2.

Table 2. Class Waters Beneficial Uses

Beneficial Uses	Class A	Class B	Class C
Municipal and Domestic Supply	X	X	X
Aquatic life	X	X	X
Propagation of wildlife	X	X	X
Irrigation	X	X	X
Watering of livestock	X	X	X
Recreation involving contact with the water	X	X	X
Recreation not involving contact with the water	X	X	X
Industrial Supply		X	X

The waterbodies that were formerly Class A do not have Industrial Supply assigned as a beneficial use. NDEP is proposing to add Industrial Supply as a beneficial use to these waters (indicated by the shaded rows in Table 1.)

NDEP is also correcting a naming error for Toyn and Green Mountain Creeks in the Ruby Mountains southeast of Jiggs. The lower reach of Toyn Creek was misnamed as Green Mountain Creek. NDEP is adjusting the descriptions of Toyn and Green Mountain Creeks to conform with the USGS topographic map (see Figure 3). The reach description strikeouts and insertions are also shown in Table 1.

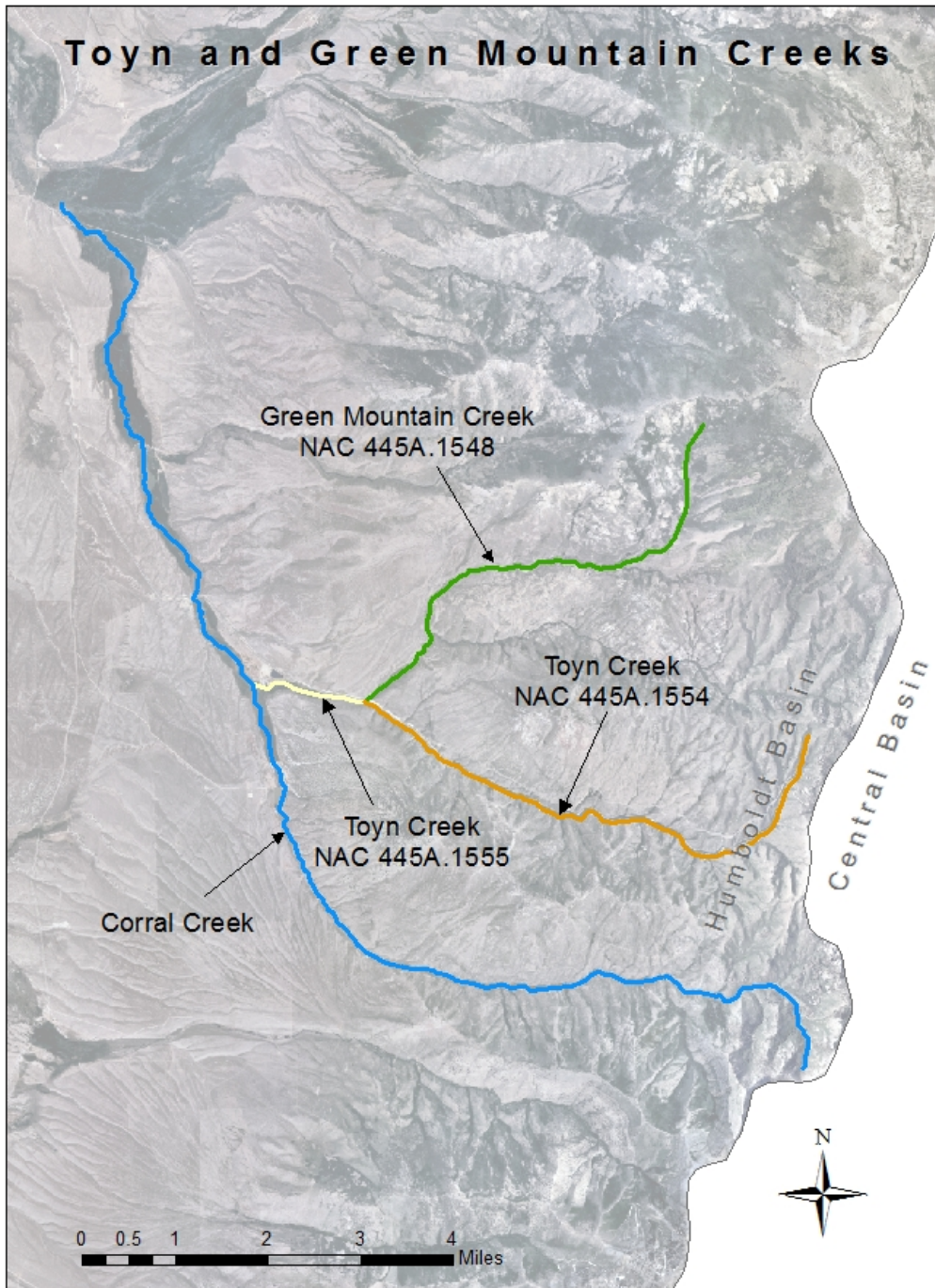


Figure 3 Corrections to Green Mountain and Toyn Creeks

Proposed Revisions to Numeric Criteria

The existing water quality standards for the UHRB waterbodies include the following parameters:

- Temperature¹
- pH
- Dissolved Oxygen (D.O.)¹
- Total Phosphorus (as P)
- Total Ammonia
- Total Dissolved Solids
- Escherichia coli
- Fecal Coliform

NDEP is proposing to add numeric criteria for the following parameters as recommended by the U.S. Environmental Protection Agency (EPA) for protection of the beneficial uses assigned to these waters:

- Nitrate
- Nitrite
- Chloride
- Sulfate
- Alkalinity as CaCO₃
- Total Suspended Solids
- Turbidity
- Color

Detailed descriptions of the proposed numeric criteria and the applicable beneficial uses are provided below.

Review of Beneficial Use Criteria

Water quality criteria are assigned as needed to protect the beneficial uses, including the most restrictive use. Generally, the criteria are derived from multiple sources such as EPA recommendations, literature reviews or site specific studies.

Nitrate:

Nitrate poses a potential risk of methemoglobinemia to bottle-fed infants. Based on EPA guidance (USEPA Quality Criteria for Water 1986 “Gold Book”), NDEP is proposing to establish a single value nitrate criterion of ≤ 10 mg/L as N to protect the municipal and domestic supply (M&D) beneficial use.

The proposed nitrate criterion is being met in all UHRB waters specified in this petition.

¹. Class A, B and C Trout waters have a single value temperature criterion of $\leq 20^{\circ}\text{C}$.
Class B Non-Trout waters have a single value temperature criterion of $\leq 24^{\circ}\text{C}$.
Class C Non-Trout waters have a single value temperature criterion of $\leq 34^{\circ}\text{C}$.
Trout waters have a single value D.O. criterion of ≥ 6.0 mg/l.
Non-Trout waters have a single value D.O. criterion of ≥ 5.0 mg/l.

Nitrite:

Nitrite is potentially toxic to cold-water aquatic life. Based upon EPA Gold Book guidance, NDEP is proposing to establish a single value nitrite criterion of ≤ 0.06 mg/l for Trout waters to protect the aquatic life beneficial use.

Nitrite can be potentially toxic to infants younger than six months of age that drink water containing levels greater than 1.0 mg/l. Based on EPA Gold Book guidance, NDEP is proposing to establish a single value nitrite criterion of ≤ 1.0 mg/l for Non-Trout waters to protect the M&D beneficial use.

The proposed nitrite criteria are being met in all UHRB waters specified in this petition.

Chloride:

Chloride is one of the anions that contributes to total dissolved solids (TDS) concentrations, but can also be toxic to aquatic life. Based on EPA guidance (Ambient Aquatic Life Water Quality Criteria for Chloride, 1988), NDEP is proposing two chloride criteria for the protection of aquatic life: a one-hour average of ≤ 860 mg/l and a 96-hour average of ≤ 230 mg/l (the one-hour and 96-hour average concentration limits may be exceeded only once every 3 years).

The proposed chloride criteria are being met in all UHRB waters specified in this petition.

Sulfate:

Sulfate is another of the anions that contributes to TDS concentrations. Elevated sulfate levels may have a laxative effect on drinking water users.

Based upon EPA Gold Book guidance, NDEP is proposing a single value sulfate criterion of ≤ 250 mg/l to protect the M&D beneficial use.

The proposed sulfate criterion is being met in all UHRB waters specified in this petition.

Alkalinity:

Alkalinity, often referred to as hardness, is the sum total of components in the water that tend to elevate the pH above a value of about 4.5. Alkalinity is important for aquatic life because it buffers pH changes, including those that occur naturally as a result of algal photosynthetic activity. Also, the main components of alkalinity will bind with some toxic heavy metals and reduce their toxicity.

Based upon EPA Gold Book guidance, NDEP is proposing a single value alkalinity criterion of ≥ 20 mg/l as CaCO_3 to protect the aquatic life beneficial use.

The proposed alkalinity criterion is being met in all UHRB waters specified in this petition except:

- NAC 445A.1456 Humboldt River, North Fork and tributaries at the national forest boundary

Total Suspended Solids:

Total Suspended Solids (TSS) are organic and inorganic solid materials that are suspended in the water. Suspended solids affect aquatic life in a variety of ways. Excess TSS levels can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development. Particles that settle out can smother fish eggs and those of aquatic insects, as well as suffocate newly-hatched larvae. In general, cold-water fish are less tolerant of elevated TSS levels than are warm-water fish.

Based on EPA guidance (Green Book) NDEP is proposing TSS single value criteria of ≤ 25 mg/l for Trout waters and ≤ 80 mg/l for Non-Trout waters to protect the aquatic life beneficial use.

The proposed TSS criteria are being met in all UHRB waters specified in this petition except:

- NAC 445A.1462 Humboldt River North Fork at the Humboldt River
- NAC 445A.1466 Humboldt River South Fork at the Humboldt River
- NAC 445A.1486 Tabor Creek
- NAC 445A.1542 Huntington Creek at the White Pine Elko county line

Turbidity:

Turbidity is a measure of how particles suspended in water affect water clarity. Elevated turbidity can impact productivity thereby reducing food availability for aquatic life, and can impair the ability of fish to feed. In general, cold-water fish are less tolerant of turbid conditions than are warm-water fish.

Based on Green Book guidance, NDEP is proposing single value turbidity criteria of ≤ 10 NTU (nephelometric turbidity units) for Trout waters and ≤ 50 NTU for Non-Trout waters to protect the aquatic life beneficial use.

The proposed turbidity criteria are being met in all UHRB waters specified in this petition except:

- NAC 445A.1484 Marys River at the Humboldt River
- NAC 445A.1486 Tabor Creek
- NAC 445A.1542 Huntington Creek at the White Pine Elko county line
- NAC 445A.1544 Huntington Creek at Smith Creek

Color:

The most common cause of color in water is from the decomposition of naturally occurring organic matter. Color can affect the taste and aesthetic quality of drinking water.

Based upon EPA Gold Book guidance, NDEP is proposing a single value color criteria of ≤ 75 PCU (platinum-cobalt color units) to protect the M&D beneficial use.

The proposed color standard is being met in all UHRB waters specified in this petition.

References

- FWPCA (Federal Water Pollution Control Administration). 1968. Water Quality Criteria (the “Green Book”), Report of the National Technical Advisory Committee to the Secretary of the Interior. U.S. Department of the Interior. Washington, DC.
- USEPA 1972. Water Quality Criteria (Blue Book). Prepared by the National Academy of Sciences – Committee on Water Quality Criteria. USEPA, Washington, DC.
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- USEPA 1988. Ambient Water Quality Criteria for Chloride – 1988. EPA-440/5-88-001. USEPA, Washington DC.