

# **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 Lower Humboldt River Basin NAC 445A.1432 – 1578**



Nevada Division of Environmental Protection  
Bureau of Water Quality Planning  
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Revising Nevada water quality regulations for the former “Class Waters”  
located in the Lower 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 Title 40, Part 131 of the Code of Federal Regulations 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 in Petition 2015-07 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 Lower 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 Lower Humboldt River Basin (LHRB) in Churchill, Elko, Eureka, Humboldt, Lander, Nye, and Pershing counties (see [Figure 1](#)). For this review, the LHRB includes the main stem of the Humboldt River and its tributaries downstream from 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 LHRB (see [Figure 2](#)).<sup>1</sup> [Table 1](#) lists the specific waterbodies addressed in this petition and indicates whether the waterbody is classified as a Trout or Non-Trout water which 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 LHRB contains former Class A, B, C, and D 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.”

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<sup>1</sup> NDEP is proposing to revise the Nevada water quality regulations for all the former “Class Waters” located in the LHRB except the Humboldt Sink (NAC 445A.1455) and Iowa Canyon Reservoir (NAC 445A.1576). The current standards for the Humboldt Sink are appropriate and do not require revision. Iowa Canyon Reservoir is located within private lands and NDEP has been denied access to monitor the waterbody. Due to the lack of available water quality data, NDEP has decided not to revise the water quality standards for Iowa Canyon Reservoir.

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.”

Class D waters included “waters or portions of waters located in areas of urban development, highly industrialized or intensively used for agriculture or a combination of all of the above and where effluent sources include a multiplicity of waste discharges from the highly altered watershed.”

# Nevada's Hydrographic Regions/Basins

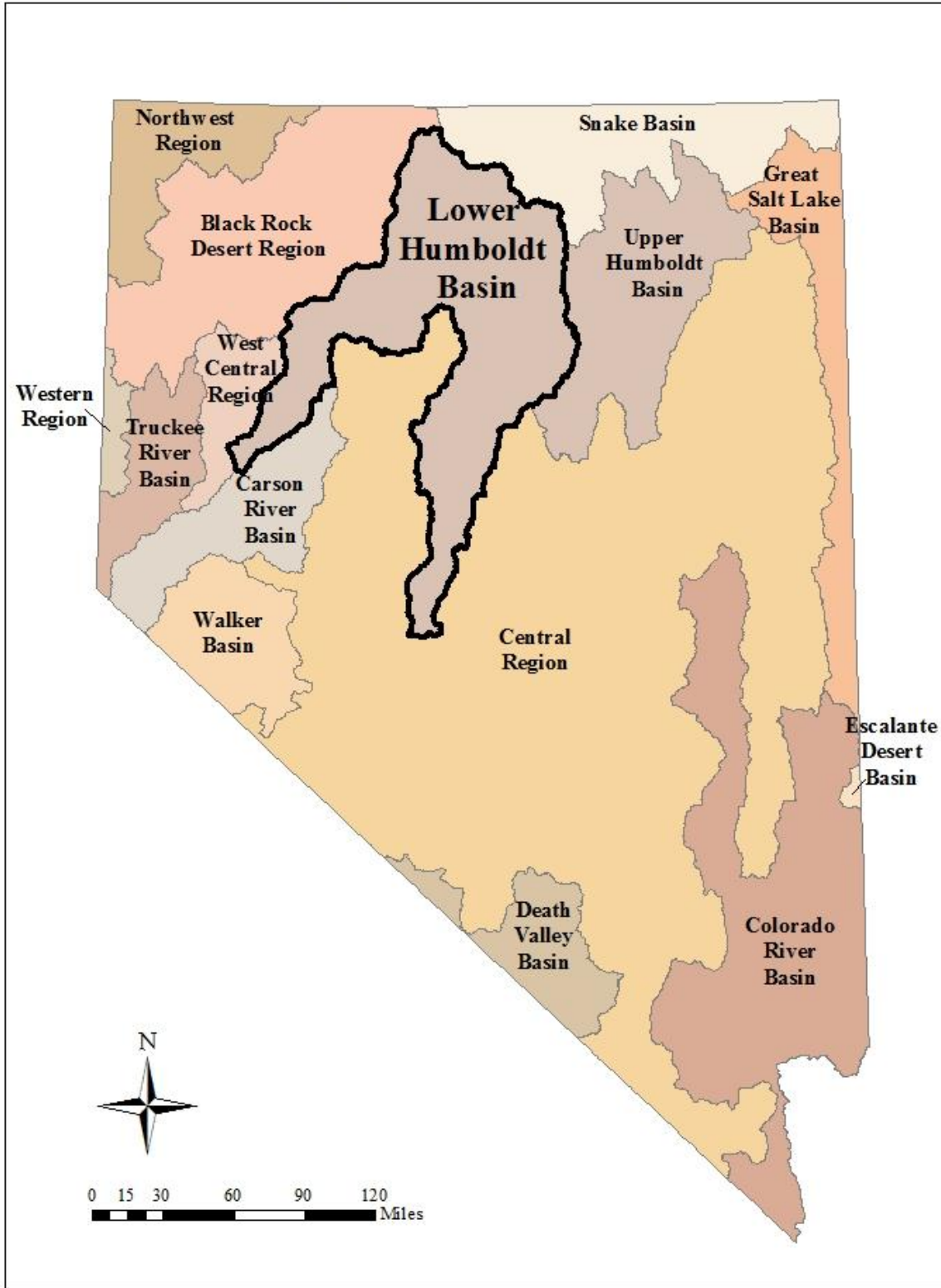


Figure 1: Lower Humboldt River Basin

# Lower Humboldt Basin Class Waters

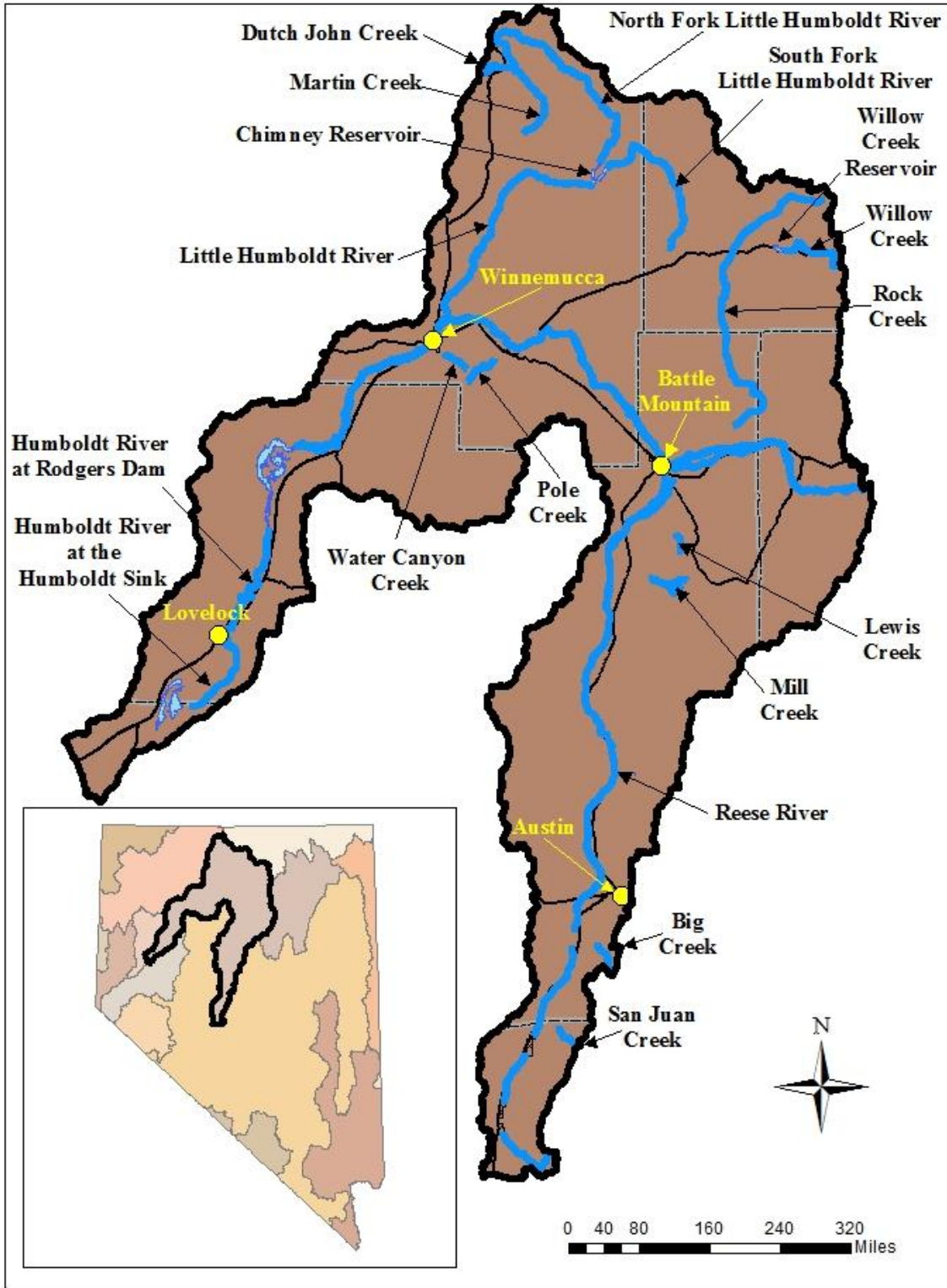


Figure 2: Former “Class Waters” in the Lower Humboldt River Basin

In 2008, the State Environmental Commission adopted revisions to the NAC which eliminated the Class Waters structure and designated specific water quality standards for each waterbody. At that time, no changes were made to the beneficial uses and the only numeric criteria added were for *Escherichia coli* and Total Ammonia (as N).

NDEP is now proposing to update the beneficial uses and numeric criteria for the LHRB waterbodies listed in [Table 1](#) for consistency with other similar types of waters throughout Nevada.

**Table 1. Specific Waterbodies Address in Petition 2015-07<sup>2</sup>**

Water Body Name	Segment Description	Aquatic Species of Concern	Water Quality Standard NAC Reference	Former Class and Trout or Non-Trout designation
Humboldt River at Rodgers Dam	From Woolsey to Rodgers Dam.		445A.1452	C – Non-Trout
Humboldt River at the Humboldt Sink	From Rodgers Dam to the Humboldt Sink.		445A.1454	D – Non-Trout
Little Humboldt River	The entire length.		445A.1468	C – Non-Trout
Little Humboldt River, North Fork at the national forest boundary	From its origin to the national forest boundary.		445A.1472	A – Trout
Little Humboldt River, North Fork at the South Fork of the Little Humboldt River	From the national forest boundary to its confluence with the South Fork of the Little Humboldt River.		445A.1474	B – Non-Trout
Little Humboldt River, South Fork at the Elko-Humboldt county line	From its origin to the Elko-Humboldt county line.		445A.1476	A – Trout
Little Humboldt River, South Fork at the North Fork of the Little Humboldt River	From the Elko-Humboldt county line to its confluence with the North Fork of the Little Humboldt River.		445A.1478	B – Non-Trout
Rock Creek at Squaw Valley Ranch	From its origin to Squaw Valley Ranch.		445A.1518	A – Trout
Rock Creek below Squaw Valley Ranch	Below Squaw Valley Ranch.		445A.1522	C – Non-Trout
Willow Creek at Willow Creek Reservoir	From its origin to Willow Creek Reservoir.		445A.1524	A – Trout
Willow Creek Reservoir	The entire body of water known as Willow Creek Reservoir	Trout	445A.1526	B – Trout
Pole Creek	From its origin to the point of diversion of the Golconda water supply, near the north line of section 13, T. 35 N., R. 39 E., M.D.B. & M.		445A.1528	A – Trout
Water Canyon Creek	From its origin to the point of diversion of the Winnemucca municipal water supply, near the west line of section 12, T. 35 N., R. 38 E., M.D.B. & M.		445A.1532	A – Trout
Martin Creek at the national forest boundary	From its origin to the national forest boundary.		445A.1534	A – Trout
Martin Creek below the national forest boundary	From the national forest boundary to the first diversion in T. 42 N., R. 40 E., M.D.B. & M.	Trout	445A.1536	B – Trout
Dutch John Creek	The entire length.		445A.1538	A – Trout
Reese River at Indian Creek	From its origin to its confluence with Indian Creek, except for the length of the river within the exterior borders of the Yomba Indian Reservation.		445A.1556	A – Trout

<sup>2</sup> Former Class A Waters are shaded.



Water Body Name	Segment Description	Aquatic Species of Concern	Water Quality Standard NAC Reference	Former Class and Trout or Non-Trout designation
Reese River at State Route 722	From its confluence with Indian Creek to State Route 722 (old U.S. Highway 50), except for the length of the river within the exterior borders of the Yomba Indian Reservation.	Trout	445A.1558	B – Trout
Reese River below State Route 722	North of State Route 722 (old U.S. Highway 50).		445A.1562	C – Non-Trout
San Juan Creek	From its origin to the national forest boundary.		445A.1564	A – Trout
Big Creek at the forest service campground	From its origin to the east boundary of the United States Forest Service's Big Creek Campground.		445A.1566	A – Trout
Big Creek below the forest service campground	From the east boundary of the United States Forest Service's Big Creek Campground to the first diversion dam, near the west line of section 4, T. 17 N., R. 43 E., M.D.B. & M.	Trout	445A.1568	B – Trout
Mill Creek	From its origin to the first point of diversion, near the south line of section 22, T. 29 N., R. 44 E., M.D.B. & M.		445A.1572	A – Trout
Lewis Creek	From its origin to the first point of diversion, near the center of section 23, T. 30 N., R. 45 E., M.D.B. & M.		445A.1574	A – Trout

### Summary of Proposed Revisions

- ❖ Add Industrial Supply as a beneficial use to the waters that were formerly categorized as Class A.
- ❖ Add Trout as an Aquatic Life Species of Concern to the waters that were formerly categorized as Class A.
- ❖ Add numeric criteria for the following parameters:
  - Nitrate (as N)<sup>3</sup>
  - Nitrite (as N)
  - Total Suspended Solids
  - Turbidity
  - Color<sup>3</sup>
  - Chloride
  - Sulfate<sup>3</sup>
  - Alkalinity (as CaCO<sub>3</sub>)

<sup>3</sup> NDEP is not proposing to add Nitrate (as N), Color, or Sulfate to NAC 445A.1454 Humboldt River at the Humboldt Sink because Municipal or domestic supply is not a beneficial use for this segment of the Humboldt River.

## Proposed Revisions to Beneficial Uses

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	Class D
Municipal or domestic supply	X	X	X	
Aquatic life	X	X	X	X
Propagation of wildlife	X	X	X	X
Irrigation	X	X	X	X
Watering of livestock	X	X	X	X
Recreation involving contact with the water	X	X	X	
Recreation not involving contact with the water	X	X	X	X
Industrial supply		X	X	X

NDEP is proposing to add Industrial Supply as a beneficial use to former Class A waters (indicated by the shaded rows in [Table 1](#).)

## Proposed Revisions to Aquatic Life Species of Concern

NDEP is proposing to add Trout to the Aquatic Life Species of Concern column of former Class A waters. By definition Class A waters were likely to be suitable habitat for trout. Furthermore, the temperature and dissolved oxygen criteria assigned to former Class A waters were designed to be protective of trout.

## Proposed Revisions to Numeric Criteria

The existing water quality criteria for former Class Waters in the LHRB include the parameters shown in [Table 3](#).

**Table 3: Existing Water Quality Criteria for Former Class Waters in the LHRB**

	Class A	Class B Trout	Class B Non-Trout	Class C	Class D
Temperature - °C	S.V. ≤ 20		S.V. ≤ 24	S.V. ≤ 34	None
pH – SU	6.5 – 9.0				6.0 – 9.0
Dissolved Oxygen – mg/l	S.V. ≥ 6.0		S.V. ≥ 5.0		S.V. ≥ 3.0
Total Phosphorus (as P) – mg/l	S.V. ≤ 0.10			S.V. ≤ 0.33	None
Total Ammonia (as N) – mg/l	The ambient water quality criteria for ammonia are specified in <a href="#">NAC 445A.118</a> .				
Total Dissolved Solids – mg/l	S.V. ≤ 500 or the 95 <sup>th</sup> percentile (whichever is less).				None
<i>Escherichia coli</i> – No./100 ml	A.G.M. ≤ 126 S.V. ≤ 410				A.G.M. ≤ 126 S.V. ≤ 576
Fecal Coliform – No./100 ml	S.V. ≤ 1,000				None

NDEP is proposing to add numeric criteria for the parameters listed in [Table 4](#) as recommended by the U.S. Environmental Protection Agency (EPA) for protection of the beneficial uses assigned to these waters.

**Table 4: Proposed Revisions to Numeric Criteria**

Parameter	Criterion	Applicability	Most Restrictive Beneficial Use
Nitrate (as N) <sup>4</sup>	S.V. ≤ 10.0 mg/l	Trout and Non-Trout Waters	Municipal or domestic supply
Nitrite (as N)	S.V. ≤ 0.06 mg/l	Trout Waters	Aquatic Life
	S.V. ≤ 1.0 mg/l	Non-Trout Waters	
Total Suspended Solids	S.V. ≤ 25 mg/l	Trout Waters	Aquatic Life
	S.V. ≤ 80 mg/l	Non-Trout Waters	
Turbidity	S.V. ≤ 10 NTU	Trout Waters	Aquatic Life
	S.V. ≤ 50 NTU	Non-Trout Waters	
Color <sup>4</sup>	S.V. ≤ 75 PCU	Trout and Non-Trout Waters	Municipal or domestic supply
Chloride	1-hour avg. ≤ 860 mg/l	Trout and Non-Trout Waters	Aquatic Life
	96-hour avg. ≤ 230 mg/l		
Sulfate <sup>4</sup>	S.V. ≤ 250 mg/l	Trout and Non-Trout Waters	Aquatic Life
Alkalinity (as CaCO <sub>3</sub> )	S.V. ≥ 20 mg/l	Trout and Non-Trout Waters	Aquatic Life

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. The sample results below include data spanning the monitoring record for each waterbody. Being mentioned below does not necessarily indicate that the waterbody would be assessed as impaired and appear on a 303(d) list.

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 or domestic supply (M&D) beneficial use.

The proposed nitrate criterion is being met in all LHRB waters specified in Petition 2015-07.

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.

<sup>4</sup> NDEP is not proposing to add Nitrate (as N), Color, or Sulfate to NAC 445A.1454 Humboldt River at the Humboldt Sink because Municipal or domestic supply is not a beneficial use for this segment of the Humboldt River.

The proposed nitrite criteria are being met in all LHRB waters specified in Petition 2015-07.

#### Total Suspended Solids:

Total Suspended Solids (TSS) includes 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 Federal Water Pollution Control Administration guidance (FWPCA Water Quality Criteria 1968 “Green Book”) NDEP is proposing TSS single value criteria of  $\leq 25$  mg/l for Trout waters and  $\leq 80$  mg/l for Non-Trout waters to protect the aquatic life beneficial use.

The proposed TSS criterion of  $\leq 25$  mg/l is being met in all Trout waters in the LHRB specified in Petition 2015-07 except:

- NAC 445A.1472 Little Humboldt River, North Fork at the national forest boundary. 1 of 16 samples exceeds the criterion.
- NAC 445A.1526 Willow Creek Reservoir. 3 of 8 samples exceed the criterion.
- NAC 445A.1558 Reese River at State Route 722. 3 of 33 samples exceed the criterion.
- NAC 445A.1564 San Juan Creek. 1 of 13 samples exceeds the criterion.
- NAC 445A.1568 Big Creek below the forest service campground. 1 of 4 samples exceeds the criterion.
- NAC 445A.1572 Mill Creek. 2 of 11 samples exceed the criterion.
- NAC 445A.1574 Lewis Creek. 2 of 7 samples exceed the criterion.

The proposed TSS criterion of  $\leq 80$  mg/l is being met in all Non-Trout waters in the LHRB specified in Petition 2015-07 except:

- NAC 445A.1452 Humboldt River at Rodgers Dam. 1 of 12 samples exceeds the criterion.
- NAC 445A.1454 Humboldt River at the Humboldt Sink. 58 of 159 samples exceed the criterion.
- NAC 445A.1468 Little Humboldt River. 5 of 28 samples exceed the criterion.
- NAC 445A.1562 Reese River below State Route 722. 3 of 12 samples exceed the criterion.

#### 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  $\leq 10$  NTU (nephelometric turbidity units) for Trout waters and  $\leq 50$  NTU for Non-Trout waters to protect the aquatic life beneficial use.

The proposed turbidity criterion of  $\leq 10$  NTU is being met in all Trout waters in the LHRB specified in Petition 2015-07 except:

- NAC 445A.1472 Little Humboldt River, North Fork at the national forest boundary. 1 of 16 samples exceeds the criterion.
- NAC 445A.1526 Willow Creek Reservoir. 8 of 8 samples exceed the criterion.
- NAC 445A.1558 Reese River at State Route 722. 7 of 33 samples exceed the criterion.

- NAC 445A.1564 San Juan Creek. 1 of 13 samples exceeds the criterion.
- NAC 445A.1568 Big Creek below the forest service campground. 1 of 4 samples exceeds the criterion.
- NAC 445A.1572 Mill Creek. 3 of 11 samples exceed the criterion.
- NAC 445A.1574 Lewis Creek. 1 of 7 samples exceeds the criterion.

The proposed turbidity criterion of  $\leq 50$  NTU is being met in all Non-Trout waters in the LHRB specified in Petition 2015-07 except:

- NAC 445A.1452 Humboldt River at Rodgers Dam. 3 of 12 samples exceed the criterion.
- NAC 445A.1454 Humboldt River at the Humboldt Sink. 30 of 165 samples exceed the criterion.
- NAC 445A.1468 Little Humboldt River. 7 of 28 samples exceed the criterion.
- NAC 445A.1478 Little Humboldt River, South Fork at the North Fork of the Little Humboldt River. 2 of 20 samples exceed the criterion.
- NAC 445A.1562 Reese River below State Route 722. 6 of 12 samples exceed the criterion.

#### 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  $\leq 75$  PCU (platinum-cobalt color units) to protect the M&D beneficial use.

The proposed color criterion is being met in all LHRB waters specified in Petition 2015-07 except:

- NAC 445A.1468 Little Humboldt River. 2 of 28 samples exceed the criterion.
- NAC 445A.1562 Reese River below State Route 722. 1 of 12 samples exceeds the criterion.

#### 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  $\leq 860$  mg/l and a 96-hour average of  $\leq 230$  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 LHRB waters specified in Petition 2015-07 except:

- NAC 445A.1454 Humboldt River at the Humboldt Sink. 39 of 165 samples exceed the one-hour average criterion of 860 mg/l. In addition, 119 of 165 samples exceed the 96-hour average criterion of 230 mg/l.

#### 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  $\leq 250$  mg/l to protect the M&D beneficial use.

The proposed sulfate criterion is being met in all LHRB waters specified in Petition 2015-07 except:

- NAC 445A.1472 Little Humboldt River, North Fork at the national forest boundary. 1 of 16 samples exceeds the criterion.
- NAC 445A.1562 Reese River below State Route 722. 1 of 12 samples exceeds the criterion.

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  $\geq 20$  mg/l as  $\text{CaCO}_3$  to protect the aquatic life beneficial use.

The proposed alkalinity criterion is being met in all LHRB waters specified in Petition 2015-07.

## 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 (the “Blue Book”). Prepared by the National Academy of Sciences – Committee on Water Quality Criteria. USEPA, Washington, DC.

USEPA 1986. Water Quality Criteria (the “Gold Book”). EPA-440/9-76-023. USEPA, Washington DC.

USEPA 1988. Ambient Water Quality Criteria for Chloride – 1988. EPA-440/5-88-001. USEPA, Washington DC.