

**Rationale for Proposed Revisions to the
Nevada Water Quality Regulations
NAC 445A.180 (New NAC 445A.1286), NAC
445A.181 (New NAC 445A.1698), and NAC 445A.182
(New NAC 445A.1702)**

Smoke, Bronco, and Gray Creek Standards



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Introduction

Background

Through section 303 of the Clean Water Act (CWA), U.S. Environmental Protection Agency (EPA) has delegated authority to Nevada to establish water quality standards (Standards) for all water bodies or segments of water bodies that lie within the state. Standards are composed of three parts: designated beneficial uses (Uses), water quality criteria (Criteria), and developing and implementation of antidegradation policies and procedures.

The CWA also requires that states periodically review and as appropriate modify Standards. The following document includes proposed revisions to the State of Nevada (Nevada) Water Pollution Control Regulations (Nevada Regulations) to the interstate waters Bronco, Gray, and Smoke Creeks, contained in the Nevada Administrative Code (NAC) 445A.180 through 445A.182, the Rationale to support the proposed revisions, and a summary of the data analysis.

Smoke Creek is approximately 30 miles from Susanville, CA and Bronco and Gray Creeks flow into the Truckee River between Hirschdale and Floriston, CA.

Nevada Beneficial Use Standards

Nevada's Standards define the water quality goals for a waterbody, or a portion of a waterbody by designating Uses of the water and setting Criteria necessary to protect the Uses. Nevada's Uses are contained in NAC 445A.122 and are listed below in Table 1.

Table 1. List of Nevada's designated beneficial uses contained in NAC 445A.122.

Watering of Livestock	The water must be suitable for the watering of livestock without treatment.
Irrigation	The water must be suitable for irrigation without treatment.
Aquatic life	The water must be suitable as a habitat for fish and other aquatic life existing in a body of water. This does not preclude the reestablishment of other fish or aquatic life.
Recreation involving contact with the water	There must be no evidence of man-made pollution, floating debris, sludge accumulation or similar pollutants.
Recreation not involving contact with the water	The water must be free from: (1) Visible floating, suspended or settled solids arising from man's activities; (2) Sludge banks; (3) Slime infestation; (4) Heavy growth of attached plants, blooms or high concentrations of plankton, discoloration or excessive acidity or alkalinity that leads to corrosion of boats and docks; (5) Surfactants that foam when the water is agitated or aerated; and (6) Excessive water temperatures.
Municipal or domestic supply	The water must be capable of being treated by conventional methods of water treatment in order to comply with Nevada's drinking water standards.
Industrial supply	The water must be treatable to provide a quality of water which is suitable for the intended use.
Propagation of wildlife	The water must be suitable for the propagation of wildlife and waterfowl without treatment.
Waters of extraordinary ecological or aesthetic value	The unique ecological or aesthetic value of the water must be maintained.
Enhancement of water quality	The water must support natural enhancement or improvement of water quality in any water which is downstream.

Nevada's Standards contain both narrative and numeric Criteria. The narrative Standards contained in NAC 445A.121 apply to all surface waters of the state and require waters to be "free from" various pollutants in sufficient levels so as to not be unsightly, interfere with any Uses, create a public nuisance, be toxic to human, animal, plant or aquatic life or have any adverse effects.

Site specific numeric Standards have been developed for the major waterbodies in Nevada, often referred to as "designated" waters. The Standards for designated waters include Criteria designed to protect the Uses and, in certain cases, antidegradation requirements.

Nevada's antidegradation requirements are contained in the Nevada Revised Statutes (NRS) NRS 445A.565. This statute is to protect and maintain existing water quality. Many surface waters have higher water quality than their adopted Standards. Discharges to these waters must not cause degradation unless there is justification to lower existing water quality.

Water Quality Standards History

The Federal Water Quality Act of 1965, Public Law 89-234, charged states with establishing Standards for their interstate waters by June 30, 1967 (FWPCA, 1968). An interstate water is a waterbody that flows across or form part of state or international boundaries. With this Act as the catalyst, Nevada adopted its first Standards on June 27, 1967 (Unknown, n.d.) to supplement the Nevada Regulations enacted in 1957 and amended in 1959 (Nevada, 1967a; McKee and Wolf, 1963). Theses Standards were placed into individual tables 1 through 46 (Tables) in the Water Pollution Regulations portion of the Nevada Regulations.

In 1966, Nevada began its water quality monitoring program in response to the 1965 Act. Where data was available, numeric and narrative standards were established for interstate waterbodies. The numeric standards were individualized for each waterbody based upon that data. Smoke Creek was sampled once, on 7/18/1966, prior to the numeric and narrative Standards adoption. This sampling event was used to establish the Standards for Smoke Creek (Table 2). Bronco and Gray Creeks were not sampled until 6/2/1967 and 5/17/1968, respectively and were assigned the same narrative Standards as Smoke Creek.

The Uses for the interstate waterbodies were outlined in Table 2 of the Interstate Water Quality Standards and Plan of Implementation (Plan) (Nevada, 1967a). Smoke Creek's Uses were Esthetics and Irrigation & Stock Watering. Bronco and Gray Creeks were Municipal Water, Fish & Wildlife, and Esthetics.

No information was provided in the Plan that accompanied the Standards as to how Uses were assigned or how the Standards, both numeric and narrative, were formulated, but it was mentioned that Nevada's Standards were very close to those established by California for those waterbodies that crossed state boundaries.

In 1972, amendments were made to the Federal Water Quality Act of 1965 and was called the Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500. This document is more commonly known as the Clean Water Act and charged States with establishing intrastate Standards. An intrastate waterbody is one that completely lies within a state. Nevada adopted its first intrastate Standards in November 1972 (Unknown, n.d.).

On April 10, 1973, Nevada adopted revisions to the interstate numeric and narrative Standards, however the Smoke Creek numeric Standards were not revised. The 1973 revisions did establish numeric Standards for Bronco and Gray Creeks (Tables 3 and 4). It is important to note that these numeric Standards were not based on the recommended water quality criteria from "Water Quality Criteria"

(FWPCA, 1968). The narrative Standards were revised for Smoke, Bronco and Gray Creeks. No Uses were outlined in the 1973 revision document.

No information was provided to explain how the Standards, both numeric and narrative, were formulated.

In the 1975 amended Nevada Regulations, Article 4, Uses were listed and defined, but not assigned to any waterbody (Nevada, 1975). Also, all but the color, turbidity, and fecal coliform narrative Standards were removed from each table and placed into Article 4. The narrative Standards were also expanded from the 1973 set of narrative Standards.

Also, in 1975, the fecal coliform Standard was revised for all waterbody Tables to:

“The more stringent of the following apply:

The fecal coliform concentration shall not exceed a geometric mean of 1000 per 100 milliliters nor shall more than 20% of total samples exceed 2400 per 100 milliliters.

The annual geometric mean of fecal coliform concentration shall not exceed that characteristic of natural conditions by more than 200 per 100 milliliters nor shall the number of fecal coliform in a single sample exceed that characteristic of natural conditions by more than 400 per 100 milliliters.”

Lastly in 1975, additions were made to the temperature Standards within the Tables. Smoke Creek’s table addition was “Allowable temperature increase above natural receiving water temperatures of not more than 3 degrees” and Bronco and Gray Creeks were “Maximum allowable temperature increase above natural receiving water temperatures of none.”

No information was provided to explain these changes/additions to the numeric and narrative Standards.

The last change to the Tables was when NAC numbers were assigned to the Tables, first in 1980 to a four or five digit number and then in the early 1990’s to the current NAC table number. The Tables are undergoing another revision and new NAC numbers are going to be assigned in the near future.

Uses were assigned to waterbody Tables during the Standards reviews of the 1980’s and 1990’s, when the table structure was modified to include the Uses in the Tables. Until now, Smoke, Bronco, and Gray Creeks Standards have not been reviewed, therefore Uses have not been assigned and the table structures were never modified.

Table 2. Table 36 Water Quality Standards Smoke Creek from the State of Nevada Division of Health Water Pollution Control Regulations (Nevada, 1967b).

Table 36
WATER QUALITY STANDARDS
Smoke Creek

Control Point: Approximately 30 miles east of Susanville, California.

Temperature °C

Single Value, Summer..... not more than 25
Single Value, Winter..... not more than 14

pH Units

Annual Median..... within range 7.0-8.0
Single Value..... within range 6.5-8.5

Dissolved Oxygen - mg/l

Average (June through September)..... not less than 8.0
Single Value..... not less than 7.5

BOD - mg/l

Single Value..... not more than 5

Chlorides - mg/l

Single Value..... not more than 10

Phosphates (PO₄) - mg/l

Annual Average..... not more than 0.5
Single Value..... not more than 0.7

Nitrates (NO₃) - mg/l

Single Value..... not more than 5.0

Total Dissolved Solids - mg/l

Annual Average..... not more than 225
Single Value..... not more than 275

Taste and Odor

Free from materials, from other than natural origin, which produce objectionable test or odor in the water or in the flesh of fish.

Turbidity and Color

No turbidity or color, from other than natural origin, which will adversely affect the natural appearance of the water.

Oil

Free of visible floating oil

Floating Solids and Debris

Free of floating solids and debris from other than natural origin.

Bottom Deposits

Substantially free of sludge bands and debris from other than natural origin.

Miscellaneous Contaminants and Radionuclides

Shall not be present in concentrations, from other than natural origin, which are deleterious to animal, plant, or aquatic life or which exceed the PHS 1962 Drinking Water Standards.

Table 3. Table 37 Water Quality Standards Bronco Creek from the State of Nevada Division of Health Water Pollution Control Regulations (Nevada, 1973).

Table 37
WATER QUALITY STANDARDS
Bronco Creek

Control Point: At Hirschdale Road.

Temperature °C

Average (June through September).....	not more than 20
Single Value, Summer.....	not more than 25
Single Value, Winter.....	not more than 13

pH Units

Annual Median.....	within range 7.0-8.5
Single Value.....	within range 6.5-8.5

Dissolved Oxygen - mg/l

Average (June through September).....	not less than 7.0
Single Value.....	not less than 6.0

Chlorides - mg/l

Single Value.....	not more than 15
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Phosphates (PO₄) - mg/l

Annual Average.....	not more than 0.3
Single Value.....	not more than 0.4

Nitrates (NO₃) - mg/l

Single Value.....	not more than 2.0
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Total Dissolved Solids - mg/l

Annual Average.....	not more than 225
Single Value.....	not more than 300

Taste and Odor

Free from materials from other than natural origin which produce objectionable test and odor in the water or in the flesh of fish.

Oil

Free of visible floating oil

Floating Solids and Debris

Free of floating solids or debris from other than natural origin.

Bottom Deposits

Substantially free of sludge bands and debris from other than natural origin.

Miscellaneous Contaminants

Shall not be present in concentrations, from other than natural origin, which are deleterious to animal, plant or aquatic life or which exceed the USPHS 1962 Drinking Water Standards.

Radioactivity

The concentration of radioactivity in water shall not:

1. Exceed $1/30^{\text{th}}$ of the MPC_w values given for continuous occupational exposure in National Bureau of standards Handbook No. 69.
2. Exceed the Public Health Service Drinking Water Standards for waters used for domestic supplies.
3. Results in accumulations of radioactivity in edible plants and animals that present a hazard to consumers.
4. Be harmful to aquatic life.

Since any human exposure to ionizing radiation is undesirable, the concentration of radioactivity in natural waters will be maintained at the lowest practicable level.

Color

Color shall not exceed that characteristic of natural conditions by more than 10 units Platinum Cobalt Scale.

Turbidity

Turbidity shall not exceed that characteristic of natural conditions by more than 10 Jackson Units.

Fecal Coliform

The annual geometric mean of fecal coliforms shall not exceed that characteristic of natural conditions by more than 200/100 ml.

The number of fecal coliforms in a single sample shall not exceed that characteristic of natural conditions by more than 400/100 ml.

Table 4. Table 38 Water Quality Standards Gray Creek from the State of Nevada Division of Health Water Pollution Control Regulations (Nevada, 1973).

TABLE 38
WATER QUALITY STANDARDS
Gray Creek

Control Point: At Hirschdale Road.

Temperature °C

Average (June through September).....	not more than 20
Single Value, Summer.....	not more than 25
Single Value, Winter.....	not more than 13

pH Units

Annual Median.....	within range 7.0-8.5
Single Value.....	within range 6.5-8.5

Dissolved Oxygen - mg/l

Average (June through September).....	not less than 8.0
Single Value.....	not less than 7.0

Chlorides - mg/l

Single Value.....	not more than 10.0
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Phosphates (PO₄) - mg/l

Annual Average.....	not more than 0.3
Single Value.....	not more than 0.4

Nitrates (NO₃) - mg/l

Single Value.....	not more than 3.0
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Total Dissolved Solids - mg/l

Annual Average.....	not more than 125.0
Single Value.....	not more than 165.0

Taste and Odor

Free from materials from other than natural origin which produce objectionable test and odor in the water or in the flesh of fish.

Oil

Free of visible floating oil

Floating Solids and Debris

Free of floating solids or debris from other than natural origin.

Bottom Deposits

Substantially free of sludge bands and debris from other than natural origin.

Miscellaneous Contaminants

Shall not be present in concentrations, from other than natural origin, which are deleterious to animal, plant or aquatic life or which exceed the USPHS 1962 Drinking Water Standards.

Radioactivity

The concentration of radioactivity in water shall not:

5. Exceed $1/30^{\text{th}}$ of the MPC_w values given for continuous occupational exposure in National Bureau of standards Handbook No. 69.
6. Exceed the Public Health Service Drinking Water Standards for waters used for domestic supplies.
7. Results in accumulations of radioactivity in edible plants and animals that present a hazard to consumers.
8. Be harmful to aquatic life.

Since any human exposure to ionizing radiation is undesirable, the concentration of radioactivity in natural waters will be maintained at the lowest practicable level.

Color

Color shall not exceed that characteristic of natural conditions by more than 10 units Platinum Cobalt Scale.

Turbidity

Turbidity shall not exceed that characteristic of natural conditions by more than 10 Jackson Units.

Fecal Coliform

The annual geometric mean of fecal coliforms shall not exceed that characteristic of natural conditions by more than 200/100 ml.

The number of fecal coliforms in a single sample shall not exceed that characteristic of natural conditions by more than 400/100 ml.

Reaches

Smoke Creek flows out of California from the Smoke Creek Reservoir and drains into the Smoke Creek Desert. It is part of the Black Rock Desert Hydrographic Region and is located in Washoe County approximately 30 miles east of Susanville, California. The U.S. Geological Survey operates a water-stage recorder gage (10353800) on this creek. Smoke Creek is considered a warm water fishery (Tisdale, 2009). Smoke Creek Standards are in NAC 445A.180.

Bronco Creek flows from its headwaters in Nevada and crosses the state line into California and drains into the Truckee River. It is part of the Truckee River Basin and is located in Washoe County. The U.S. Geological Survey operated a water-stage recorder gage (10345700) in the 1990's on this creek. Bronco Creek is considered a cold water fishery (NDOW, n.d.; LRWQCB, 1995). Bronco Creek's Standards are in NAC 445A.181 which apply from its headwaters to the Nevada state line.

Gray Creek flows from its headwaters in Nevada and crosses the state line into California and drains into the Truckee River. It is part of the Truckee River Basin and is located in Washoe County. The U.S. Geological Survey operates a water-stage recorder gage (10345490) on this creek. Gray Creek is considered a cold water fishery (NDOW, n.d.; LRWQCB, 1995). Gray Creek's Standards are in NAC 445A.182 which apply from its headwaters to the Nevada state line.

State of California Regional Water Quality Control Board Lahontan Region Water Quality Objectives

As stated previously, Bronco, Gray, and Smoke Creeks are interstate waters of California and Nevada. California's Uses and narrative and numerical objectives are outlined in the State of California Regional Water Quality Control Board Lahontan Region (Region) "Water Quality Control Plan for The Lahontan Region North and South Basins". For additional information on this plan go to:

http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

Designated Beneficial Uses

Table 5 lists the Region's current Uses for Bronco, Gray, and Smoke Creeks and Smoke Creek Reservoir. Table 6 lists the Region's current Uses and Nevada's equivalent Uses.

Table 5. State of California Regional Water Quality Control Board Lahontan Region designated beneficial uses for Bronco, Gray, and Smoke Creeks and Smoke Creek Reservoir (LRWQCB, 1995).

Lahontan Region Beneficial Uses	Bronco Creek	Gray Creek	Smoke Creek	Smoke Creek Reservoir
Agricultural Supply	X	X	X	X
Agricultural Supply	X	X	X	X
Cold Freshwater Habitat	X	X	X	X
Commercial and Sportfishing	X	X	X	X
Ground Water Recharge	X	X	X	X
Industrial Service Supply				X
Municipal and Domestic Supply	X	X	X	X
Rare, Threatened, or Endangered Species	X	X	X	
Water Contact Recreation	X	X	X	X
Non-Contact Water Recreation	X	X	X	X
Spawning, Reproduction, and Development	X	X	X	
Warm Freshwater Habitat				
Wildlife Habitat	X	X	X	X

Table 6. State of California Regional Water Quality Control Board Lahontan Region designated beneficial uses for Bronco, Gray, and Smoke Creeks and Smoke Creek Reservoir and Nevada’s Equivalent designated beneficial uses.

Lahontan Region Beneficial Uses	Nevada Equivalent Beneficial Uses
Agricultural Supply	Irrigation
Agricultural Supply	Watering of Livestock
Cold Freshwater Habitat	Aquatic Life - Cold
Commercial and Sportfishing	Aquatic Life - Cold/Warm
Ground Water Recharge	None
Industrial Service Supply	Industrial Supply
Municipal and Domestic Supply	Municipal or domestic Supply
Rare, Threatened, or Endangered Species	Aquatic Life - Cold/Warm
Water Contact Recreation	Water Contact Recreation
Non-Contact Water Recreation	Non-Contact Water Recreation
Spawning, Reproduction, and Development	Aquatic Life - Cold/Warm
Warm Freshwater Habitat	Aquatic Life - Warm
Wildlife Habitat	Propagation of Wildlife

Water Quality Objectives

The Region has two types of Objectives. There are Objectives that apply to all surface waters within the Lahontan Region and objectives that apply to specific hydrologic units/areas watersheds, or water bodies within the Lahontan Region. The all surface waters Objectives apply to Smoke Creek and Smoke Creek Reservoir. Bronco and Gray Creeks are part of the Truckee River Hydrologic Unit (Truckee Unit) and those specific objectives apply along with the all surface water Objectives that are not listed under the Truckee Unit.

Below is a list of the numeric Objectives that are comparable to Nevada’s Standards.

All Surface Water Objectives

Bacteria, Coliform, Chemical Constituents for Municipal and Domestic Supply – (Chloride, Nitrate as NO₃, Sulfate, Total Dissolved Solids), Color, Dissolved Oxygen, pH, Temperature, Turbidity.

Truckee River Hydrologic Unit Objectives

Chloride, Color, Dissolved Oxygen, Nitrate as N, pH, Phosphorous, Total Dissolved Solids, Turbidity.

Water Quality Monitoring and Data

Smoke Creek

Water quality monitoring began in 1966 on Smoke Creek with annual sampling until the mid 70’s then sporadically until 1986. From 2004 through 2006 the creek was sampled semi-annually and then quarterly from 2007 to present. There are a total of 30 sampling events with 44 samples to date.

Bronco and Gray Creeks

Water quality monitoring began in 1967 on Bronco Creek and 1968 on Gray Creek. Both creeks were intensely sampled in 1970 and 1971 then sporadically until 1991. Starting in 2005, the creeks were

sampled quarterly until the 3rd quarter of 2009 when sampling was discontinued. There are a total of 49 sampling events and 49 samples on each creek.

For more sampling information or to request the data please contact Bureau of Water Quality Planning at 775-687-9444.

Smoke Creek - Discussion of Proposed Revisions and Water Quality Data

Smoke Creek's Standards are of unknown origin. There was no documentation found as to how the Standards were established. Only one sample was taken prior to establishment of the Standards and the Standards have never been reviewed. There are also no Uses within its table. It is proposed to set Uses and use the most current recommended Criteria for the Smoke Creek Standards, except for the single value temperature standard. In the near future, temperature Standards are going to be reviewed statewide and the temperature Criteria will be revised at that point. Table 7 is the proposed Uses and Criteria in the new NAC table format. Followed by a detailed description of how the Standards Criteria were determined.

Table 7. Proposed water quality standards table for Smoke Creek.

NAC 180 (1286). The limits of this table apply to the body of water known as Smoke Creek from the Nevada State line to the Smoke Creek Desert. Smoke Creek is located in Washoe County.

STANDARDS OF WATER QUALITY

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use ^a												
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh		
Beneficial Uses			X	X	X	X	X				X				
Aquatic Life Species of Concern															
Temperature - °C		S.V. Summer ≤ 25.0 S.V. Winter ≤ 14.0			*	X									
pH - SU		S.V. 6.5 - 9	X	X	*	*					*				
Total Phosphorus (as P) - mg/l		^b			*	*	X								
Nitrogen Species (as N) - mg/l		Nitrate S.V. ≤ 90	X		*						X				
		Nitrite S.V. ≤ 5	X		*						X				
		Total Nitrogen ^b			*	*									
Dissolved Oxygen - mg/l		S.V. ≥ 5.0	X		*	X	X				X				
Turbidity - NTU		S.V. ≤ 50			*										
Total Dissolved Solids - mg/l		S.V. ≤ 1000	X	*											
Chloride - mg/l		S.V. ≤ 1500	*								*				
Fecal Coliform - No./100 ml		S.V. ≤ 1000	*	*			X				*				
E Coli –No./100 ml		AGM ≤ 126 S.V. ≤ 410				*	X								
Total Ammonia (as N) - mg/l		^c			*										

* = The most restrictive beneficial use.

X = Beneficial use.

^a Refer to NAC 445A.122 and section 11 of this regulation for beneficial use terminology.

^b Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.

^c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

Reach Description

Proposed Action and Rationale for Action

It is proposed to add the reach description “The limits of this table apply to the body of water known as Smoke Creek from the Nevada State line to the Smoke Creek Desert. Smoke Creek is located in Washoe County.”

The current reach description for this waterbody is “Approximately 30 miles east of Susanville, California.” This reach description is a general reference to where the creek is located and is not an adequate description of where the Standards apply.

Designated Beneficial Uses

Proposed Action Rationale for Action

In 1967, Uses and Criteria were assigned to all interstate waterbodies. Smoke Creek’s Uses were Esthetics and Irrigation & Stock Watering. Uses were not carried through to the 1973 Standards revisions and only listed in the 1975 amendments. Beneficial uses were assigned to waterbody tables during the Standards reviews of the 1980’s and 1990’s, except for Smoke, Bronco, and Gray Creeks which were never reviewed since their inception.

It is proposed to assign the following uses to Smoke Creek:

- Watering of Livestock
- Irrigation
- Aquatic Life
- Water Contact Recreation
- Water Non-Contact Recreation
- Propigation of Wildlife

Watering of Livestock is proposed due to cattle grazing and signs of grazing along the entire waterbody.

Irrigation is proposed due to there being irrigated fields below the Reservoir. Also, land near the USGS gage, after the creek comes out of the canyon area, has been cleared for irrigation and irrigation equipment can be seen in this field.

Aquatic Life is proposed due to warm water aquatic life in the creek.

Water Contact recreation is proposed due to the potential swimming in and the ingestion of water.

Water Non-Contact Recreation is proposed due to the potential for non-contact recreation such as fishing and hiking.

Propigation of Wildlife is proposed due to wildlife making use of the creek.

The Uses Municipal or domestic Supply and Industrial Supply are not proposed for Smoke Creek.

Smoke Creek is in rural Washoe County with the only human development in the vicinity being the Smoke Creek Ranch. The Ranch has a domestic well with no hydrologic connection to the creek. The

well is 125' deep. The lithology shows clay to 105' and black basalt from 105' to 125'. The screen starts at 105' in the black basalt. The clay acts as a barrier between the creek and the basalt so there is no hydrologic connection to creek.

Municipal or Domestic Supply and Industrial Supply are not being proposed as Uses for several reasons. These two Uses were not designated in the 1967 Plan as Uses for Smoke Creek. There is no industry along the creek to prompt the industrial supply use and Smoke Creek is not being used as a municipal or domestic supply source.

Water Quality Criteria

Proposed Action and Rationale for Action

Smoke Creek's Standards were created from one sampling event in 1966. The 1967 Plan stated that the Standards were established using a limited amount of data. There was no documentation found that explained how the Standards and revisions to the Standards were established.

It is proposed to establish Standards from the most current EPA recommended criteria except for Temperature. In the near future, Temperature Standards are going to be reviewed for the entire state and at that point the Temperature Standard will be addressed.

Temperature

Proposed Action and Rationale for Action

It is proposed to remove the $\Delta T \leq 3$ from the temperature Standard. The ΔT Standard is set for the maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the single value standard. This Standard is for discharges to the waterbody that need a National Pollution Discharge Elimination System (NPDES) permit. There are no NPDES permits on Smoke Creek and no industry has been built in the vicinity that could potentially require a permit.

pH

Proposed Action and Rationale for Action

It is proposed to set the pH Criteria to a single value of 6.5 to 9.0 SU. The most recent EPA Criteria recommends a pH of 6.5 – 9.0 SU for protection of aquatic life. This range appears to provide adequate protection for freshwater fish and bottom dwelling invertebrates (USEPA, 1986). This Criteria also protects for irrigation, watering of livestock, water contact recreation, and propagation of wildlife Uses.

Discussion of pH Data

There are 34 pH samples ranging from 7.7 to 9.51. Three of the samples exceed the 9.0 upper limit for a 9% exceedance of the proposed Criteria.

Total Phosphorous

Proposed Action and Rationale for Action

It is proposed to change the name of the parameter to Total Phosphorous (as P) and add the narrative criteria “Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.” This Criteria protects for the Uses aquatic life, water contact recreation and water non-contact recreation. The rationale for this narrative is in Appendix A.

The data received from the analyzing laboratories for this parameter are in Total Phosphorous as P instead of as PO₄. The name change is also consistent with what is in the other Standards tables within the NAC.

Discussion of Total Phosphorous Data

There are 44 Total Phosphorous samples ranging from 0.08 to 23.38.

Nitrogen Species – Nitrate, Nitrite and Total Nitrogen

Proposed Action and Rationale for Action

It is proposed to change the name of the parameter to Nitrogen Species (as N) and add Nitrate, Nitrite and Total Nitrogen criteria under the Water Quality Standards for Beneficial Uses column. The data received from the analyzing laboratories for this parameter are expressed in as N. The name change is also consistent with what is in the other Standards tables within the NAC.

Nitrate

It is proposed to set the Nitrate criteria to a single value of 90 mg/l.

The most recent EPA Criteria recommends a Nitrate value of 90 mg/l for protection of aquatic life for warm water fish without significant effect upon their growth and feeding activities (USEPA, 1986). This Criteria also protects for watering of livestock and propagation of wildlife Uses.

Discussion of Nitrate Data

There are 43 Nitrate samples ranging from < 0.09 to 1.56. No samples exceeded the proposed criteria.

Nitrite

It is proposed to set the Nitrite criteria to a single value of 5 mg/l.

The most recent EPA Criteria recommends a Nitrite value of 5 mg/l for protection of aquatic life to be protective of most warm water fish (USEPA, 1986). This Criteria also protects for watering of livestock and propagation of wildlife Uses.

Discussion of Nitrite Data

Smoke Creek has 39 Nitrite samples ranging from < 0.01 to 0.03. No samples exceeded the proposed criteria.

Total Nitrogen

It is proposed to add the narrative criteria “Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.” This criteria protects for aquatic life and water contact recreation Uses. The rationale for this narrative is in Appendix A.

Discussion of Total Nitrogen Data

Smoke Creek has 39 Total Nitrogen samples ranging from 0.2 to 2.7.

Dissolved Oxygen

Proposed Action and Rationale for Action

It is proposed to set the Dissolved Oxygen Criteria to a single value of 5.0 mg/l. The most recent EPA Criteria recommends a Dissolved Oxygen value of 5.0 mg/l for protection of aquatic life for warm water fish early life stages (USEPA, 1986). This Criteria also protects for watering of livestock, water contact recreation, water non-contact recreation, and propagation of wildlife Uses.

Discussion of Dissolved Oxygen Data

There are 42 Dissolved Oxygen samples ranging from 2.5 to 22.74. Three of the samples exceed the 5.0 for a 7% exceedance of the proposed Criteria.

Turbidity

Proposed Action and Rationale for Action

It is proposed to change the units from Jackson Units (JU) to Nephelometric Turbidity Units (NTU) and set the Turbidity Criteria to a single value of 50 NTU. The data received from the analyzing laboratories for this parameter is in NTU, this unit of measure is consistent with what is in the other Nevada Standards tables within the NAC. The 1968 Report of the Commission on Water Quality Criteria recommends a Turbidity value of 50 NTU for protection of warm water aquatic life. This value protects against sediment filling in the interstices between gravel and stones which eliminate the spawning grounds of fish and the habitat of many aquatic insects and other invertebrate animals such as mollusks, crayfish, fresh water shrimp, etc (FWPCA, 1968).

Discussion of Turbidity Data

There are 42 Turbidity samples ranging from 0 to 110. Eleven of the samples exceed the 50 for a 26% exceedance of the proposed Criteria.

Total Dissolved Solids

Proposed Action and Rationale for Action

It is proposed to set the Total Dissolved Solids (TDS) Criteria to a single value of 1000 mg/l. The most recent EPA Criteria recommends a TDS value of 1000 mg/l for protection of irrigation water which can

have detrimental effects on sensitive crops in arid and semiarid areas (USEPA, 1986). This Criteria also protects for the Use watering of livestock.

Discussion of Total Dissolved Solids

There are 44 TDS samples ranging from 19.1 to 541. No samples exceeded the proposed criteria.

Chloride

Proposed Action and Rationale for Action

It is proposed to set the Chloride Criteria to a single value of 1500 mg/l. The 1963 California, Water Quality Criteria recommends a Chloride value of 1500 mg/l for protection of watering of livestock. This value appears to provide adequate protection for cattle, sheep, swine, and chickens (McKee and Wolf, 1963). This Criteria also protects for the Use propagation of wildlife.

Discussion of Chloride Data

There are 44 Chloride samples ranging from 1 to 34. No samples exceeded the proposed Criteria.

Fecal Coliform

Proposed Action and Rationale for Action

It is proposed to set the Fecal Coliform Criteria to a single value of 1000 No./100 ml. The 1972 National Academy of Sciences and National Academy of Engineering, Water Quality Criteria recommends a Fecal Coliform value of 1000 No./100 ml for protection of irrigation. This value appears to provide adequate protection so that no hazards to animals or man result from their use or from consumption of raw crops irrigated with such waters (NASNAE, 1973). This Criteria also protects for watering of livestock, water non-contact recreation, and propagation of wildlife Uses.

Discussion of Fecal Coliform Data

There are 33 Fecal Coliform samples ranging from <10 to > 600. No samples exceeded the proposed Criteria.

E Coli

Proposed Action and Rationale for Action

It is proposed to add the E Coli Criteria of an annual geometric mean (AGM) of 126 No./100 ml and a single value (SV) of 410 No./100 ml. The most recent EPA implementation guidance criteria for bacteria recommends E Coli values of AGM 126 No./100 ml and a SV of 410 No./100 ml for protection of water contact recreation. These values appears to provide adequate protection for the risk level of 8% (8 illness per 1000 swimmers) and the 90th percentile (lightly used full body contact recreation)(USEPA, 2004). The SV of 410 No./100 ml is consistent with what is in the other Nevada Standards tables within the NAC. This Criteria also protects the Use water non-contact recreation.

Discussion of E Coli Data

There are 29 E Coli samples ranging from < 10 to 17329. One AGM exceeded the 126 and 6 SV samples exceeded the 410 for a 21% exceedance of the proposed SV Criteria.

Total Ammonia

Proposed Action and Rationale for Action

It is proposed to add Total Ammonia Criteria specified in NAC 445A.118. The most recent EPA Criteria update recommends an acute water quality criteria for total ammonia for freshwater aquatic life, a chronic water quality criteria for total ammonia for waters where freshwater fish in early life stages may be present, and a chronic water quality criteria for total ammonia for water where freshwater fish in early life stages are absent for protection of aquatic life which are specified in NAC 445A.118 (USEPA, 1999).

Discussion of Total Ammonia Data

There are 33 Total Ammonia samples ranging from < 0.1 to 0.4. No samples exceeded the proposed Criteria.

Biochemical Oxygen Demand (BOD)

Proposed Action and Rationale for Action

It is proposed to remove the BOD Criteria from the Standards table. In 1967, BOD Criteria was set on all of Nevada's Standard Tables where numeric Standards were established. There is no documentation as to why or how BOD values were established. BOD was discussed in the 1968 and 1972 Federal Water Quality Criteria books, but no recommendations were given and there has been no mention of BOD in the EPA Criteria recommendations since 1972. This parameter is being deleted since it is not directly related to a Use. During the Standards reviews of the 1980's and 1990's BOD was systematically removed from other Nevada waters. BOD's effect may cause a problem attaining the DO Standard, therefore, discharges of BOD are regulated through NPDES Permits as outlined in the NPDES Permit Writers Manual (USEPA, 1996).

Discussion of BOD Data

There are 17 BOD samples ranging from 0 to 9. Four of the samples exceed the 5 for a 24% exceedance of the current Criteria.

Color

Proposed Action and Rationale for Action

It is proposed to remove the Color Criteria from the Standards table. Color is a parameter that is set for the municipal or domestic supply Use. It is an important constituent in terms of aesthetic considerations. Municipal or domestic supply is not a proposed Use for Smoke Creek and thus color is not a valid parameter.

Discussion of Color Data

There are 44 Color samples ranging from 0 to 200. The current Standard is "Color shall not exceed that characteristic of natural conditions by more than 10 units Platinum Cobalt Scale." Due to Smoke Creek

being highly modified by anthropogenic sources, including the construction of Smoke Creek Reservoir, natural conditions cannot be established to evaluate the current Standard.

Bronco and Gray Creek - Discussion of Proposed Revisions and Water Quality Data

Bronco and Gray Creek’s Standards are of unknown origin. There was no documentation found as to how the Standards were established. The 1968 Federal Water Quality Criteria was published before the creeks numeric Standards were established in 1973, but these Criteria were not consistent with the Standards established for Bronco and Gray Creeks. Each creek was sampled 25 times before their numeric Standards were established, though not all parameters were analyzed each time. Bronco and Gray Creek Standards have never been reviewed. There are also no Uses within their tables. It is proposed to set Uses and use the most current recommended Criteria for the Bronco and Gray Creeks Standards, except for the single value temperature standard. In the near future, temperature Standards are going to be reviewed statewide and the temperature Criteria will be revised at that point. Table 8 and 9 are the proposed Uses and Criteria for Bronco and Gray Creeks, respectively, in the new NAC table format. Followed by a detailed description of how the Standards Criteria were determined.

Table 8. Proposed water quality standards table for Bronco Creek.

NAC 445A.181 (445A.1698). The limits of this table apply to the body of water known as Bronco Creek from its origin to the Nevada State Line. Bronco Creek is located in Washoe County.

STANDARDS OF WATER QUALITY

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use ^a													
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh			
Beneficial Uses			X	X	X	X	X	X	X	X	X					
Aquatic Life Species of Concern																
Temperature - °C		Avg. Jun-Sep ≤ 20.0 S.V. Summer ≤ 25.0 S.V. Winter ≤ 13.0			*	X										
pH – SU		S.V. 6.5 - 9	X	X	*	*			X	X	*					
Total Phosphorus (as P) - mg/l		^b			*	*	X	X								
Nitrogen Species (as N) - mg/l		Nitrate S.V. ≤ 10	X				*		X							
		Nitrite S.V. ≤ 0.06	X		*		X		X							
		Total Nitrogen ^b			*	*										
Dissolved Oxygen - mg/l		S.V. ≥ 6.0	X		*	X	X	X		X						
Turbidity - NTU		S.V. ≤ 10			*											
Color - PCU		S.V. ≤ 75							*							
Total Dissolved Solids - mg/l		S.V. ≤ 500	X	X					*							
Chloride - mg/l		S.V. ≤ 250	X						*		X					
Sulfate - mg/l		S.V. ≤ 250							*							
Fecal Coliform - No./100 ml		S.V. ≤ 1000	*	*				X	X		*					
E Coli - No./100 ml		AGM ≤ 126 S.V. ≤ 410				*	X									
Total Ammonia (as N) - mg/l		^c			*											

* = The most restrictive beneficial use.

X = Beneficial use.

^a Refer to NAC 445A.122 and section 121 of this regulation for beneficial use terminology.

^b Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.

^c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

Table 9. Proposed water quality standards table for Gray Creek.

NAC 445A.182 (445A.1702). The limits of this table apply to the body of water known as Gray Creek from its origin to the Nevada State Line. Gray Creek is located in Washoe County.

STANDARDS OF WATER QUALITY

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use ^a														
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh				
Beneficial Uses			X	X	X	X	X	X	X	X	X						
Aquatic Life Species of Concern																	
Temperature - °C		Avg. Jun-Sep ≤ 20.0 S.V. Summer ≤ 25.0 S.V. Winter ≤ 13.0			*	X											
pH - SU		S.V. 6.5 - 9	X	X	*	*			X	X	*						
Total Phosphorus (as P) - mg/l		^b			*	*	X	X									
Nitrogen Species (as N) - mg/l		Nitrate S.V. ≤ 10	X				*		X								
		Nitrite S.V. ≤ 0.06	X		*		X		X								
		Total Nitrogen ^b			*	*											
Dissolved Oxygen - mg/l		S.V. ≥ 6.0	X		*	X	X	X			X						
Turbidity - NTU		S.V. ≤ 10			*												
Color - PCU		S.V. ≤ 75						*									
Total Dissolved Solids - mg/l		S.V. ≤ 500	X	X				*									
Chloride - mg/l		S.V. ≤ 250	X					*			X						
Sulfate - mg/l		S.V. ≤ 250						*									
Fecal Coliform - No./100 ml		S.V. ≤ 1000	*	*			X	X			*						
E Coli - No./100 ml		AGM ≤ 126 S.V. ≤ 410				*	X										
Total Ammonia (as N) - mg/l		^c			*												

* = The most restrictive beneficial use.

X = Beneficial use.

^a Refer to NAC 445A.122 and section 121 of this regulation for beneficial use terminology.

^b Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.

^c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

Reach Description

Proposed Action and Rationale for Action

It is proposed to add to the Bronco Creek NAC table the reach description “The limits of this table apply to the body of water known as Bronco Creek from its origin to the Nevada State Line. Bronco Creek is located in Washoe County.” and to the Gray Creek NAC table the reach description “The limits of this table apply to the body of water known as Gray Creek from its origin to the Nevada State Line. Gray Creek is located in Washoe County.”

Currently, there is no reach description for either creek.

Designated Beneficial Uses

Proposed Action and Rationale for Action

In 1967, Uses and Criteria were assigned to all interstate waterbodies. Bronco and Gray Creek’s uses were Municipal Water, Fish and Wildlife, and Esthetics. Uses were not carried through to the 1973 Standards revisions and only listed in the 1975 amendments. Beneficial uses were assigned to waterbody tables during the Standards reviews of the 1980’s and 1990’s, except for Smoke, Bronco, and Gray Creeks which were never reviewed since their inception.

It is proposed to assign the following uses to Bronco and Gray Creeks:

- Watering of Livestock
- Irrigation
- Aquatic Life
- Water Contact Recreation
- Water Non-Contact Recreation
- Municipal or Domestic Supply
- Industrial Supply
- Propigation of Wildlife

Watering of Livestock is proposed due to this being a use in the Nevada state line table NAC 445A.184 and California has Agricultural Supply as a Use.

Irrigation is proposed due to this being a use in the Nevada state line table NAC 445A.184 and California has Agricultural Supply as a Use.

Aquatic Life is proposed due to cold water aquatic life in the creek.

Water Contact recreation is proposed due to the potential swimming in and the ingestion of water.

Water Non-Contact Recreation is proposed due to the potential for non-contact recreation such as fishing and hiking.

Municipal or Domestic Supply is proposed so it will be consistent with Nevada’s Truckee River @ state line Use in table NAC 445A.184 and California’s Municipal and Domestic Supply Use.

Industrial Supply is proposed so it will be consistent with Nevada's Truckee River @ state line Use in table NAC 445A.184 and California's Industrial Service Supply Use.

Propagation of Wildlife is proposed due to wildlife making use of the creek.

Water Quality Criteria

Proposed Action and Rationale for Action

Bronco and Gray Creek's numeric Standards were established in 1973 after the 1968 Federal Water Quality Criteria was published, but the federal criteria were not consistent with the Standards established for Bronco and Gray Creeks. There was no documentation found that explained how the Standards and revisions to the Standards were established.

It is proposed to establish Standards from the most current EPA recommended Criteria except for Temperature, SV and Bronco Creek's SV Dissolved Oxygen Standards. In the near future, temperature Standards are going to be reviewed for the entire state and at that point the Temperature Standard will be addressed.

Note that each proposed action is for both Bronco and Gray Creek, except for Dissolved Oxygen.

Temperature

Proposed Action and Rationale for Action

It is proposed to removed the $\Delta T = 0$ from the temperature Standard. The ΔT standard is set for the maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the single value standard. This Standard is for discharges to the waterbody that need a NPDES permit. There are no NPDES permits on Bronco or Gray Creeks and no industry has been built in the vicinity that could potentially require a permit.

pH

Proposed Action and Rationale for Action

It is proposed to set the pH criteria to a single value of 6.5 to 9.0 SU. The most recent EPA criteria recommends a pH of 6.5 – 9.0 SU for protection of aquatic life. This range appears to provide adequate protection for freshwater fish and bottom dwelling invertebrates (USEPA, 1986). This criteria also protects for irrigation, watering of livestock, water contact recreation, municipal or domestic supply, industrial supply, and propagation of wildlife Uses.

Discussion of pH Data

Bronco Creek has 43 pH samples ranging from 7.25 to 8.47. No samples exceeded the proposed criteria.

Gray Creek has 44 pH samples ranging from 5.7 to 8.73. One of the samples exceeds the 6.5 lower limit for a 2% exceedance of the proposed criteria.

Total Phosphorous

Proposed Action and Rationale for Action

It is proposed to change the name of the parameter to Total Phosphorous (as P) and add the narrative criteria “Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.” The rationale for this narrative is in Appendix A.

The data received from the analyzing laboratories for this parameter are in Total Phosphorous as P instead of as PO₄. The name change is also consistent with what is in the other Standards tables within the NAC.

This criteria protects for aquatic life, water contact recreation, water non-contact recreation, and municipal or domestic supply.

Discussion of Total Phosphorous Data

Bronco Creek has 25 Total Phosphorous samples ranging from 0.03 to 0.17.

Gray Creek has 25 Total Phosphorous samples ranging from 0.02 to 0.14.

Nitrogen Species – Nitrate, Nitrite and Total Nitrogen

Proposed Action and Rationale for Action

It is proposed to change the name of the parameter to Nitrogen Species (as N) and add Nitrate, Nitrite and Total Nitrogen criteria under the water quality standards for beneficial uses column. The data received from the analyzing laboratories for this parameter are in expressed in as N. The name change is also consistent with what is in the other Standards tables within the NAC.

Nitrate

It is proposed to set the Nitrate criteria to a single value of 10 mg/l.

The most recent EPA criteria recommends a Nitrate value of 10 mg/l for protection of municipal or domestic supply because of the potential risk of methemoglobinemia to bottle-fed infants, and in view of the absence of substantiated physiological effects of nitrate concentrations below the proposed criteria (USEPA, 1986). This criteria also protects for watering of livestock and propagation of wildlife Uses.

Discussion of Nitrate Data

Bronco Creek has 28 Nitrate samples ranging from <0.002 to <0.1. No samples exceeded the proposed criteria.

Gray Creek has 28 Nitrate samples ranging from 0 to < 0.5. No samples exceeded the proposed criteria.

Nitrite

It is proposed to add the Nitrite criteria of 0.06 mg/l.

The most recent EPA criteria recommends a Nitrite value of 0.06 mg/l for protection of aquatic life to be protective of salmonid fishes (USEPA, 1986). This criteria also protects for watering of livestock, municipal or domestic supply and propagation of wildlife Uses.

Discussion of Nitrate Data

Bronco Creek has 19 Nitrite samples each a non-detect of < 0.01. No samples exceeded the proposed criteria.

Gray Creek has 19 Nitrite samples ranging from < 0.01 to 0.01. No samples exceeded the proposed criteria.

Total Nitrogen

It is proposed to add the narrative criteria “Waters shall be free from nutrient concentrations from other than natural source that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.” This criteria protects for aquatic life and water contact recreation Uses. The rationale for this narrative is in Appendix A.

Discussion of Total Nitrogen Data

Bronco Creek has 19 Total Nitrogen samples ranging from 0 to 0.4.

Gray Creek has 19 Total Nitrogen samples ranging from 0 to 0.4.

Dissolved Oxygen

Proposed Action and Rationale for Action

It is proposed to set Gray Creek’s Dissolved Oxygen criteria to 6 mg/l. This criteria is consistent with what is established for the Nevada portion of the Truckee River and all other Nevadan cold water aquatic life waters. This criteria also protects for watering of livestock, water contact recreation, water non-contact recreation, and propagation of wildlife.

There are no proposed changes to the Dissolved Oxygen Standard for Bronco Creek.

Discussion of Dissolved Oxygen Data

Bronco Creek has 26 Dissolved Oxygen samples ranging from 7.3 to 11.8. No samples exceeded the criteria.

Gray Creek has 25 Dissolved Oxygen samples ranging from 7.2 to 13.06. No samples exceeded the proposed criteria.

Turbidity

Proposed Action and Rationale for Action

It is proposed to change the units from Jackson Units (JU) to Nephelometric Turbidity Units (NTU) and set the Turbidity criteria to a single value of 10 NTU. The data received from the analyzing laboratories for this parameter is in NTU and is also consistent with what is in the other Standards tables within the NAC.

The 1968 Report of the Commission on Water Quality Criteria recommends a Turbidity value of 10 NTU for protection of aquatic life. This value protects against sediment filling in the interstices between gravel and stones which eliminate the spawning grounds of fish and the habitat of many aquatic insects and other invertebrate animals such as mollusks, crayfish, fresh water shrimp, etc (FWPCA, 1968).

Discussion of Turbidity Data

Bronco Creek has 26 Turbidity samples ranging from 0.22 to 5. No samples exceeded the proposed criteria.

Gray Creek has 26 Turbidity samples ranging from 0.36 to 24. One of the samples exceeds the 10 for a 4% exceedance of the proposed criteria.

Color

Proposed Action and Rationale for Action

It is proposed to set the Color criteria to a single value of 75 PCU. The most recent EPA criteria recommends a Color value of 75 PCU for protection of municipal or domestic supply. It is an important constituent in terms of aesthetic considerations (USEPA, 1986).

Discussion of Color

Bronco Creek has 27 Color samples ranging from < 3 to 100. One of the samples exceeds the 75 for a 4% exceedance of the proposed criteria.

Gray Creek has 27 Color samples ranging from 0 to 17. No samples exceeded the proposed criteria.

Total Dissolved Solids

Proposed Action and Rationale for Action

It is proposed to set the Total Dissolved Solids (TDS) criteria to a single value of 500 mg/l. The most recent EPA criteria recommends a TDS value of 500 mg/l for protection of municipal or domestic supply (USEPA, 1986). High TDS are objectionable because of physiological effects, mineral taste, or economic effect (FWPCA, 1968). This criteria also protects for the irrigation and watering of livestock Uses.

Discussion of Total Dissolved Solids

Bronco Creek has 44 TDS samples ranging from 14 to 190. No samples exceeded the proposed criteria.

Gray Creek has 44 TDS samples ranging from 11 to 155.52. No samples exceeded the proposed criteria.

Chloride

Proposed Action and Rationale for Action

It is proposed to set the Chloride criteria to a single value of 250 mg/l. The 1986 EPA criteria recommends a Chloride value of 250 mg/l for protection of municipal or domestic supply. Chloride ions have frequently been cited as having a low taste threshold in water and the proposed criteria is a reasonable maximum level to protect consumers of drinking water (USEPA, 1986). This criteria also protects for watering of livestock and propagation of wildlife Uses.

Discussion of Chloride Data

Bronco Creek has 44 Chloride samples ranging from 0 to 11. No samples exceeded the proposed criteria.

Gray Creek has 44 TDS samples ranging from 0 to 48. No samples exceeded the proposed criteria.

Sulfate

Proposed Action and Rationale for Action

It is proposed to add the Sulfate criteria of a single value of 250 mg/l. The most recent EPA criteria recommends a Sulfate value of 250 mg/l for protection of municipal or domestic supply. This value appears to provide adequate protection to transients to an area against laxative effects (USEPA, 1986).

Discussion of Sulfate Data

Bronco Creek has 29 Sulfate samples ranging from 0.46 to < 5. No samples exceeded the proposed criteria.

Gray Creek has 31 Sulfate samples ranging from 3.7 to 82. No samples exceeded the proposed criteria.

Fecal Coliform

Proposed Action and Rationale for Action

It is proposed to set the Fecal Coliform criteria to a single value of 1000 No./100 ml. The 1972 National Academy of Sciences, Water Quality Criteria recommends a Fecal Coliform value of 1000 No./100 ml for protection of irrigation. This value appears to provide adequate protection so that no hazards to animals or man result from their use or from consumption of raw crops irrigated with such

waters (NASNAE, 1973). This criteria also protects for watering of livestock, water non-contact recreation, municipal or domestic supply, and propagation of wildlife Uses.

Discussion of Fecal Coliform Data

Bronco Creek has 24 Fecal Coliform samples ranging from 0 to 20. No samples exceeded the proposed criteria.

Gray Creek has 25 Fecal Coliform samples ranging from 0 to 20. No samples exceeded the proposed criteria.

E Coli

Proposed Action and Rationale for Action

It is proposed to add the E Coli criteria of an annual geometric mean (AGM) of 126 No./100 ml and a single value (SV) of 410 No./100 ml. The most recent EPA implementation guidance criteria for Bacteria recommends E Coli values of AGM 126 No./100 ml and a SV of 410 No./100 ml for protection of water contact recreation. This value appears to provide adequate protection for the risk level of 8% (8 illness per 1000 swimmers) and the 90th percentile (lightly used full body contact recreation). The 410 is a rounded value from the recommended 409 (USEPA, 2004). This criteria also protects the Use water non-contact recreation.

Discussion of E Coli Data

Bronco Creek has 13 E Coli samples ranging from <10 to 42. No samples exceeded either proposed criteria.

Gray Creek has 14 E Coli samples ranging from < 10 to 31. No samples exceeded either proposed criteria.

Total Ammonia

Proposed Action and Rationale for Action

It is proposed to add Total Ammonia criteria specified in NAC 445A.118. The most recent EPA criteria update recommends an acute water quality criteria for total ammonia for freshwater aquatic life, a chronic water quality criteria for total ammonia for waters where freshwater fish in early life stages may be present, and a chronic water quality criteria for total ammonia for water where freshwater fish in early life stages are absent for protection of aquatic life which are specified in NAC 445A.118 (USEPA, 1999).

Discussion of Total Ammonia Data

Bronco Creek has 19 Total Ammonia samples each a non-detect of < 0.1. No samples exceeded either proposed criteria.

Gray Creek has 25 Total Ammonia samples each a non-detect of < 0.1. No samples exceeded either proposed criteria.

Appendix A

NDEP Nutrient Criteria Strategy – Rationale for Narrative April 27, 2010

Background

Historically, Nevada has assigned phosphorus standards for many of its waters for the control of algae and associated eutrophication problems (such as depressed dissolved oxygen). However, these values were based upon 20-year old + guidance from EPA that may be better suited for the eastern United States. Additionally, nitrogen species are an important contributor to algae growth in Nevada waters and EPA guidance has been ambiguous. Therefore nitrogen eutrophication water quality standards have generally not been promulgated in Nevada.

Beginning in the late 1990s, EPA recognized the need to assist states in developing improved nutrient criteria. However, nutrient relationships can be very complex and variable from waterbody to waterbody. A few years later EPA issued a series of technical guidance documents for states to use in setting nutrient criteria with the intention that they serve as a starting point. These documents include suggested numeric criteria for various nutrients by ecoregions. One major shortcoming of these criteria recommendations is their lack of a connection to beneficial use support. These recommendations were based solely on the 25th percentile of the entire population of data for a given ecoregion, and were not derived from any cause-effect relationships. EPA recognizes these shortcomings and strongly encourages states and tribes to refine these recommendations as appropriate.

Further confounding the situation, numerous investigations across the county have demonstrated that nutrient concentrations alone are poor predictors of eutrophication problems. In response Benjamin Grumbles, EPA Administrator, issued a memorandum (2007) recommending that states adopt more robust nutrient standards including water chemistry, algae levels (chlorophyll-a) and transparency:

“To be effective, nutrient criteria should address causal (both nitrogen and phosphorus) and response (chlorophyll-a and transparency) variables for all waters that contribute nutrients loadings to our waterways. EPA encourages the adoption of standards for all four parameters because of the interrelationships between these parameters and its experience showing that controlling both nitrogen and phosphorus is important for successfully combating nutrient pollution in all waters.”

Many states are refining EPA recommendations and are using multiple lines of evidence in regulations and/or assessments to determine impairment status. Some (including Nevada) are concluding that a water should not be listed for aquatic life impairment without biological verification (algae, macroinvertebrates, etc.) of impairment. Nevada’s long term strategy is to incorporate water chemistry, algae levels, and other biological measures into its assessments (and potentially water quality standards). It is desirable that these chemical/biological thresholds be based upon cause and effect relationships applicable to Nevada waters. While the literature provides a variety of such thresholds (for nutrients, algae levels, water clarity, etc.), they are variable and need to be tested before being promulgating into the regulations. This process of testing and developing appropriate thresholds will be undertaken as part of the NDEP long term strategy. Due to the uncertainties in future budget and resources available to gather the information needed and perform the appropriate analyses, a time schedule for fully implementing this long term strategy can not be realistically set.

Nonetheless, NDEP has begun a new nutrient assessment approach which will assist in the development of appropriate eutrophication thresholds. Given that water chemistry alone is a poor indicator of eutrophication problems, NDEP is implementing a new assessment approach which addresses both causal and response variables. It is NDEP's desire to list only those waters where both causal and response measures indicate nutrient impairment. Multiple lines of evidence could include:

- Water chemistry
- Dissolved oxygen
- Algae biomass and coverage of streambottom
- Secchi disc
- Other biological indicators (macroinvertebrates, diatoms)

In implementing this approach, NDEP has developed the following protocols for wadeable streams and lakes/reservoirs:

- *Nutrient Assessment Protocols for Wadeable Streams in Nevada* (2009)
- *Nutrient Assessment Protocols for Lakes and Reservoirs in Nevada* (2008)

These documents are available at <http://ndep.nv.gov/bwqp/special01.htm>.

At this time, Nevada does not have macroinvertebrate or diatom thresholds to use in the assessment process. Future work is aimed at developing the needed thresholds for these biological indicators. Upon completion, these other biological indicators will be incorporated into the assessment process. For other response variables such as dissolved oxygen, algal coverage of streambottom, algae biomass and Secchi disc (water clarity), the literature provides guidance on thresholds. Initial thresholds for these variables have been incorporated in the *Assessment Protocols* and will be tested and refined as appropriate. Significant levels of best professional judgment will be used in making use support or impairment determinations.

Proposed Regulatory Change

Given that water column nutrient levels are a poor indicator of eutrophication problems, NDEP desires to take a different approach than nitrogen/phosphorus criteria for Smoke, Bronco, and Gray Creeks. Since measures of algae (and other aquatic plant) coverage and biomass are a much better indicator of eutrophication, the following narrative standard is to be added to the NAC for these specific waters:

Waters shall be free from nutrient concentrations from other than natural sources that cause the growth of algae or aquatic plants in amounts that interfere with any beneficial uses of the water.

As described above, compliance with this narrative standard will be evaluated following protocols presented in *Nutrient Assessment Protocols for Wadeable Streams in Nevada* (NDEP, 2010). These protocols present an ever-evolving approach to incorporate multiple lines of evidence (algae, macroinvertebrate, diatoms) into the evaluation process. Significant work is needed to test this approach and refine thresholds for determining impairment or use support.

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