Water Quality Assessment
Ranch Creek
Colorado Mountain Resorts Investors LLC Devil's Thumb Ranch WWTF

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I. Water Quality Assessment Summary

Table A-1 includes summary information related to this WQA. This summary table includes key regulatory starting points used in development of the WQA such as: receiving stream information; threatened and endangered species; 303(d) and Monitoring and Evaluation listings; low flow and facility flow summaries; and a list of parameters evaluated.

Table A-1
WQA Summary

Facility Information			
Facility Name	**Permit Number**	**Design Flow (max 30-day ave, MGD)**	**Design Flow (max 30-day ave, CFS)**
Devil's Thumb Ranch	CO0046566	0.034	0.053

Receiving Stream Information			
Receiving Stream Name	**Segment ID**	**Designation**	**Classification(s)**
Ranch Creek	COUCUC10a	Undesignated	Aquatic Life Cold 1 Recreation Class E Agriculture Water Supply

Low Flows (cfs)				
Receiving Stream Name	**1E3 (1-day)**	**7E3 (7-day)**	**30E3 (30-day)**	**Ratio of 30E3 to the Design Flow (cfs)**
Ranch Creek	1.30	1.80	1.90	36:1

Regulatory Information					
T&E Species	**303(d) (Reg 93)**	**Monitor and Eval (Reg 93)**	**Existing TMDL**	**Temporary Modification(s)**	**Control Regulation**
No	Temperature	None	No	As (CH) = Hybrid Exp 12/31/21	Reg 85 Reg 39

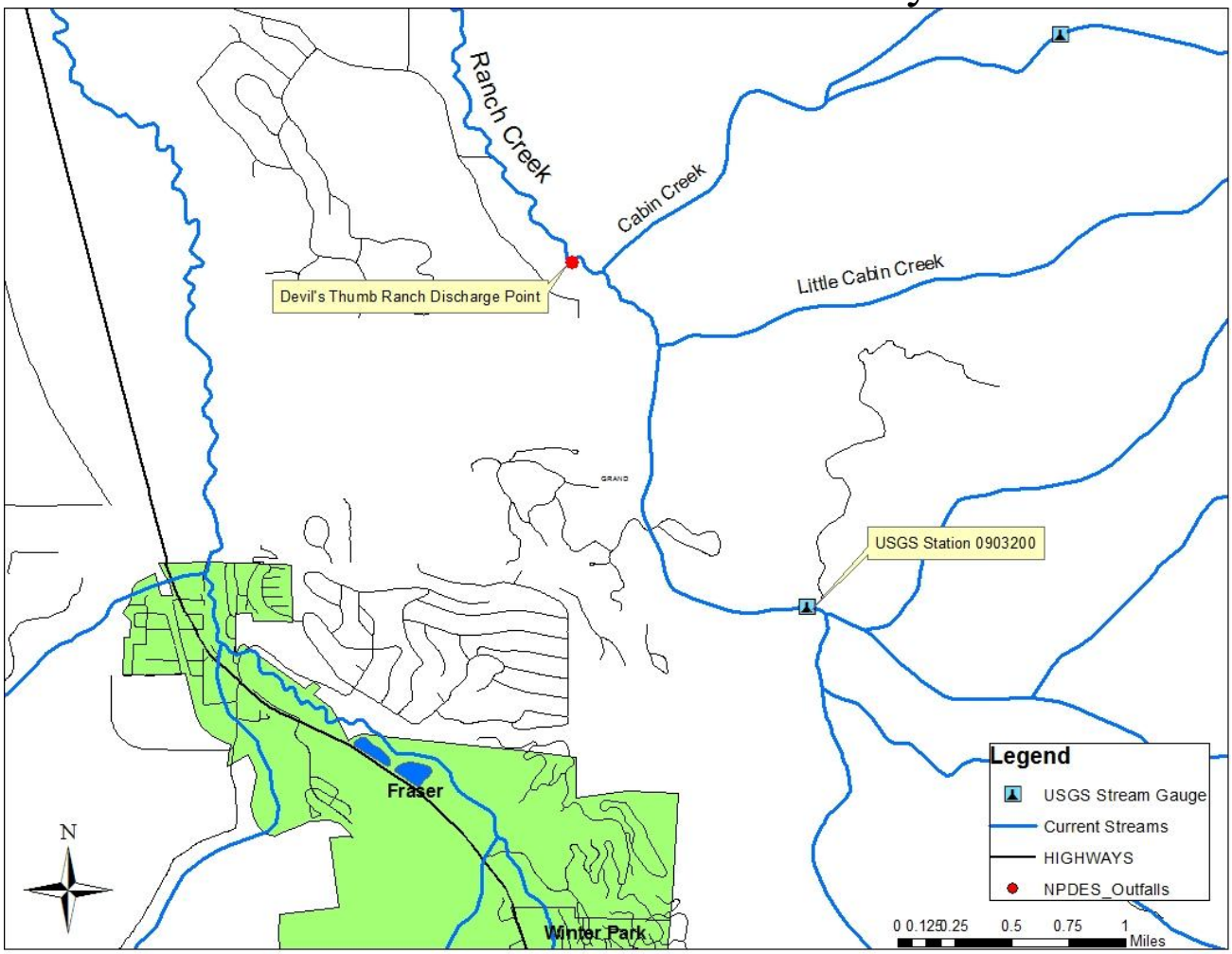
Pollutants Evaluated
Ammonia, E. Coli, TRC, Nitrate, Temp

II. Introduction

The water quality assessment (WQA) of Ranch Creek near the Devil's Thumb Ranch (WWTF), located in Grand County, is intended to determine the assimilative capacities available for pollutants found to be of concern. This WQA describes how the water quality based effluent limits (WQBELs) are developed. These parameters may or may not appear in the permit with limitations or monitoring requirements, subject to other determinations such as reasonable potential analysis, evaluation of federal effluent limitation guidelines, implementation of state-based technology based limits, mixing zone analyses, 303(d) listings, threatened and endangered species listing, or other requirements as discussed in the permit rationale. Figure A-1 contains a map of the study area evaluated as part of this WQA.

FIGURE A-1

Devil's Thumb Ranch WWTF Study Area



The Devil's Thumb Ranch WWTF discharges to Ranch Creek, which is stream segment COUCUC10a. This means the Colorado River Basin, Upper Colorado River Sub-basin, Stream Segment 10a. This segment is composed of the "Mainstem of the Fraser River from the source to a point immediately below the Rendezvous Bridge. All tributaries to the Fraser River, including wetlands, from the source to the confluence with the Colorado River, except for those tributaries included in Segment 9." Stream segment COUCUC10a is classified for Aquatic Life Cold 1, Recreation Class E, Water Supply and Agriculture.

Information used in this assessment includes data gathered from the Devil's Thumb Ranch WWTF, the Division, the U.S. Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS). The data used in the assessment consist of the best information available at the time of preparation of this WQA analysis.

III. Water Quality Standards

Narrative Standards

Narrative Statewide Basic Standards have been developed in Section 31.11(1) of the regulations, and apply to any pollutant of concern, even where there is no numeric standard for that pollutant. Waters of the state shall be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which:

for all surface waters except wetlands;

(i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludge, mine slurry or tailings, silt, or mud; or (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or (v) produce a predominance of undesirable aquatic life; or (vi) cause a film on the surface or produce a deposit on shorelines; and

for surface waters in wetlands;

(i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for any parameter of concern could be put in CDPS discharge permits.

Standards for Organic Parameters and Radionuclides

Radionuclides: Statewide Basic Standards have been developed in Section 31.11(2) and (3) of The Basic Standards and Methodologies for Surface Water to protect the waters of the state from radionuclides and organic chemicals.

In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted. Standards for radionuclides are shown in Table A-2.

Table A-2 Radionuclide Standards	
Parameter	**Picocuries per Liter**
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Radionuclide samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values.

Organics: The organic pollutant standards contained in the Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for the corresponding use classifications, unless alternative site-specific standards have been adopted. These standards have been adopted as "interim standards" and will remain in effect until alternative permanent standards are adopted by the Commission. These interim standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions. Although not reproduced in this WQA, the specific standards for organic chemicals can be found in Regulation 31.11(3).

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for radionuclides, organics, or any other parameter of concern could be put in CDPS discharge permits.

The aquatic life standards for organics apply to all stream segments that are classified for aquatic life. The water supply standards apply only to those segments that are classified for water supply. The water + fish standards apply to those segments that have a Class 1 aquatic life and a water supply classification. The fish ingestion standards apply to Class 1 aquatic life segments that do not have a water supply designation. The water + fish and the fish ingestion standards may also apply to Class 2 aquatic life segments, where the Water Quality Control Commission has made such determination.

Because the Ranch Creek is classified for Aquatic Life Cold 1, with a water supply designation the, water + fish, and aquatic life standards apply to this discharge.

Salinity and Nutrients

Salinity: Regulation 61.8(2)(l) contains requirements regarding salinity for any discharges to the Colorado River Watershed. For industrial dischargers and for the discharge of intercepted groundwater, this is a no-salt discharge requirement. However, the regulation states that this requirement may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 350 tons per year. The Division may permit the discharge of salt upon a satisfactory demonstration that it is not practicable to prevent the discharge of all salt. See

Regulation 61.8(2)(l)(i)(A)(1) for industrial discharges and 61.8(2)(l)(iii) for discharges of intercepted groundwater for more information regarding this demonstration.

For municipal dischargers, an incremental increase of 400 mg/l above the flow weighted averaged salinity of the intake water supply is allowed. This may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 366 tons per year. The Division may permit the discharge of salt in excess of the 400 mg/l incremental increase, upon a satisfactory demonstration that it is not practicable to attain this limit. See Regulation 61.8(2)(l)(vi)(A)(1) for more information regarding this demonstration.

In addition, the Division's policy, Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, may be applied to discharges where an agricultural water intake exists downstream of a discharge point. Limitations for electrical conductivity and sodium absorption ratio may be applied in accordance with this policy.

Nutrients

Phosphorus and Total Inorganic Nitrogen: Regulation 85, the *Nutrients Management Control Regulation* has been adopted by the Water Quality Control Commission and became effective September 30, 2012. This regulation contains requirements for phosphorus and Total Inorganic Nitrogen (TIN) concentrations for some point source dischargers. Limitations for phosphorus and TIN may be applied in accordance with this regulation.

Temperature

Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the resident aquatic life. This standard shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.

Segment Specific Numeric Standards

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. The standards in Table A-3 have been assigned to stream segment COUCUC10a in accordance with the *Classifications and Numeric Standards for Upper Colorado River Basin and North Platte River (Planning Region 12).*

Table A-3 **In-stream Standards for Stream Segment COUCUC10a**
Physical and Biological
Dissolved Oxygen (DO) = 6 mg/l, minimum (7 mg/l, minimum during spawning)
pH = 6.5 - 9 su
E. coli chronic = 126 colonies/100 ml
*Chlorophyll *a* = 150mg/m^2
Temperature June-Sept = 17° C MWAT and 21.7° C DM
Temperature Oct-May = 9° C MWAT and 13° C DM
Inorganic
Total Ammonia acute and chronic = TVS
Chlorine acute = 0.019 mg/l
Chlorine chronic = 0.011 mg/l
Free Cyanide acute = 0.005 mg/l
Sulfide chronic = 0.002 mg/l
Boron chronic = 0.75 mg/l
Nitrite acute = 0.05 mg/l
Nitrate acute = 10 mg/l
Chloride chronic = 250 mg/l
Sulfate chronic = WS
*Total Phosphorus = 100 µg/l [C]
Metals
Dissolved Arsenic acute = 340 µg/l
Total Recoverable Arsenic chronic = 0.02 - 10 µg/l
Dissolved Cadmium acute for trout and Dissolved Cadmium chronic = TVS
Total Recoverable Trivalent Chromium acute = 50 µg/l
Dissolved Trivalent Chromium chronic = TVS
Dissolved Hexavalent Chromium acute and chronic = TVS
Dissolved Copper acute and chronic = TVS
Dissolved Iron chronic = For WS, the greater of ambient water quality as of January 1, 2000, or 300 µg/l
Total Recoverable Iron chronic = 1000 µg/l
Dissolved Lead acute and chronic = TVS
Dissolved Manganese chronic = WS
Dissolved Manganese acute and chronic = TVS
Total Mercury chronic = 0.01 µg/l
Total Recoverable Molybdenum = 160 µg/l
Dissolved Nickel acute and chronic = TVS
Dissolved Selenium acute and chronic = TVS
Dissolved Silver acute and Dissolved Silver chronic for trout = TVS
Dissolved Zinc acute and chronic and for chronic sculpin = TVS
Nonylphenol acute = 28 µg/l
Nonylphenol chronic = 6.6 µg/l

*Total phosphorus and chlorophyll *a* standards apply only upstream of the facilities listed in Regulation 33.5(4); therefore, therefore these standards do not apply to the Devil's Thumb Ranch WWTF at this time.

T**able Value Standards and Hardness Calculations**

As metals with standards specified as TVS are not included as parameters of concern for this facility, the hardness value of the receiving water and the subsequent calculation of the TVS equations is inconsequential and is therefore omitted from this WQA.

Total Maximum Daily Loads and Regulation 93 – Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List

This stream segment is listed on the monitoring and evaluation list provisionally for aquatic life. The current aquatic life standards are protective of the stream and will be used in this WQA. The allowable concentration calculated in the following sections may change upon further evaluation by the Division.

This stream segment is on the 303(d) list of water quality impacted streams for temperature. For a receiving water placed on this list, the Restoration and Protection Unit is tasked with developing the Total Maximum Daily Loads (TMDLs) and the Waste Load Allocation (WLAs) to be distributed to the affected facilities. WLAs for temperature have not yet been established and therefore, the Division may implement a report only requirement in the permit to data collection for future TMDL development.

IV. Receiving Stream Information

Low Flow Analysis

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval, and is used in developing limitations based on an acute standard. The 7-day average low flow, 7E3, represents the seven-day average low flow recurring in a 3 year interval, and is used in developing limitations based on a Maximum Weekly Average Temperature standard (MWAT). The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval, and is used in developing limitations based on a chronic standard.

To determine the low flows available to the Devil's Thumb Ranch WWTF, USGS gage station 09032000 (Ranch Creek Near Fraser, CO) was used. This flow gage provides a representative measurement of the upstream flow because there are no diversions or confluence of significance between the flow gage and the facility.

Daily flows from the USGS Gage Station 09032000 (Ranch Creek Near Fraser, CO) were obtained and the annual 1E3 and 30E3 low flows were calculated using U.S. Environmental Protection Agency (EPA) DFLOW software. The output from DFLOW provides calculated acute and chronic low flows for each month.

Flow data from January 1, 2003 through December 17, 2013 were available from the gage station. The gage station and time frames were deemed the most accurate and representative of current flows and were therefore used in this analysis.

Based on the low flow analysis described previously, the upstream low flows available to the Devil's Thumb Ranch WWTF were calculated and are presented in Table A-4.

Table A-4

Low Flows for Ranch Creek at the Devil's Thumb Ranch WWTF

Low Flow (cfs)	*Annual*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
1E3 Acute	1.30	1.80	1.80	1.60	1.90	2.50	2.00	1.30	1.90	2.30	2.30	2.10	1.90
7E3 Chronic	1.80	1.80	1.90	1.90	1.90	2.50	2.00	1.80	2.30	2.30	2.30	2.10	1.90
30E3 Chronic	1.90	1.90	1.90	1.90	1.90	2.50	2.00	2.00	2.30	2.60	2.30	2.10	1.90

During the months of May, June, October and December, the acute low flow calculated by DFLOW exceeded the chronic low flow. In accordance with Division standard procedures, the acute low flow was thus set equal to the chronic low flow for these months.

The ratio of the low flow of Ranch Creek to the Devil's Thumb Ranch WWTF design flow is 36:1.

Mixing Zones

The amount of the available assimilative capacity (dilution) that may be used by the permittee for the purposes of calculating the WQBELs may be limited in a permitting action based upon a mixing zone analysis or other factor. These other factors that may reduce the amount of assimilative capacity available in a permit are: presence of other dischargers in the vicinity; the presence of a water diversion downstream of the discharge (in the mixing zone); the need to provide a zone of passage for aquatic life; the likelihood of bioaccumulation of toxins in fish or wildlife; habitat considerations such as fish spawning or nursery areas; the presence of threatened and endangered species; potential for human exposure through drinking water or recreation; the possibility that aquatic life will be attracted to the effluent plume; the potential for adverse effects on groundwater; and the toxicity or persistence of the substance discharged.

Unless a facility has performed a mixing zone study during the course of the previous permit, and a decision has been made regarding the amount of the assimilative capacity that can be used by the facility, the Division assumes that the full assimilative capacity can be allocated. Note that the review of mixing study considerations, exemptions and perhaps performing a new mixing study (due to changes in low flow, change in facility design flow, channel geomorphology or other reason) is evaluated in every permit and permit renewal.

If a mixing zone study has been performed and a decision regarding the amount of available assimilative capacity has been made, the Division may calculate the water quality based effluent limitations (WQBELs) based on this available capacity. In addition, the amount of assimilative capacity may be reduced by T&E implications.

For this facility, 100% of the available assimilative capacity may be used as the facility has not had to perform a mixing zone study, and the discharge is not to a T&E stream segment, and is not expected to have an influence on any of the other factors listed above.

Ambient Water Quality

The Division evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*, and as outlined in the Division's Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits (WQP-19). Ambient water quality is evaluated in this WQA analysis for use in determining assimilative capacities and in completing antidegradation reviews for pollutants of concern, where applicable.

To conduct an assessment of the ambient water quality upstream of the Devil's Thumb Ranch WWTF, data were gathered from USGS Station 03092000 located approximately 2 miles upstream from the facility. Data were available for a period of record from January 2009 through July 2014. A summary of the upstream data from this source is presented in Table A-5.

Table A-5

Ambient Water Quality for Ranch Creek

Parameter	*Number of Samples*	*15th Percentile*	*50th Percentile*	*85th Percentile*	*Mean*	*Maximum*	*Chronic Stream Standard*	*Notes*
Temp (°C)	36	0.1	2.2	10	4.1	13	NA	
DO (mg/l)	36	8.7	10	11	9.8	12	7	
pH (su)	36	7.5	7.7	8	7.7	8.4	6.5-9	
Nitrate as N (mg/l)	32	0.0065	0.049	0.096	0.052	0.11	10	
Nitrite as N (mg/l)	33	0	0	0	0.00009	0.003	0.05	1
Total Inorganic Nitrogen (mg/l)	30	0.016	0.049	0.098	0.055	0.12	NA	
NH_3 as N, Tot (mg/l)	33	0	0	0.0022	0.002	0.018	TVS	1
NH3 as N, Tot (mg/l) Jan	6	0	0	0.0028	0.0018	0	136	1
NH3 as N, Tot (mg/l) Mar	5	0	0	0	0	0	111	1
NH3 as N, Tot (mg/l) May	6	0	0	0.013	0.0043	0	175	1
NH3 as N, Tot (mg/l) Jul	5	0	0	0.0072	0.0036	0	126	1
NH3 as N, Tot (mg/l) Sep	6	0	0	0	0	0	180	1
NH3 as N, Tot (mg/l) Nov	5	0	0	0.0044	0.0022	0	144	1
TSS (mg/l)	5	0	0	0	0	0	30	1
Oil and Grease (mg/l)	30	0	0	0	0	0	10	1

Note 1: When sample results were below detection levels, the value of zero was used in accordance with the Division's standard approach for summarization and averaging purposes.

V. Facility Information and Pollutants Evaluated

Facility Information

The Devil's Thumb Ranch WWTF is located at in the NW 1/4 of the SW 1/4 of Section 9, T1S, R75W; 3530 County Road 83, Tabernash, CO; at 39.970969° latitude North and -105.784111° longitude West in Grand County. The current design capacity of the facility is 0.034 MGD (0.053 cfs). Wastewater treatment is accomplished using a mechanical wastewater treatment process. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

The Devil's Thumb Ranch WWTF is the sole known point source contributor to Ranch Creek. No other point sources were identified as dischargers to Ranch Creek upstream or downstream.

Pollutants of Concern

Pollutants of concern may be determined by one or more of the following: facility type; effluent characteristics and chemistry; effluent water quality data; receiving water quality; presence of federal effluent limitation guidelines; or other information. Parameters evaluated in this WQA may

or may not appear in a permit with limitations or monitoring requirements, subject to other determinations such as a reasonable potential analysis, mixing zone analyses, 303(d) listings, threatened and endangered species listings or other requirement as discussed in a permit rationale.

There are no site-specific in-stream water quality standards for BOD_5 or $CBOD_5$, TSS, percent removal, and oil and grease for this receiving stream. Thus, assimilative capacities were not determined for these parameters. The applicable limitations for these pollutants can be found in Regulation No. 62 and will be applied in the permit for the WWTF. Requirements for TDS can be found in Regulation No. 39 and will be applied in the permit for the WWTF as well.

The following parameters were identified by the Division as pollutants to be evaluated for this facility:

- Total Residual Chlorine
- *E. coli*
- Nitrate
- Ammonia
- Temperature

Based upon the size of the discharge, the lack of industrial contributors, dilution provided by the receiving stream and the fact that no unusually high metals concentrations are expected to be found in the wastewater effluent, metals are not evaluated further in this water quality assessment.

According to the *Rationale for Classifications, Standards and Designations of the Colorado River,* stream segment COUCUC10a is designated a water supply because the Fraser River supplies raw water for the Town of Granby, Winter Park Water and Sanitation District, and the Raintree Inn. The Grand County Water and Sanitation District #1 derives their water from Big Vasquez and Little Vasquez Creeks. The Town of Fraser and Winter Park West Water and Sanitation District have wells that draw water from the Fraser River alluvium. Thus, the nitrate standard is further evaluated as part of this WQA.

During assessment of the facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as pollutants of concern.

VI. Determination of Water Quality Based Effluent Limitations (WQBELs)

Technical Information

Note that the WQBELs developed in the following paragraphs, are calculations of what an effluent limitation may be in a permit. The WQBELs for any given parameter, will be compared to other potential limitations (federal effluent limitations guidelines, state effluent limitations, or other applicable limitation) and typically the more stringent limit is incorporated into a permit. If the WQBEL is the more stringent limitation, incorporation into a permit is dependent upon a reasonable potential analysis.

In-stream background data and low flows evaluated in Sections II and III are used to determine the assimilative capacity of Ranch Creek near the Devil's Thumb Ranch WWTF for pollutants of concern, and to calculate the WQBELs. For all parameters except ammonia, it is the Division's approach to calculate the WQBELs using the lowest of the monthly low flows (referred to as the annual low flow) as determined in the low flow analysis. For ammonia, it is the standard procedure of the Division to determine monthly WQBELs using the monthly low flows, as the regulations allow the use of seasonal flows.

The Division's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the Division to calculate the WQBELs, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3)
Q_2 = Average daily effluent flow (design capacity)
Q_3 = Downstream flow ($Q_1 + Q_2$)
M_1 = In-stream background pollutant concentrations at the existing quality
M_2 = Calculated WQBEL
M_3 = Water Quality Standard, or other maximum allowable pollutant concentration

The upstream background pollutant concentrations used in the mass-balance equation will vary based on the regulatory definition of existing ambient water quality. For most pollutants, existing quality is determined to be the 85th percentile. For metals in the total or total recoverable form, existing quality is determined to be the 50th percentile. For pathogens such as fecal coliform and *E. coli*, existing quality is determined to be the geometric mean.

For temperature, the highest 7-day mean (for the chronic standard) of daily average stream temperature, over a seven consecutive day period will be used in calculations of the chronic temperature assimilative capacity, where the daily average temperature should be calculated from a minimum of three measurements spaced equally through the day. The highest 2-hour mean (for the acute standard) of stream temperature will be used in calculations of the acute temperature assimilative capacity. The highest 2-hour mean should be calculated from a minimum of 12 measurements spaced equally through the day.

Calculation of WQBELs

Using the mass-balance equation provided in the beginning of Section VI, the acute and chronic low flows set out in Section IV, ambient water quality as discussed in Section IV, and the in-stream standards shown in Section III, the WQBELs for were calculated. The data used and the resulting WQBELs, M_2, are set forth in Table A-6a for the chronic WQBELs and A-6b for the acute WQBELs.

When the ambient water quality exceeds the in-stream standard, the Division standard procedure is to allocate the water quality standard to prevent further degradation of the receiving waters.

Chlorine: There are no point sources discharging total residual chlorine within one mile of the Devil's Thumb Ranch WWTF. Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

***E. coli*:** There are no point sources discharging E. coli within one mile of the Devil's Thumb Ranch WWTF. Thus, WQBELs were evaluated separately. In the absence of *E. coli* ambient water quality data, fecal coliform ambient data are used as a conservative estimate of *E. coli* existing quality. For *E. coli*, the Division establishes the 7-day geometric mean limit as two times the 30-day geometric mean WQBEL and also includes maximum limits of 2,000 colonies per 100 ml (30-day geometric mean) and 4,000 colonies per 100 ml (7-day geometric mean). This 2000 colony limitation also applies to discharges to ditches.

Temperature:
The 7E3 low flow is 1.80 cfs, resulting in a dilution ratio (7E3 low flow to effluent) of 34:1. As the discharge is from a Domestic WWTF where the available dilution ratio is > 10:1, in accordance with the Division's Temperature Policy, no temperature limitations are required. However, the Division may add a report only requirement since the segment is listed in the 303(d) impared waters list for temperature.

Nitrate / Total Inorganic Nitrogen (T.I.N.): An acute nitrate standard of 10 mg/l is assigned to this segment. Because nitrite and ammonia can also form nitrate, compliance with the nitrate standard is achieved through imposition of a Total Inorganic Nitrogen (T.I.N.) limit. T.I.N. effectively measures nitrate and its precursors including nitrite and ammonia.

To determine the background concentration for Total Inorganic Nitrogen for use in the mass balance equation, same day samples of the ambient data for ammonia, nitrite and nitrate (or nitrite + nitrate) were added together to calculate the T.I.N. The 85th percentile of this summed data was calculated and used as the ambient water quality for T.I.N.

Table A-6a

Chronic WQBELs

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2
E. coli (#/100 ml)	1.9	0.053	1.953	1	126	***4607***
TRC (mg/l)	1.9	0.053	1.953	0	0.011	***0.41***

Table A-6b

Acute WQBELs

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2
E. coli (#/100 ml)	chronic X 2 = acute					***9214***
TRC (mg/l)	1.3	0.053	1.353	0	0.019	***0.49***
Total Inorganic Nitrogen (mg/l)	1.3	0.053	1.353	0.098	10	***253***

Ammonia: The Ammonia Toxicity Model (AMMTOX) is a software program designed to project the downstream effects of ammonia and the ammonia assimilative capacities available to each discharger based on upstream water quality and effluent discharges. To develop data for the AMMTOX model, an in-stream water quality study should be conducted of the upstream receiving water conditions, particularly the pH and corresponding temperature, over a period of at least one year.

Temperature and corresponding pH data sets reflecting upstream ambient receiving water conditions were available for Ranch Creek from USGS station 0903200. Bi-monthly data, reflecting a period of record from January 2009 through July 2014, were used to establish the setpoint and average headwater conditions in the AMMTOX model. For the odd months, where data was available, the monthly average was used. For the even months, where data wasn't available, the average of the odd month preceding and the odd month following was used.

Effluent pH data were also available from Devil's Thumb Ranch effluent DMR data reflecting a period of record from November 2009 through July 2014 and were used to establish the average facility contributions in the AMMTOX model. Default data was used for effluent temperature.

Ammonia data from USGS station 0903200 were available reflecting a period of record from January 2009 through July 2014. Upstream ammonia data for each month were not adequate to represent monthly ambient water quality concentrations for the AMMTOX. Thus, the mean total ammonia concentration found in Ranch Creek as summarized in Table A-6 was used as an applicable upstream ammonia concentration reflective of each month.

The AMMTOX may be calibrated for a number of variables in addition to the data discussed above. The values used for the other variables in the model are listed below:

- Stream velocity = $0.3Q^{0.4d}$
- Default ammonia loss rate = 6/day
- pH amplitude was assumed to be medium
- Default times for pH maximum, temperature maximum, and time of day of occurrence
- pH rebound was set at the default value of 0.2 su per mile
- Temperature rebound was set at the default value of 0.7 degrees C per mile.

The results of the ammonia analyses for the Devil's Thumb Ranch WWTF are presented in Table A-7.

Table A-7

AMMTOX Results for Ranch Creek at the Devil's Thumb Ranch WWTF

Design of 0.034 MGD (0.053 cfs)

Month	*Total Ammonia Chronic (mg/l)*	*Total Ammonia Acute (mg/l)*
January	136	280
February	121	228
March	111	184
April	119	251
May	175	352
June	142	355
July	126	218
August	143	306
September	180	332
October	159	293
November	144	326
December	131	330

Note: ammonia values may be capped at 100 mg/L in the permit if the calculated standard was over 100 mg/L as domestic wastewater is not expected to exceed 100 mg/L with treatment.

Whole Effluent Toxicity (WET) Testing:

The Water Quality Control Division has established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities. WET testing is being utilized as a means to ensure that there are no discharges of pollutants "in amounts, concentrations or combinations which are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life" as required by Section 31.11 (1) of the Basic Standards and Methodologies for Surface Waters. The requirements for WET testing are being implemented in accordance with Division policy, Implementation of the Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (Sept 30, 2010). Note that this policy has recently been updated and the permittee should refer to this document for additional information regarding WET.

In-Stream Waste Concentration (IWC) – Where monitoring or limitations for WET are deemed appropriate by the Division, the chronic in-stream dilution is critical in determining whether acute or chronic conditions shall apply. In accordance with Division policy, for those discharges where the chronic IWC is greater than 9.1% and the receiving stream has a Class 1 Aquatic Life use or Class 2 Aquatic Life use with all of the appropriate aquatic life numeric standards, chronic conditions will normally apply. Where the chronic IWC is less than or equal to 9.1, or the stream is not classified as described above, acute conditions will normally apply. The chronic IWC is determined using the following equation:

IWC = [Facility Flow (FF)/(Stream Chronic Low Flow (annual) + FF)] X 100%

The flows and corresponding IWC for the appropriate discharge point are:

Permitted Feature	Chronic Low Flow, 30E3 (cfs)	Facility Design Flow (cfs)	IWC, (%)
001A	1.90	0.05	3

The IWC for this permit is 3 %, which represents a wastewater concentration of 3 % effluent to 97 % receiving stream. This IWC correlates to acute WET testing. The fact sheet and the permit will contain additional information regarding the type of WET testing applicable to this facility.

VII. Antidegradation Evaluation

As set out in *The Basic Standards and Methodologies for Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as "Use Protected." Note that "Use Protected" waters are waters "that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process" as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this WQA analysis.

According to the *Classifications and Numeric Standards for Upper Colorado River Basin and North Platte River (Planning Region 12)*, stream segment COUCUC10a is Undesignated. Thus, an antidegradation review is required for this segment if new or increased impacts are found to occur.

Introduction to the Antidegradation Process

The antidegradation process conducted as part of this water quality assessment is designed to determine if an antidegradation review is necessary and if necessary, to complete the required calculations to determine the limits that can be selected as the antidegradation-based effluent limit (ADBEL), absent further analyses that must be conducted by the facility.

As outlined in the *Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance* (AD Guidance), the first consideration of an antidegradation evaluation is to determine if new or increased impacts are expected to occur. This is determined by a comparison of the newly calculated WQBELs verses the existing permit limitations in place as of September 30, 2000, and is described in more detail in the analysis. Note that the AD Guidance refers to the permit limitations as of September 30, 2000 as the existing limits.

If a new or increased impact is found to occur, then the next step of the antidegradation process is to go through the significance determination tests. These tests include: 1) bioaccumulative toxic pollutant test; 2) temporary impacts test; 3) dilution test (100:1 dilution at low flow) and; 4) a concentration test.

As the determination of new or increased impacts, and the bioaccumulative and concentration significance determination tests require more extensive calculations, the Division will begin the antidegradation evaluation with the dilution and temporary impact significance determination tests. These two significance tests may exempt a facility from further AD review without the additional calculations.

Note that the antidegradation requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the antidegradation review; however, where there is only an acute standard, the acute standard should be used. The appropriate standards are used in the following antidegradation analysis.

Significance Tests for Temporary Impacts and Dilution

The ratio of the chronic (30E3) low flow to the design flow is 36:1, and is less than the 100:1 significance criteria. Therefore this facility is not exempt from an AD evaluation based on the dilution significance determination test, and the AD evaluation must continue.

For the determination of a new or increased impact and for the remaining significance determination tests, additional calculations are necessary. Therefore, at this point in the antidegradation evaluation, the Division will go back to the new or increased impacts test. If there is a new or increased impact, the last two significance tests will be evaluated.

New or Increased Impact and Non Impact Limitations (NILs)

To determine if there is a new or increased impact to the receiving water, a comparison of the new WQBEL concentrations and loadings verses the concentrations and loadings as of September 30, 2000, needs to occur. If either the new concentration or loading is greater than the September 2000 concentration or loading, then a new or increased impact is determined. If this is a new facility (commencement of discharge after September 30, 2000) it is automatically considered a new or increased impact.

Note that the AD Guidance document includes a step in the New or Increased Impact Test that calculates the Non-Impact Limit (NIL). The permittee may choose to retain a NIL if certain conditions are met, and therefore the AD evaluation for that parameter would be complete. As the NIL is typically greater than the ADBAC, and is therefore the chosen limit, the Division will typically conclude the AD evaluation after determining the NIL. Where the NILs are very stringent, or upon request of a permittee, the Division will calculate both the NIL and the AD limitation so that the limitations can be compared and the permittee can determine which of the two limits they would prefer, one which does not allow any increased impact (NIL), or the other which allows an insignificant impact (AD limit).

The non impact limit (NIL) is defined as the limit which results in no increased water quality impact (no increase in load or limit over the September 2000 load or limit). The NIL is calculated as the September 2000 loading, divided by the new design flow, and divided by a conversion factor of 8.34. If there is no change in design flow, then the NIL is equal to the September 2000 permit limitation.

If the facility was in place, but did not have a limitation for a particular parameter in the September 2000 permit, the Division may substitute an implicit limitation. Consistent with the First Update to the AD Guidance of April 2002, an implicit limit is determined based on the approach that specifies that the implicit limit is the maximum concentration of the effluent from October 1998 to September 2000, if such data is available. If this data is unavailable, the Division may substitute more recent representative data, if appropriate, on a case by case basis. Note that if there is a change in design flow, the implicit limit/loading is subject to recalculation based on the new design flow. For parameters that are undisclosed by the permittee, and unknown to the Division to be present, an implicit limitation may not be recognized.

This facility was not in place as a discharger as of September 30, 2000, and therefore this is automatically considered a new or increased impact. The antidegradation review must continue to the next two significance tests (bioaccumulative and concentration). To evaluate these significance tests the antidegradation limitations need to be calculated.

Calculation of Loadings for New or Increased Impact Test

The equations for the loading calculations are given below. Note that the AD requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the AD review; however, where there is only an acute standard, the acute standard

should be used. Thus, the chronic low flows will be used later in this AD evaluation for all parameters with a chronic standard, and the acute low flows will be used for those parameters with only an acute standard.

$$\textit{Previous permit load} = M_{permitted}\,(mg/l) \times Q_{permitted}\,(mgd) \times 8.34$$
$$\textit{New WQBELs load} = M_2\,(mg/l) \times Q_2\,(mgd) \times 8.34$$

Where,

$M_{permitted}$ = September 2000 permit limit (or implicit limit) **(mg/l)**
$Q_{permitted}$ = design flow as of September 2000 **(mgd)**
Q_2 = current design flow (same as used in the WQBEL calculations)
M_2 = new WQBEL concentration **(mg/l)**
8.34 = unit conversion factor

Table A-8 shows the results of these calculations and the determination of a new or increased impact.

Table A-8

Determination of New or Increased Impacts

Pollutant	*Sept 2000 Permit Limit*	*Sept 2000 Permit Load (lbs/day)*	*NIL*	*New WQBEL*	*New WQBEL Load (lbs/day)*	*New or Increased Impact*
E. coli (#/100 ml)	NA	NA	NA	4607	1306	Yes
TRC (mg/l)	NA	NA	NA	0.41	0.12	Yes
Nitrate as N (mg/l)	NA	NA	NA	253	72	Yes
NH_3, Tot (mg/l) Jan	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Feb	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Mar	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Apr	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) May	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Jun	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Jul	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Aug	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Sep	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Oct	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Nov	NA	NA	NA	100	28	Yes
NH_3, Tot (mg/l) Dec	NA	NA	NA	100	28	Yes

Note that loading for E. coli cannot be calculated; but, for comparison purposes, the approach is sufficient

For all parameters there are new or increased impacts and in accordance with regulation, the permittee has the option of choosing either the NIL's or ADBAC's. Since the ammonia NILs are very stringent the Division will automatically calculate the antidegradation based limitations for all parameters.

The final two significance determination tests (bioaccumulative and concentration) need to be applied, to determine if AD limits are applicable. For the bioaccumulative test, the determination of the baseline water quality (BWQ), the baseline water quality loading (BWQload), the threshold load (TL) and the threshold load concentration (TL conc) needs to occur. For the concentration test, the BWQ, significant concentration thresholds (SCT) and antidegradation based average concentrations (ADBACs) need to be calculated. These calculations are explained in the following sections, and each significance determination test will be performed as the necessary calculations are complete. The AD low flow may also need to be calculated when determining the BWQ for an existing discharger (as of Sept 2000) when upstream water quality data are used.

Determination of Baseline Water Quality (BWQ)

The BWQ is the ambient condition of the water quality as of September 30, 2000. The BWQ defines the baseline low flow pollutant concentration, and for bioaccumulative toxic pollutants, the baseline load. The BWQ is to take into account the influence of the discharger if the discharge was in place prior to September 30, 2000. In such a case, data from a downstream location should be used to determine the BWQ. If only upstream data is available, then a mass balance equation may be applied, using the facilities effluent data to determine the BWQ. If the discharge was not present prior to September 30, 2000, then the influence of that discharge would not be taken into account in determining the BWQ. If the BWQ has already been determined in a previous WQA AD evaluation, it may not need to be recalculated as the BWQ is the water quality as of September 30, 2000, and therefore should not change unless additional data is obtained or the calculations were in error.

The BWQ concentrations were correctly determined for all potential pollutants of concern as part of a previous WQA June 11, 2009. These are summarized in Table A-9a and Table A-9b.

Table A-9a

BWQ Concentrations Based on Previous Determinations

Pollutant	M_{eff}	Q_{eff} *(cfs)*	$M_{u/s}$	$Q_{u/s}$ *(cfs)*	*BWQ*	*WQS*
E. coli (#/100 ml)	--	--	--	--	1	126
TRC (mg/l)					0	0.011

Table A-9b

BWQ Concentrations for Ammonia, Based on the AMMTOX Model

Pollutant	*BWQ*
NH_3, Total (mg/l) Jan	0.10
NH_3, Total (mg/l) Feb	0.10
NH_3, Total (mg/l) Mar	0.10
NH_3, Total (mg/l) Apr	0.10
NH_3, Total (mg/l) May	0.10
NH_3, Total (mg/l) Jun	0.10
NH_3, Total (mg/l) Jul	0.10
NH_3, Total (mg/l) Aug	0.10
NH_3, Total (mg/l) Sep	0.10
NH_3, Total (mg/l) Oct	0.10
NH_3, Total (mg/l) Nov	0.10
NH_3, Total (mg/l) Dec	0.10

In this renewal the Division established BWQ for the nitrate using data from January 1, 2003 through September 2007 and provided in Table A-9c. Data is from USGS Station 395840105472700

(Ranch Creek Below Cabin Creek Near Tabernash, CO), located about 1.5 mile downstream from the discharge.

Table A-9c

BWQ Concentrations for Nitrate

Nitrate as N (mg/l)	--	--	--	--	0.099	10

Bioaccumulative Significance Test

Parameters associated with the bioaccumulative significance test are not parameters of concern for this facility. This section is therefore omitted.

Significant Concentration Threshold

The SCT is defined as the BWQ plus 15% of the baseline available increment (BAI), and is calculated by the following equation:

$$SCT = (0.15 \times BAI) + BWQ$$

The BAI is the concentration increment between the baseline water quality and the water quality standard, expressed by the term (WQS – BWQ). Substituting this into the SCT equation results in:

$$SCT = 0.15 \times (WQS-BWQ) + BWQ$$

Where,

WQS = Chronic standard or, in the absence of a chronic standard, the acute standard
BWQ = Value from Table A-9a

When the BWQ concentration is equal to zero, the following equation results:

$$SCT = 0.15 \times WQS$$

The AMMTOX model is used to determine the SCTs for ammonia. Because the new ammonia standard is based on a function of the pH and temperature of the receiving stream, the WQS changes moving downstream from a discharge point. The BWQ and the SCT also change moving downstream. The AMMTOX model calculates these values for every tenth of a mile, for up to 20 miles. Therefore, it is impractical to show the SCTs for every part of the stream for all 12 months. These values are available in the AMMTOX model, if requested.

Determination of the Antidegradation Based Average Concentrations

Antidegradation based average concentrations (ADBACs) are determined for all parameters except ammonia, by using the mass-balance equation, and substituting the SCT in place of the water quality standard, as shown in the following equation:

$$ADBAC = \frac{SCT \times Q_3 - M_1 \times Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3 based on either the chronic or acute standard)
Q_2 = Current design capacity of the facility
Q_3 = Downstream flow ($Q_1 + Q_2$)
M_1 = Current ambient water quality concentration (From Section III)
SCT = Significant concentration threshold

The ADBACs were calculated using the SCTs, and are set forth in Table A-10a.

ADBACs for total ammonia are calculated by substituting the SCT in place of the chronic standard in the AMMTOX model, which generates monthly ADBACs as shown in Table A-10b. However, it is the procedure of the Division to either impose the minimum of the calculated monthly ADBACs or determine average ADBACs for three groups. The ADBAC groups that were determined are summarized in Table A-10b.

Table A-10a

SCTs and ADBACs

Pollutant	*Q_1(cfs)*	*Q_2 (cfs)*	*Q_3 (cfs)*	*M_1*	*SCT*	*ADBAC*
E. coli (#/100 ml)	1.9	0.053	1.953	1	20	701
TRC (mg/l)	1.9	0.053	1.953	0	0.0017	0.063
Nitrate as N (mg/l)	1.3	0.053	1.353	0.096	1.6	38

Table A-10b

ADBACs for Ammonia

Pollutant	*Monthly ADBAC*
NH_3, Total (mg/l) Jan	16
NH_3, Total (mg/l) Feb	14
NH_3, Total (mg/l) Mar	13
NH_3, Total (mg/l) Apr	14
NH_3, Total (mg/l) May	21
NH_3, Total (mg/l) Jun	17
NH_3, Total (mg/l) Jul	15
NH_3, Total (mg/l) Aug	17
NH_3, Total (mg/l) Sep	22
NH_3, Total (mg/l) Oct	19
NH_3, Total (mg/l) Nov	17
NH_3, Total (mg/l) Dec	16

Concentration Significance Tests

The concentration significance determination test considers the cumulative impact of the discharges over the baseline condition. In order to be insignificant, the new or increased discharge may not increase the actual instream concentration by more than 15% of the available increment over the baseline condition. The insignificant level is the ADBAC calculated in Tables A-10a and A-10b above. If the new WQBEL concentration (or potentially the TL Conc for bioaccumulatives) is greater than the ADBAC, an AD limit would be applied. This comparison is shown in Tables A-11a and A-11b (for ammonia).

Table A-11a

Concentration Significance Test

Pollutant	*New WQBEL*	*ADBAC*	*Concentration Test Result*
E. coli (#/100 ml)	4607	701	Significant
TRC (mg/l)	0.41	0.063	Significant
Nitrate as N (mg/l)	253	38	Significant

Table A-11b

Concentration Significance Test for Ammonia

Pollutant	*New WQBEL*	*ADBAC*	*Concentration Test Result*
NH3, Total (mg/l) Jan	100	16	Significant
NH3, Total (mg/l) Feb	100	14	Significant
NH3, Total (mg/l) Mar	100	13	Significant
NH3, Total (mg/l) Apr	100	14	Significant
NH3, Total (mg/l) May	100	21	Significant
NH3, Total (mg/l) Jun	100	17	Significant
NH3, Total (mg/l) Jul	100	15	Significant
NH3, Total (mg/l) Aug	100	17	Significant
NH3, Total (mg/l) Sep	100	22	Significant
NH3, Total (mg/l) Oct	100	19	Significant
NH3, Total (mg/l) Nov	100	17	Significant
NH3, Total (mg/l) Dec	100	16	Significant

Antidegradation Based Effluent Limitations (ADBELs)

The ADBEL is defined as the potential limitation resulting from the AD evaluation, and may be either the ADBAC, the NIL (when applicable), or may be based on the concentration associated with the threshold load concentration (for the bioaccumulative toxic pollutants). ADBACs, NILs and TLs have already been determined in the AD evaluation, and therefore to complete the evaluation, a final comparison of limitations needs to be completed.

Note that ADBACs and NILs are not applicable when the new WQBEL concentration (and loading as evaluated in the New and Increased Impacts Test) is less than the NIL concentration (and loading), or when the new WQBEL is less than the ADBAC.

Where an ADBAC or NIL applies, the permittee has the final choice between the two limitations. A NIL is applied as a 30-day average (and the acute WQBEL would also apply where applicable) while the ADBAC would be applied as a 2 year rolling average concentration. For the purposes of this WQA, the Division has made an attempt to determine whether the NIL or ADBAC will apply. The end results of this AD evaluation are in Table A-12, including any parameter that was previously exempted from further AD evaluation, with the final potential limitation identified (NIL, WQBEL or ADBAC).

Table A-12

Final Selection of WQBELs, NILs, and ADBACs

Pollutant	***NIL***	***New WQBEL***	***ADBAC***	***Chosen Limit***
E. coli (#/100 ml)	NA	4607	701	ADBAC
TRC (mg/l)	NA	0.41	0.063	ADBAC
Nitrate as N (mg/l)	NA	253	38	ADBAC
NH3 as N, Tot (mg/l) Jan	NA	100	16	ADBAC
NH3 as N, Tot (mg/l) Feb	NA	100	14	ADBAC
NH3 as N, Tot (mg/l) Mar	NA	100	13	ADBAC
NH3 as N, Tot (mg/l) Apr	NA	100	14	ADBAC
NH3 as N, Tot (mg/l) May	NA	100	21	ADBAC
NH3 as N, Tot (mg/l) Jun	NA	100	17	ADBAC
NH3 as N, Tot (mg/l) Jul	NA	100	15	ADBAC
NH3 as N, Tot (mg/l) Aug	NA	100	17	ADBAC
NH3 as N, Tot (mg/l) Sep	NA	100	22	ADBAC
NH3 as N, Tot (mg/l) Oct	NA	100	19	ADBAC
NH3 as N, Tot (mg/l) Nov	NA	100	17	ADBAC
NH3 as N, Tot (mg/l) Dec	NA	100	16	ADBAC

For all parameters, the ADBACs have been established for this facility. The ADBACs were selected as they are less stringent than the WQBELs, or perhaps due to the application as a two-year rolling average.

Alternatives Analysis

If the permittee does not want to accept an effluent limitation that results in no increased impact (NIL) (when applicable) or in insignificant degradation (ADBAC), the applicant may conduct an

alternatives analysis (AA). The AA examines alternatives that may result in no degradation or less degradation, and are economically, environmentally, and technologically reasonable. If the proposed activity is determined to be important economic or social development, a determination shall be made whether the degradation that would result from such regulated activity is necessary to accommodate that development. The result of an AA may be an alternate limitation between the ADBEL and the WQBEL, and therefore the ADBEL would not being applied. This option can be further explored with the Division. See Regulation 31.8 (3)(d), and the Antidegradation Guidance for more information regarding an alternatives analysis.

VIII. Technology Based Limitations

Federal Effluent Limitation Guidelines

The Federal Effluent Limitation Guidelines for domestic wastewater treatment facilities are the secondary treatment standards. These standards have been adopted into, and are applied out of, Regulation 62, the Regulations for Effluent Limitations.

Regulations for Effluent Limitations

Regulation No. 62, the Regulations for Effluent Limitations, includes effluent limitations that apply to all discharges of wastewater to State waters, with the exception of storm water and agricultural return flows. These regulations are applicable to the discharge from the proposed discharge.

Table A-13 contains a summary of the applicable limitations for pollutants of concern at this facility.

Table A-13

Regulation 62 Based Limitations

Parameter	***30-Day Average***	***7-Day Average***	***Instantaneous Maximum***
BOD_5	30 mg/l	45 mg/l	NA
BOD_5 Percent Removal	85%	NA	NA
TSS,	30 mg/l	45 mg/l	NA
TSS Percent Removal	85%	NA	NA
Total Residual Chlorine	NA	NA	0.5 mg/l
pH	NA	NA	6.0-9.0 s.u.
Oil and Grease	NA	NA	10 mg/l

Nutrient Effluent Limitation Considerations

WQCC Regulation No. 85, the new *Nutrients Management Control Regulation*, includes technology based effluent limitations for total inorganic nitrogen and total phosphorus that currently, or will in the future, apply to many domestic wastewater discharges to State surface waters. These effluent limits for dischargers are to start being implemented in permitting actions as of July 1, 2013, and are shown in the two tables below:

Effluent Limitations Table at 85.5(1)(a)(iii)

For all Domestic Wastewater Treatment Works not identified in subsections (a)(i) or (ii) above(in

Reg. 85) *and discharging prior to May 31, 2012 or for which a complete request for preliminary effluent limits has been submitted to the Division prior to May 31, 2012, the following numeric limits shall apply:*

Parameter	***Parameter Limitations***	
	Annual Median [1]	*95th Percentile [2]*
Total Phosphorus	*1.0 mg/l*	*2.5 mg/l*
Total Inorganic Nitrogen[3]	*15 mg/l*	*20 mg/l*

1 Running Annual Median: The median of all samples taken in the most recent 12 calendar months.
2 The 95th percentile of all samples taken in the most recent 12 calendar months.
3 Determined as the sum of nitrate as N, nitrite as N, and ammonia as N.

Effluent Limitations Table at 85.5(1)(b)
For New Domestic Wastewater Treatment Works which submit a complete request for preliminary effluent limits to the Division on or after May 31, 2012, the following numeric limits shall apply:

Parameter	***Parameter Limitations***	
	Annual Median [1]	*95th Percentile [2]*
Total Phosphorus	*0.7 mg/l*	*1.75 mg/l*
Total Inorganic Nitrogen[3]	*7 mg/l*	*14 mg/l*

1 Running Annual Median: The median of all samples taken in the most recent 12 calendar months.
2 The 95th percentile of all samples taken in the most recent 12 calendar months.
3 Determined as the sum of nitrate as N, nitrite as N, and ammonia as N.

Requirements in Reg. 85 also apply to non-domestic wastewater for industries in the Standard Industrial Class 'Major Group 20,' and any other non-domestic wastewater where the facility is expected, without treatment, to discharge total inorganic nitrogen or total phosphorus concentrations in excess of the numeric limits listed in 85.5 (1)(a)(iii). The facility must investigate, with the Division's approval, whether different considerations should apply.

All permit actions based on this WQA will occur after the July 1, 2013 permit implementation date of Reg. 85. Therefore, total inorganic nitrogen and total phosphorus effluent limitations potentially imposed because of Reg. 85 must be considered. However, also based on Reg. 85, there are direct exemptions from these limitations for smaller domestic facilities that discharge less than 1 million gallons per day (MGD), or are a domestic facility owned by a disadvantaged community.

The Division will consider Devil's Thumb Ranch WWTF to be an existing WWTF, as the previous facility was discharging and permitted prior to May 31, 2012. Also, since the proposed design capacity of the Devil's Thumb Ranch WWTF is 0.034 MGD, the facility is not currently required to address the new technology based effluent limits as of 7/1/2013.

However, the Division does not intend these results to discourage Devil's Thumb Ranch WWTF from working on nutrient control with the other dischargers within the Colorado River watershed. These dischargers upstream and downstream of the Devil's Thumb Ranch WWTF have the potential to create future nutrient issues in the Colorado River. The Division encourages these entities to all work together to create the most efficient and cost effective solutions for nutrient control in the Colorado River watershed.

Supplemental Reg. 85 Nutrient Monitoring

Reg. 85 also requires that some monitoring for nutrients in wastewater effluent and streams take

place, independent of what nutrient effluent limits or monitoring requirements may be established in a discharge permit. The requirements for the type and frequency of this monitoring are set forth in Reg. 85 at 85.6. This nutrient monitoring is not currently required by a permitting action, but is still required to be done by the Reg. 85 nutrient control regulation. Nutrient monitoring for the Reg. 85 control regulation is currently required to be reported to the WQCD Environmental Data Unit.

IX. References

Regulations:

The Basic Standards and Methodologies for Surface Water, Regulation 31, Colorado Department Public Health and Environment, Water Quality Control Commission, effective January 31, 2013.

Classifications and Numeric Standards for Upper Colorado River Basin and North Platte River (Planning Region 12), Regulation No. 33, Colorado Department Public Health and Environment, Water Quality Control Commission, effective June 30, 2014.

Regulations for Effluent Limitations, Regulation 62, CDPHE, WQCC, effective July 30, 2012.

Colorado River Salinity Standards, Regulation 39, CDPHE, WQCC, effective September 30, 1997.

Nutrients Management Control Regulation, Regulation 85, Colorado Department Public Health and Environment, Water Quality Control Commission, effective September 30, 2012.

Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation 93, Colorado Department Public Health and Environment, Water Quality Control Commission, effective March 30, 2012.

Policy and Guidance Documents:

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, December 2001.

Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department Public Health and Environment, Water Quality Control Division, April 23, 2002.

Rationale for Classifications, Standards and Designations of Segments of the Colorado River, Colorado Department Public Health and Environment, Water Quality Control Division, effective August 29, 2008.

Policy Concerning Escherichia coli versus Fecal Coliform, CDPHE, WQCD, July 20, 2005.

Colorado Mixing Zone Implementation Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, effective April 2002.

Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge Permits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-23, effective July 3, 2008.

Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-24, effective March 10, 2008.

Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-19, effective May 2002.