Fact Sheet

The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

The City of Culdesac
Wastewater Treatment Plant

Public Comment Start Date: April 15, 2016
Public Comment Expiration Date: May 16, 2016

Technical Contact: John Drabek
206-553-8257
800-424-4372, ext. 8257 (within Alaska, Idaho, Oregon and Washington)
drabek.john@epa.gov

The EPA Proposes To reissue NPDES Permit
The EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States within the Nez Perce Reservation. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to the EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, the EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit

issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, the EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting the EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://EPA.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OWW-191
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Idaho Operations Office
950 W Bannock
Suite 900
Boise, ID 83702
Phone: 208-378-5746

Water Quality Program Coordinator
Water Resources Division
Nez Perce Tribe
P.O. Box 365
Lapwai, ID 83540

Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
30Q10	30 day, 10 year low flow
ACR	Acute-to-Chronic Ratio
AML	Average Monthly Limit
ASR	Alternative State Requirement
AWL	Average Weekly Limit
BA	Biological Assessment
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BE	Biological Evaluation
BOD_5	Biochemical oxygen demand, five-day
BOD_{5u}	Biochemical oxygen demand, ultimate
BMP	Best Management Practices
BPT	Best Practicable
°C	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

FR	Federal Register
gpd	Gallons per day
HUC	Hydrologic Unit Code
ICIS	Integrated Compliance Information System
IDEQ	Idaho Department of Environmental Quality
I/I	Infiltration and Inflow
LA	Load Allocation
lbs/day	Pounds per day
LTA	Long Term Average
LTCP	Long Term Control Plan
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
N	Nitrogen
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SIC	Standard Industrial Classification

SPCC	Spill Prevention and Control and Countermeasure
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
Water Quality Standards	Water Quality Standards
WWTP	Wastewater treatment plant

I. Applicant

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

Facility Name:	City of Culdesac Wastewater Treatment Plant
Mailing Address:	100 6th Street, Culdesac, Idaho 83303
Facility Address:	Main street and Canyon Road Intersection, Culdesac, Idaho
Contact:	Noreen Durant, City Clerk (208) 843-5483

B. Permit History

The most recent NPDES permit for the City of Culdesac wastewater treatment plant (facility) was issued on September 11, 2002, became effective on November 1, 2002, and expired on October 31, 2007. An NPDES application for permit issuance was submitted by the permittee on April 30, 2007. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively extended and remains fully effective and enforceable.

II. Facility Information

A. Treatment Plant Description

Service Area

The City of Culdesac owns and operates a facility that treats wastewater from domestic, industrial, and commercial sources. The facility discharges secondarily treated wastewater throughout the year to the Lapwai Creek tributary to the Clearwater River.

The collection system has a separate sanitary sewer system. The facility serves a resident population consisting of 650 from the City of Culdesac.

Treatment Process

The design flow of the facility is 0.055 mgd on an average day maximum monthly basis. The facility consists of the following unit operations: two lagoon treatment cells, chlorine contact chamber, three intermittent sand filters, and two infiltration and percolation ditches.

B. Background Information

Effluent Characterization

In order to determine pollutants of concern for further analysis, EPA evaluated the application form, additional discharge data, and the nature of the discharge. Pollutants typical of a sewage treatment plant are five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), *E. coli* bacteria, pH, ammonia and total residual chlorine. Based on this analysis, pollutants of concern are as follows:

- BOD_5
- TSS
- *E. coli* bacteria
- pH
- Ammonia
- Total residual chlorine

The concentrations of pollutants in the discharge were reported in the NPDES application and in discharge monitoring reports (DMRs) and were used in determining reasonable potential for several parameters (see Appendix E).

Compliance History

The EPA reviewed the last three years of effluent monitoring data from the DMR.

A summary of effluent violations is provided in Table 1.

Table 1: Effluent Limit Violations

Parameter	Limit	Units	Number of Instances
E.Coli	Instantaneous Max	#/100 ml	9
E.Coli	Monthly Average	#/100 ml	11
BOD_5	Monthly Average	mg/L	1
BOD_5	Weekly Average	mg/L	1
Total Residual Chlorine (TRC)	Weekly Average	lb/day	47

The EPA and the City of Culdesac entered into a Compliance Order on Consent (CWA-10-2012-0082) in July 2012. The Compliance Order on Consent required Culdesac, pending issuance of a new permit, to comply with interim loading effluent limits for total recoverable chlorine (TRC) of:

Daily maximum limit: 0.046 lbs/day
Monthly average limit: 0.046 lbs/day

Upon further evaluation, the EPA has found that the "interim loading effluent limit" established in the Compliance Order was a compliance evaluation level to be used to determine whether the facility was in compliance with the effluent limits in the old permit. The actual effluent limits in the old permit remain in effect; however, since the detection limit for TRC is higher than the effluent limits in the permit, the EPA has to establish a compliance evaluation level based upon the detection limit. This was not done for the mass based TRC limits in the permit; therefore, the EPA issued the Compliance Order to correct this.

In addition to the effluent limit violations, Culdesac also failed to monitor surface water as required by the permit.

III. Receiving Water

The treated effluent from the City of Culdesac's wastewater treatment plant will discharge from Outfall 001 to Lapwai Creek. The outfall is not equipped with a diffuser, and the point of discharge in Lapwai Creek is located within the boundaries of the Nez Perce Indian Reservation. Lapwai Creek is a tributary to the Clearwater River.

A. Low Flow Conditions

The Technical Support Document for Water Quality-Based Toxics Control (hereafter referred to as the TSD) (EPA, 1991) and the Idaho Water Quality Standards (WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD states that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria.

Because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the 30B3 for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based flow rate designed to ensure an excursion frequency of no more than once every three years for a 30-day average flow rate. For human health criteria, the Idaho WQS recommend the 30Q5 flow rate for non-carcinogens, and the harmonic mean flow rate for carcinogens. (see Appendix C of this fact sheet for additional information on flows).

The EPA used Nez Perce ambient flow data and ambient flow data collected at Station # USGS 13342450 LAPWAI CREEK NR LAPWAI, ID and the EPA's DFLOW 3.1b model to calculate the low flow conditions for Lapwai Creek.

B. Receiving Water Quality

The EPA reviews receiving water quality data when assessing the need for and developing water quality based effluent limits. In granting assimilative capacity of the receiving water, the EPA must account for the amount of the pollutant already present in the receiving water. In situations where some of the pollutant is actually present in the upstream waters, an assumption of "zero background" concentration overestimates the available assimilative capacity of the receiving water and could result in limits that are not protective of applicable water quality standards.

Receiving water data was available from upstream ambient monitoring conducted by the Nez Perce Tribe. Table 2 summarizes the receiving water data used to evaluate the need for and develop water quality based effluent limits.

Table 2: Receiving Water Quality Data

Parameter	Units	Percentile	Value
Temperature	°C	95th	20.6
pH	Standard units	95th	8.4
Ammonia	mg/L	95th	0.10

Receiving Water Quality Data - Summer			
Parameter	**Units**	**Percentile**	**Value**
Temperature	°C	95th	20.9
pH	Standard units	95th	8.01
Ammonia	mg/L	95th	0.05

Receiving Water Quality Data - Winter			
Parameter	**Units**	**Percentile**	**Value**
Temperature	°C	95th	10.0
pH	Standard units	95th	8.57
Ammonia	mg/L	95th	0.11

C. Water Quality Standards

Overview

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limitations in permits necessary to meet water quality standards. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy.

The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The Nez Perce Tribe has not applied for the status of Treatment as a State (TAS) from the EPA for purposes of the Clean Water Act. When the Nez Perce Tribe is granted TAS, and when it has Water Quality Standards (WQS) approved by EPA, those tribal WQS will be used for determining effluent limitations. Meanwhile, the Idaho WQS were used as reference for setting permit limits, and to protect downstream uses in the State of Idaho. The distance from the point of discharge on the Lapwai River to the Clearwater River downstream is approximately 14 miles.

Designated Beneficial Uses

This facility discharges to Lapwai Creek in the Clearwater Subbasin. At the point of discharge, Lapwai Creek has the following designated uses:

- cold water aquatic life
- primary contact recreation
- industrial and agricultural water supply

- wildlife habitat
- aesthetics.

Existing Uses

Tier 1 protection under the Antidegradation Policy applies to all water bodies under the CWA. It requires the protection of existing uses and requires that the water quality necessary to protect those uses be maintained and protected. (See federal regulations at 40 CFR Section 131.12(a)(1)). Under the antidegradation regulations, the EPA must include permit conditions in the NPDES permit sufficient to protect and maintain the existing uses in that water body.

Salmonid spawning is determined an existing use. Salmonid spawning in the Lapwai River is demonstrated in the Nez Perce electrofishing study *Fish Distribution and Relative Abundance of Big Canyon Creek, Lapwai Creek, Mission Creek and Sweetwater Creek*, Nez Perce Tribe, Department of Fisheries Resources Management, Lapwai, ID, Chandler, C. A. and Parot, R. P. 2003. The discharge occurs at Lapwai Creek kilometer 22. Appendix A shows electrofishing results upstream and downstream near the outfall at Lapwai Creek kilometers 19, 21, 23, 24 and 25. These data reflect the relatively high level of steelhead production and successful Spawning. (*O.mykiss*, age 0) which occurs in Lapwai Creek.

Surface Water Quality Criteria

The reference criteria are found in the following sections of the Idaho Water Quality Standards:

- The narrative criteria applicable to all surface waters of the State are found at IDAPA 58.01.02.200 (General Surface Water Quality Criteria).

- The numeric criteria for toxic substances for the protection of aquatic life and primary contact recreation are found at IDAPA 58.01.02.210 (Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use).

- Additional numeric criteria for the protection of aquatic life can be found at IDAPA 58.01.02.250 (Surface Water Quality Criteria for Aquatic Life Use Designations).

- Numeric criteria for the protection of recreation uses can be found at IDAPA 58.01.02.251 (Surface Water Quality Criteria for Recreation Use Designations).

- Water quality criteria for agricultural water supply can be found in the EPA's *Water Quality Criteria 1972*, also referred to as the "Blue Book" (EPA R3-73-033)

The numeric and narrative water quality criteria used as a reference for Lapwai Creek at the point of discharge are provided in Appendix B of this fact sheet.

Antidegradation

In setting permit conditions, EPA must consider the State's and Tribe's antidegradation policy. This policy is designed to protect existing water quality when the existing quality is

better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard. For high quality waters, antidegradation requires that the State and Tribe finds that allowing lower water quality is necessary to accommodate important economic or social development before any degradation is authorized. This means that, if water quality is better than necessary to meet the water quality standards, increased permit limits can be authorized only if they do not cause degradation, or if the EPA makes the determination that more stringent limits are necessary.

Since EPA evaluated the discharge by referencing Idaho's water quality standards, EPA utilized IDEQ's antidegradation implementation methods as guidance. Appendix F contains EPA's antidegradation analysis for this permit.

D. Water Quality Limited Waters

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment."

Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments. A TMDL is a detailed analysis of the water body to determine its assimilative capacity. The assimilative capacity is the loading of a pollutant that a water body can assimilate without causing or contributing to a violation of water quality standards. Once the assimilative capacity of the water body has been determined, the TMDL will allocate that capacity among point and non-point pollutant sources, taking into account natural background levels and a margin of safety. Allocations for non-point sources are known as "load allocations" (LAs). The allocations for point sources, known as "waste load allocations" (WLAs), are implemented through effluent limitations in NPDES permits. Effluent limitations for point sources must be consistent with applicable TMDL allocations.

Lapwai Creek in the vicinity of the discharge, Winchester Lake to Sweetwater Creek is not water quality limited, thus, a TMDL does not exist for the waterbody.

IV. Effluent Limitations

A. Basis for Effluent Limitations

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits. The basis for the effluent limits proposed in the draft permit is provided in Appendix D.

B. Proposed Effluent Limitations

The following summarizes the proposed effluent limits that are in the draft permit.

Narrative Limitations to Implement Idaho's Narrative Criteria for Floating, Suspended or Submerged Matter

The permittee must not discharge floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

Numeric Limitations

Table 3 below presents the proposed effluent limits for BOD_5, TSS, *E. coli*, ammonia and total residual chlorine.

Table 3: Proposed Effluent Limits

Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	---
	lb/day	13.7	20.6	---
BOD_5 Removal	percent	85 minimum	---	---
Total Suspended Solids (TSS)	mg/L	30	45	---
	lb/day	13.7	20.6	---
TSS Removal	percent	85 minimum	---	---
E. coli	#/100 ml	126 (geometric mean)	---	406
Total Ammonia as N (5/1 – 9/30) (as N)	mg/L	10.1	---	27.0
	lbs/day	4.6	---	12
Total Ammonia as N (10/1 – 4/30) (as N)	mg/L	7.0	---	15.2
	lb/day	3.2	---	7.0
Total Residual Chlorine[1]	µg/L	51	---	94
	lb/day	0.023	---	0.043

Average monthly mass limit is calculated as

0.051 mg/L × 0.055 mgd × 8.34 = 0.023 lbs/day

The maximum daily limit is calculated as:

Maximum Daily Limit = 0.094 mg/L x 0.055 mgd x 8.34 = 0.043 lbs/day

Changes in Effluent Limits from the Previous Permit are shown in Table 4.

Table 4. Changes in Permit Effluent Limits		
Parameter	**Existing Permit**	**Draft Permit**
BOD_5 Average Monthly Limit	45 mg/L	30 mg/L
BOD5 Average Monthly Limit	21 lbs/day	13.7 lbs/day
BOD5 Average Weekly Limit	65 mg/L	45 mg/L
BOD_5 Average Weekly Limit	30 lbs/day	20.6 lbs/day
BOD_5 Percent Removal	65 minimum	85 minimum
TSS Average Monthly Limit	70 mg/L	30 mg/L
TSS Average Monthly Limit	32 lbs/day	13.7 lbs/day
TSS Average Weekly Limit	100 mg/L	45 mg/L
TSS Average Weekly Limit	46 lbs/day	20.6 lbs/day
TSS Percent Removal	65 minimum	85 minimum
Total Ammonia as N (5/1 – 9/30) Monthly Limit	none	10.1 mg/L
	none	4.6 lbs/day
Total Ammonia as N (5/1 – 9/30) Maximum Daily Limit	none	27.0 mg/L
	none	12 lbs/day
Total Ammonia as N (10/1 – 4/30) Monthly Limit	none	7.0 mg/L
	none	3.2 lbs/day
Total Ammonia as N (10/1 – 4/30) Maximum Daily	none	15.2 mg/L
	none	7.0 lbs/day
Total Residual Chlorine Monthly Limit	9[1] µg/L	51[2] µg/L
Total Residual Chlorine Monthly Limit	0.0041 lbs/day	0.023 lbs/day
Total Residual Chlorine Maximum Daily Limit	17[1] µg/L	94[2] µg/L
Total Residual Chlorine Maximum Daily Limit	0.0082 lbs/day	0.043 lbs/day

[1]Quantifiable level 100 µg/L
[2]Quantifiable level 50 µg/L

C. Compliance Schedules

Compliance schedules are authorized by federal NPDES regulations at 400 CFR 122.47 and Idaho WQS at IDAPA 58.01.02.400.03. Compliance schedules allow a discharger to phase in, over time, compliance with water quality-based effluent limitations when limitations are in the permit for the first time. Additionally, the federal regulations at 40 CFR 122.47 require that the compliance schedules require compliance with effluent limitations as soon as possible and that, when the compliance schedule is longer than 1 year, the schedule shall set forth interim requirements and the dates for their achievement. The time between the interim dates shall generally not exceed 1 year, and when the time necessary to complete any interim requirement is more than one year, the schedule shall require reports on progress toward completion of these interim requirements. In order to grant a compliance schedule the permitting authority must make a reasonable finding that the discharger cannot immediately comply with the water quality-based effluent limit upon the effective date of the permit and that a compliance schedule is appropriate (see 40 CFR 122.47 (a)). The EPA has found that a compliance schedule is appropriate for total ammonia.

A reasonable potential calculation showed that the Culdesac discharge would have the reasonable potential to cause or contribute to a violation of the water quality criteria for ammonia. Therefore, the draft permit contains water quality-based effluent limits for ammonia.

The proposed effluent limits and 95th percentile values are shown below:

Ammonia Effluent		
Season	**Limit**	**95th Percentile**
Average Monthly Summer	10.1 mg/L	13.8 mg/L
Average Monthly Winter	7.0 mg/L	22.49 mg/L

A review of the data shows that the permittee will not be able to meet the limits upon the effective date of the permit. Therefore, a compliance schedule is appropriate. See Appendices D and E for the reasonable potential and effluent limit calculations for ammonia.

The permit requires the facility to meet final effluent limits in four years and eleven months. The time is required to obtain funding, allow proper evaluation of alternatives in the facilities planning process. Pursuant to 40 CFR 122.47(a)(3), a permit with a compliance schedule must have interim requirements and dates for achievement. EPA has included interim requirements, dates for their achievement and reports of progress.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permit also requires the permittee to perform effluent monitoring required by the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Table 5, below, presents the proposed effluent monitoring requirements in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Table 5: Effluent Monitoring Requirements				
Parameter	**Units**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	Mgd	Effluent	Continuous	recording
BOD_5	mg/L	Influent & Effluent	1/week	8-hour composite
	lb/day	Influent & Effluent	1/week	calculation[1]
	% Removal	--	--	calculation[2]
TSS	mg/L	Influent & Effluent	1/week	8-hour composite
	lb/day	Influent & Effluent	1/week	calculation[1]
	% Removal	--	--	calculation[2]
pH	standard units	Effluent	5/week	grab
E. Coli	#/100 ml	Effluent	5/month	grab
Temperature[3]	ºC	Effluent	Continuous	Recording
Total Residual Chlorine	µg/L	Effluent	5/week	grab
	lb/day	Effluent	5/week	Calculation[1]
Total Ammonia as N	mg/L	Effluent	1/week	8-hour composite
	lb/day	Effluent	1/week	calculation[1]
NPDES Application Form 2A[4]	---	Effluent	3x/5 years	---

Notes:
1. Loading is calculated by multiplying the concentration (in mg/L) by the flow (in mgd) on the day sampling occurred and a conversion factor of 8.34.
2. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month, i.e.:
   (average monthly influent – average monthly effluent) ÷ average monthly influent.
   Influent and effluent samples must be taken over approximately the same time period.
3. Continuous temperature monitoring must begin no later than six months after the effective date of the permit
4. For Effluent Testing Data, in accordance with instructions in NPDES Application Form 2A, Part B.6.

Monitoring Changes from the Previous Permit

Ammonia monitoring is increased from once per month to once per week to insure compliance with the weekly effluent limitations.

Monitoring for total phosphorus and total nitrate is discontinued.

The reference temperature standard for spawning is 13°C Maximum Daily Maximum Temperature (MWMT) with a maximum daily average of no more than 9°C. Therefore the EPA is establishing continuous temperature monitoring to better characterize temperature discharges and to determine the effects on salmonid spawning. Reporting is required in terms of the reference criteria, MWMT and maximum daily average.

Monitoring meeting the requirements of NPDES Application Form 2A.Part B.6. is added to the permit to insure the data is available for the next permit reissuance.

C. Surface Water Monitoring

Table 6 presents the proposed surface water monitoring requirements for the draft permit. Culdesac failed to monitor surface water as required in the existing permit. Tribal upstream monitoring is over ten years old. Therefore, surface water monitoring is required. Surface water monitoring results must be submitted with the DMR.

Table 6 Surface Water Monitoring Requirements				
Parameter	**Units**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	mgd	Upstream of outfall	quarterly[1]	measure
Total Ammonia as N	mg/L	Upstream of outfall	quarterly[1]	grab
pH	s.u.	Upstream of outfall	quarterly[1]	grab
Temperature	°C	Upstream of outfall	quarterly[1]	grab

1. Quarters are defined as January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31.

D. Electronic Submission of Discharge Monitoring Reports

The draft permit includes new provisions to allow the permittee the option to submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application. NetDMR allows participants to discontinue mailing in paper forms under 40 CFR § 122.41 and § 403.12. The permittee may use NetDMR after requesting and receiving permission from the EPA Region 10.

Under NetDMR, all reports required under the permit are submitted to the EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it is no longer required to submit paper copies of DMRs or other reports to the EPA and the Nez Perce Tribe.

The EPA encourages permittees to sign up for NetDMR, and currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.zendesk.com.

During the period between the effective date of the permit and the submission of the October, 2016 DMR, the permittee must either submit monitoring data and other reports in paper form, or must report electronically using NetDMR, a web-based tool that allows permittees to electronically submit DMRs and other required reports via a secure internet connection.

Beginning with the submission of the November DMR (due December 20, 2016), the permittee must submit monitoring data and other reports electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application. NetDMR allows participants to discontinue mailing in paper forms under 40 CFR 122.41 and 403.12. Under NetDMR, all reports required under the permit are submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it is no longer required to submit paper copies of DMRs or other reports to EPA.

However hard copies must continue to be sent to the Nez Perce Tribe.

The EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website:

https://netdmr.zendesk.com. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

VI. Sludge (Biosolids) Requirements

The EPA Region 10 separates wastewater and sludge permitting. The EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. The EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VII. Other Permit Conditions

A. Quality Assurance Plan

In order to ensure compliance with the federal regulation at 40 CFR 122.41(e) for proper operation and maintenance, the draft permit requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The City of Culdesac is required to update the Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan must include of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and be made available to the EPA, Tribe, and the IDEQ upon request.

B. Operation and Maintenance Plan

The permit requires the City of Culdesac to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the final permit. The plan must be retained on site and made available to the EPA, Tribe, and the IDEQ upon request.

C. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

Untreated or partially treated discharges from separate sanitary sewer systems are referred to as sanitary sewer overflows (SSOs). SSOs may present serious risks of human exposure when released to certain areas, such as streets, private property, basements, and receiving waters used for drinking water, fishing and shellfishing, or contact recreation. Untreated sewage contains pathogens and other pollutants, which are toxic. SSOs are not authorized under this permit. Pursuant to the NPDES regulations, discharges from separate sanitary sewer systems authorized by NPDES permits must meet effluent limitations that are based upon secondary treatment. Further, discharges must meet any more stringent effluent limitations that are established to meet the EPA-approved water quality standards.

The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system. The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify the EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6))

Written Reports – The permittee is required to provide the EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by the EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

D. Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities." The EPA strives to enhance the ability of overburdened

communities to participate fully and meaningfully in the permitting process for EPA-issued permits, including NPDES permits. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. As part of an agency-wide effort, the EPA Region 10 will consider prioritizing enhanced public involvement opportunities for EPA-issued permits that may involve activities with significant public health or environmental impacts on already overburdened communities. For more information, please visit http://www.epa.gov/compliance/ej/plan-ej/ .

As part of the permit development process, the EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. The EPA used a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

The Culdesac WWTP is not located within or near a Census block group that is potentially overburdened. The draft permit does not include any additional conditions to address environmental justice.

Regardless of whether a facility is located near a potentially overburdened community, the EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/articles/2013/05/09/2013-10945/epa-activities-to-promote-environmental-justice-in-the-permit-application-process#p-104). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

E. Design Criteria

The permit includes design criteria requirements. This provision requires the permittee to compare influent flow and loading to the facility's design flow and loading and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the annual average flow or loading exceeds 85% of the design criteria values for two consecutive months.

F. Industrial Waste Management Requirements

EPA implements and enforces the National Pretreatment Program regulations of 40 CFR 403, per authority from sections 204(b)(1)(C), 208(b)(2)(C)(iii), 301(b)(1)(A)(ii), 301(b)(2)(A)(ii), 301(h)(5) and 301(i)(2), 304(e) and (g), 307, 308, 309, 402(b, 405, and 501(a) of the Federal Water Pollutant Control Act as amended by the CWA of 1977.

The proposed permit contains requirements that the WWTP control industrial dischargers, pursuant to 40 CFR 403. Indirect dischargers to the treatment plant must comply with the applicable requirements of 40 CFR 403, any categorical pretreatment standards promulgated by the EPA, and any additional or more stringent requirements imposed by the WWTP as part of its approved pretreatment program or sewer use ordinance (e.g., local limits).

G. Standard Permit Provisions

Sections **III, IV and V** of the draft permit contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species.

NOAA Fisheries lists the following species:

- Fall Chinook salmon (Oncorhynchus tshawytscha) listed threatened
- Snake River steelhead (Oncorhynchus mykiss) listed threatened

Based on the USFWS website the Bull Trout is threatened.

EPA has determined that the issuance of an NPDES permit to the Culdesac WWTP will have no effect on bull trout, fall Chinook salmon or steelhead.

The U.S. Fish and Wildlife Service Draft Bull Trout Recovery Plan (USFWS 2002) identified causes of the bull trout listing. They are operation and maintenance of dams and other diversion structures, forest management practices, livestock grazing, agriculture, agricultural diversions, road construction and maintenance, mining, and introduction of nonnative species. No sewage treatment plant is identified as a contributing factor to the decline in bull trout. Similar factors have likely caused the decline of other salmonid species such as the fall Chinook salmon and the Snake River steelhead.

A similar conclusion was reached by the Biological Evaluation of the Reissuance of a National Pollutant Discharge Elimination System Permit for the Twin Falls, Idaho, Wastewater Treatment Plant (May, 2009, LimnoTech) (BE). It cited the factors of decline for Bull Trout are hydroelectric development and operation; increase in concentration of nutrients, sediment and other pollutants reaching the river and competition with nonnative species. In general this part of the Snake River basin and its tributaries are impacted by runoff from irrigated crop production, rangeland, pastureland, animal holding areas, feedlots, dredging, hydro-modification and urban runoff.

The majority of sediment input to the streams in the Middle Snake River basin comes from nonpoint sources. The BE cited a study by the University of Idaho that stated that over a 13 month period from 1990 to 1991, irrigated agriculture contributed more than 21,000 tons of sediment to the river. During this same period major tributaries with irrigated agriculture contributed more than 452,000 tons of sediment to the Middle Snake River. The Culdesac permit prohibits sediment discharges above 20.6 lbs/day or over a 13 month period four tons or about 0.0009 percent of the total loading of sediment. Sediment discharges will have no effect on listed species.

The other effluent limitations in the Culdesac permit ensure protection of the aquatic life standards in the Lapwai Creek. Therefore, the EPA determines the discharges from the Culdesac WWTP will have no effect on listed species.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH).

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

NOAA Fisheries lists the following critical habitat:

Snake River steelhead critical habitat

Fall Chinook salmon critical habitat

For the same reasons discharges will have no effect on listed species discharges will have no effect on EFH.

C. Certification Requirement

Since this permit authorizes the discharge into Nez Perce tribal waters, EPA will provide Section 401 certification under the Clean Water Act.

D. Permit Expiration

The permit will expire five years from the effective date.

IX. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

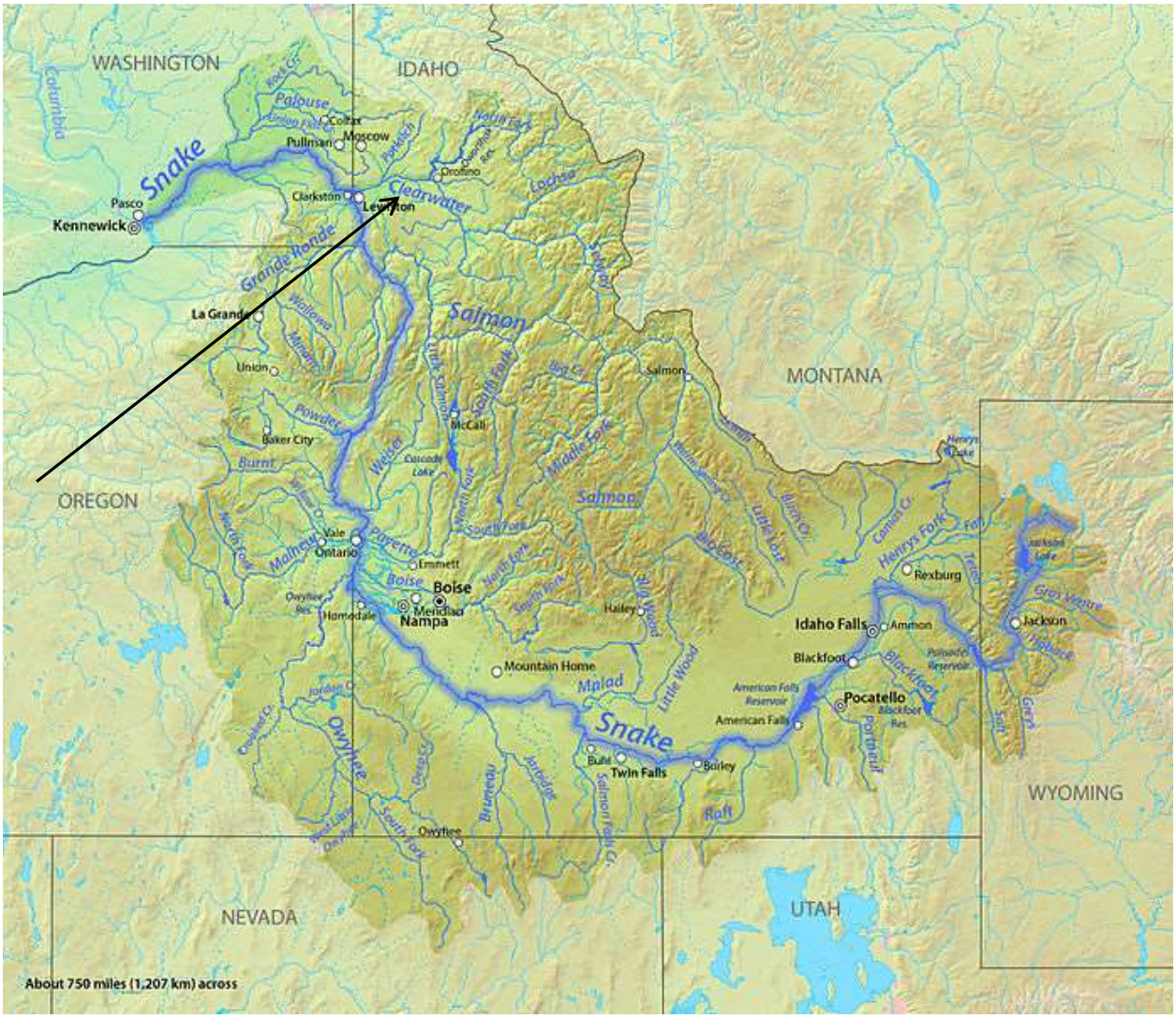
EPA. 2010. *NPDES Permit Writers' Manual.* Environmental Protection Agency, Office of Wastewater Management, EPA-833-K-10-001.

U.S. Fish and Wildlife Service. 2002. Chapter 16, Clearwater River Recovery Unit, Idaho. 196 p. In: U.S. Fish and Wildlife Service. Bull Trout (Salvelinus confluentus) Draft Recovery Plan. Portland, Oregon.

U.S. Environmental Protection Agency, EPA Region 10. Biological Evaluation of the Reissuance of a National Pollutant Discharge Elimination System Permit for the Twin Falls, Idaho, Wastewater Treatment Plant (May, 2009, LimnoTech)

Chandler, C. A. and Parot, R. P. 2003. *Fish distribution and relative abundance of Big Canyon Creek, Lapwai Creek, Mission Creek and Sweetwater Creek: Nez Perce and Lewis Counties, Idaho,* Nez Perce Tribe Department of Fisheries Resources Management, Lapwai, ID.

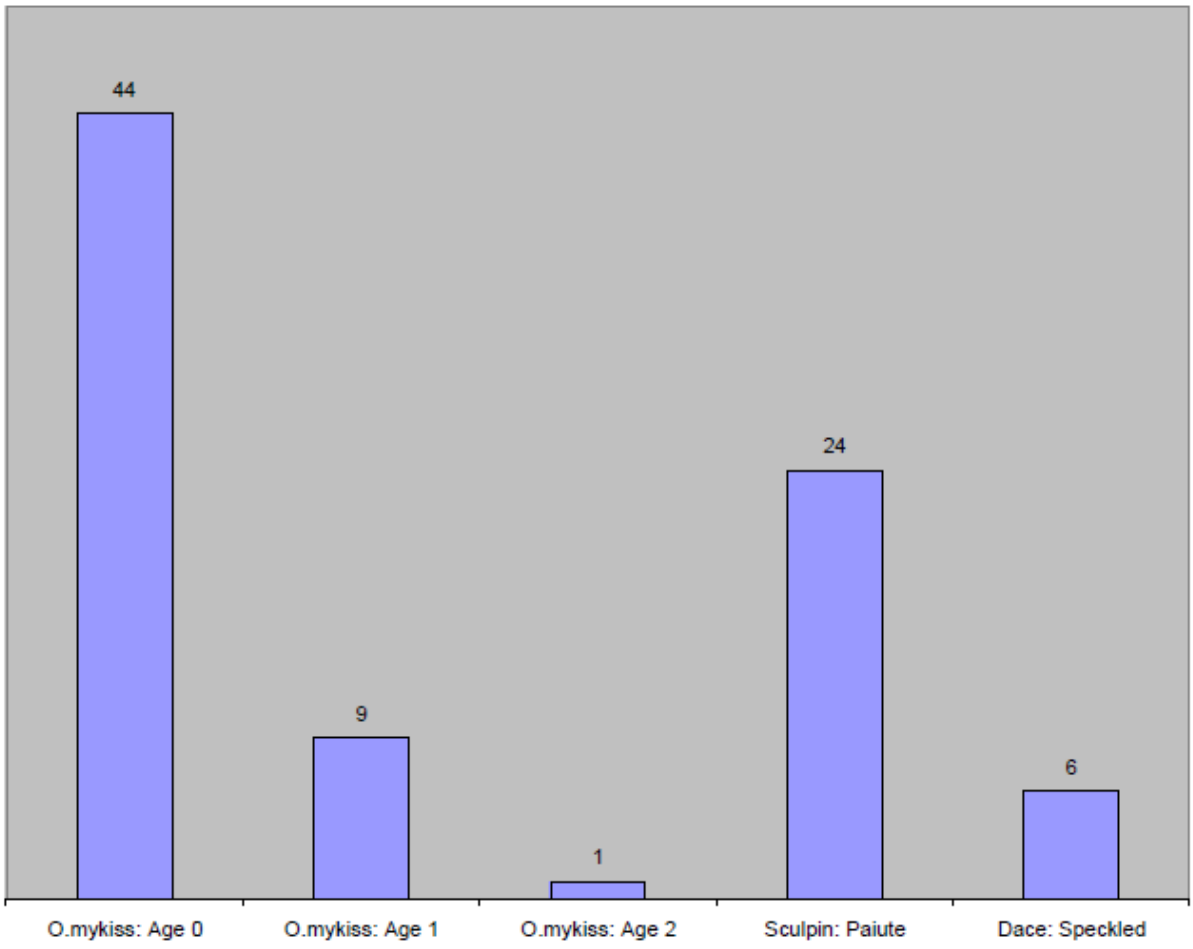
Appendix A: Facility Information and Spawning Locations



Lapwai Creek km 19.07

Species	Age Classes	Site Density		Site Biomass		Condition
Oncorhynchus mykiss	All	.30/m²	5.10/m³	2.01g/m²	34.46g/m³	-
	Age 0	**.24/m²**	**4.15/m³**	**.54g/m²**	**9.25g/m³**	**1.044**
	Age 1	.05/m²	.85/m³	.95g/m²	16.24g/m³	1.074
	Age 2	.006/m²	.09/m³	.52g/m²	8.97g/m³	1.052
	Age 2+	-	-	-	-	-
All	All	.46/m²	7.93/m³	2.71g/m²	46.46g/m³	N/A

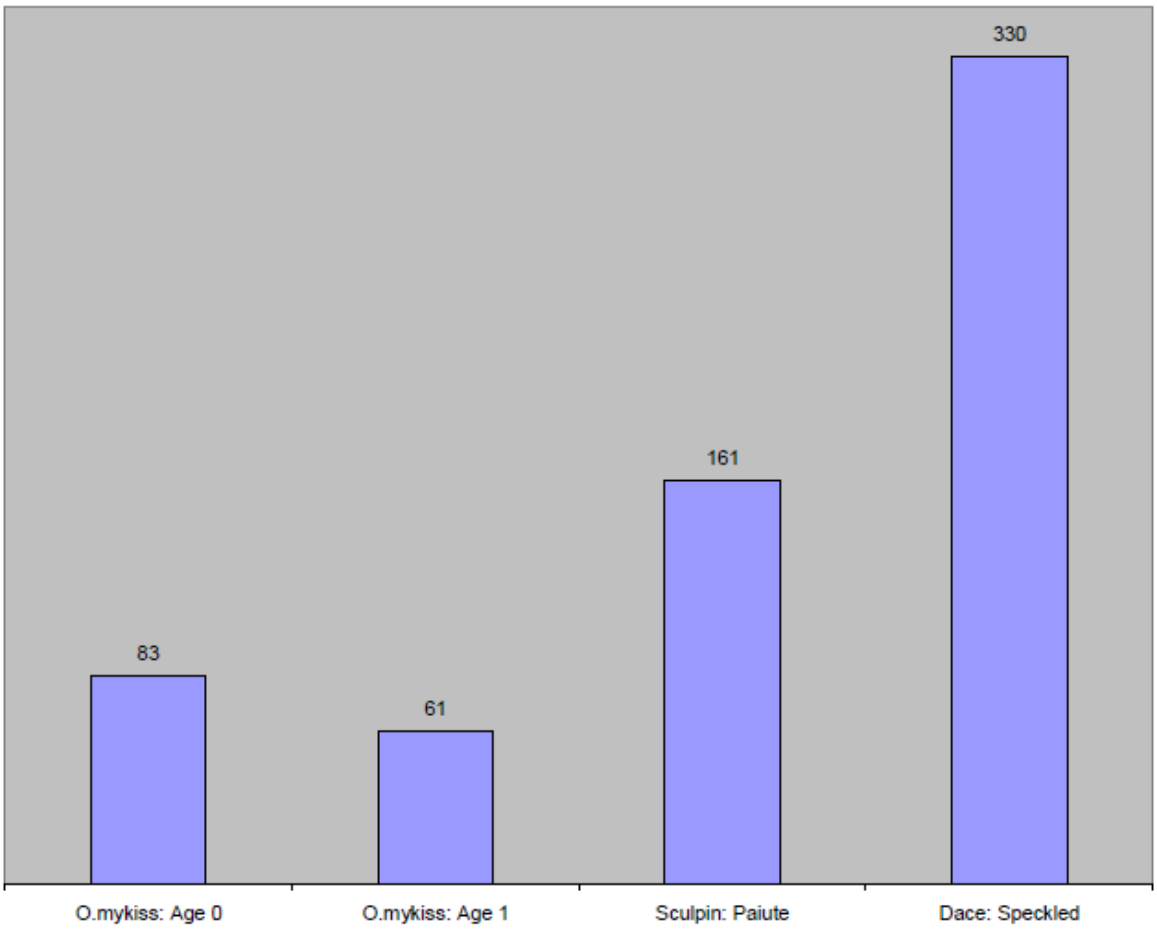
Species	Number Sampled	Sample Composition	Fork-Length Avg. (mm)	Weight Avg. (g)	Biomass (g)	Biomass Composition
O.mykiss: Age 0	44	52.38%	59	2.2	98	19.92%
O.mykiss: Age 1	9	10.71%	119.9	19.1	172	34.96%
O.mykiss: Age 2	1	1.20%	208	94.7	95	19.31%
Sculpin: Paiute	24	28.60%	65.2	4	96	19.51%
Dace: Speckled	6	7.10%	74.5	5.2	31	6.30%
TOTAL	**84**				**492**	



Lapwai Creek km 21.07

Species	Age Classes	Site Density		Site Biomass		Condition
Oncorhynchus mykiss	All	1.13/m²	13.10/m³	8.07g/m²	93.99g/m³	-
	Age 0	**.65/m²**	**7.55/m³**	**1.13g/m²**	**13.10g/m³**	**1.085**
	Age 1	.48/m²	5.55/m³	6.95g/m²	80.89g/m³	1.047
	Age 2	-	-	-	-	-
	Age 2+	-	-	-	-	-
All	All	4.96/m²	57.78/m³	23.86g/m²	277.80g/m³	N/A

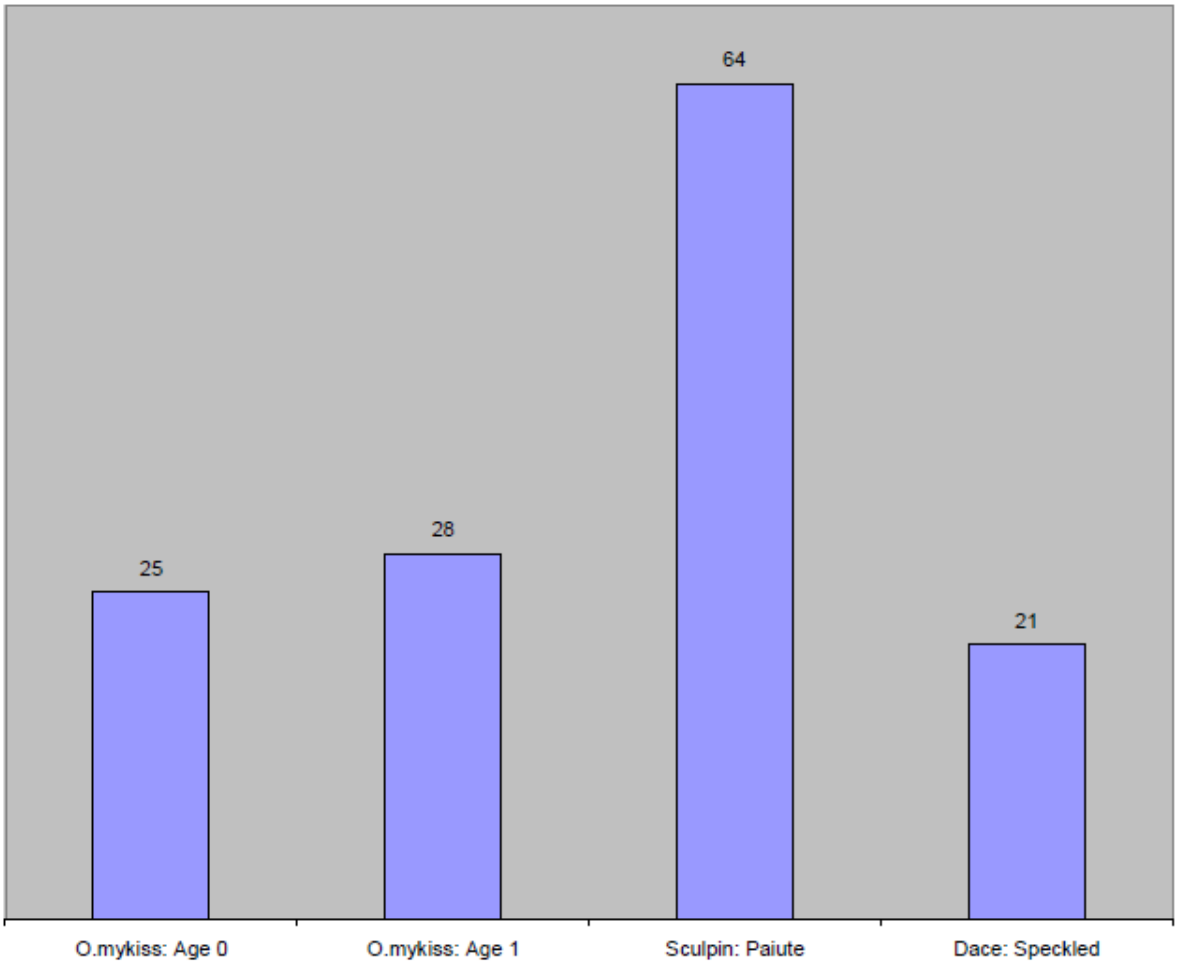
Species	Number Sampled	Sample Composition	Fork-Length Avg. (mm)	Weight Avg. (g)	Biomass (g)	Biomass Composition
O.mykiss: Age 0	83	13.07%	53.6	1.7	144	4.72%
O.mykiss: Age 1	61	9.61%	110.2	14.6	889	29.12%
Sculpin: Paiute	161	25.40%	69.8	5.1	816	26.70%
Dace: Speckled	330	51.90%	64	3.6	1204	39.50%
TOTAL	**635**				**3053**	



Lapwai Creek km 23.07

Species	Age Classes	Site Density		Site Biomass		Condition
Oncorhynchus mykiss	All	.24/m²	2.84/m³	2.37g/m²	28.45g/m³	-
	Age 0	**.11/m²**	**1.34/m³**	**.20g/m²**	**2.42g/m³**	**1.054**
	Age 1	.12/m²	1.50/m³	2.16g/m²	26.03g/m³	1.024
	Age 2	-	-	-	-	-
	Age 2+	-	-	-	-	-
All	All	.61/m²	7.41/m³	3.92g/m²	47.18g/m³	N/A

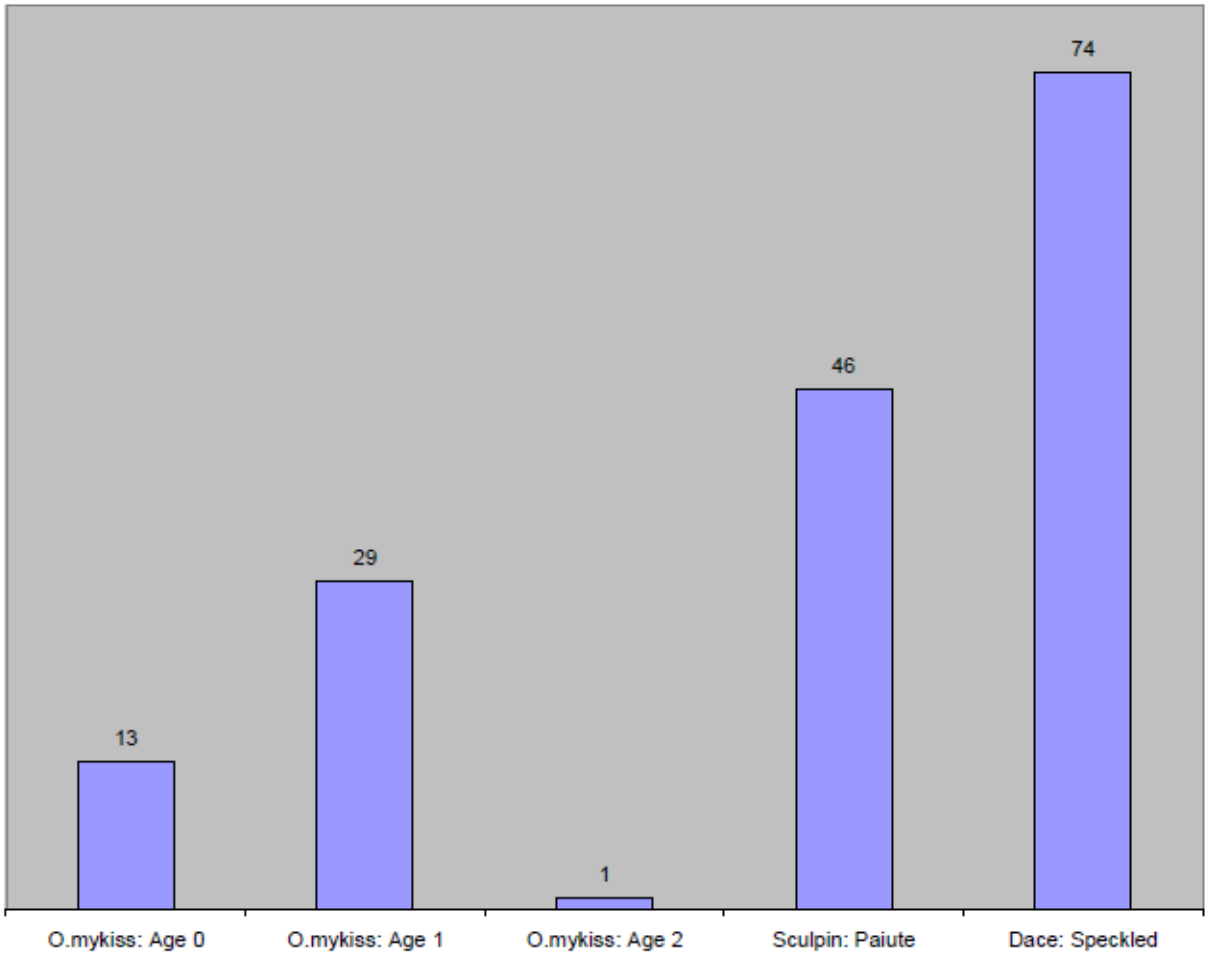
Species	Number Sampled	Sample Composition	Fork-Length Avg. (mm)	Weight Avg. (g)	Biomass (g)	Biomass Composition
O.mykiss: Age 0	25	18.12%	55	1.8	45	5.12%
O.mykiss: Age 1	28	20.29%	117.1	17.3	485	55.18%
Sculpin: Paiute	64	46.30%	64	4.2	267	30.30%
Dace: Speckled	21	15.20%	67.8	3.9	81	9.30%
TOTAL	**138**				**879**	



Lapwai Creek km 24.07

Species	Age Classes	Site Density		Site Biomass		Condition
Oncorhynchus mykiss	All	.18/m²	1.60/m³	2.35g/m²	21.27g/m³	-
	Age 0	**.05/m²**	**.48/m³**	**.11g/m²**	**1.00g/m³**	**1.056**
	Age 1	.12/m²	1.08/m³	2.03g/m²	18.34g/m³	1.070
	Age 2	.004/m²	.04/m³	.21g/m²	1.89g/m³	1.010
	Age 2+	-	-	-	-	-
All	All	.67/m²	6.05/m³	4.48g/m²	40.53g/m³	N/A

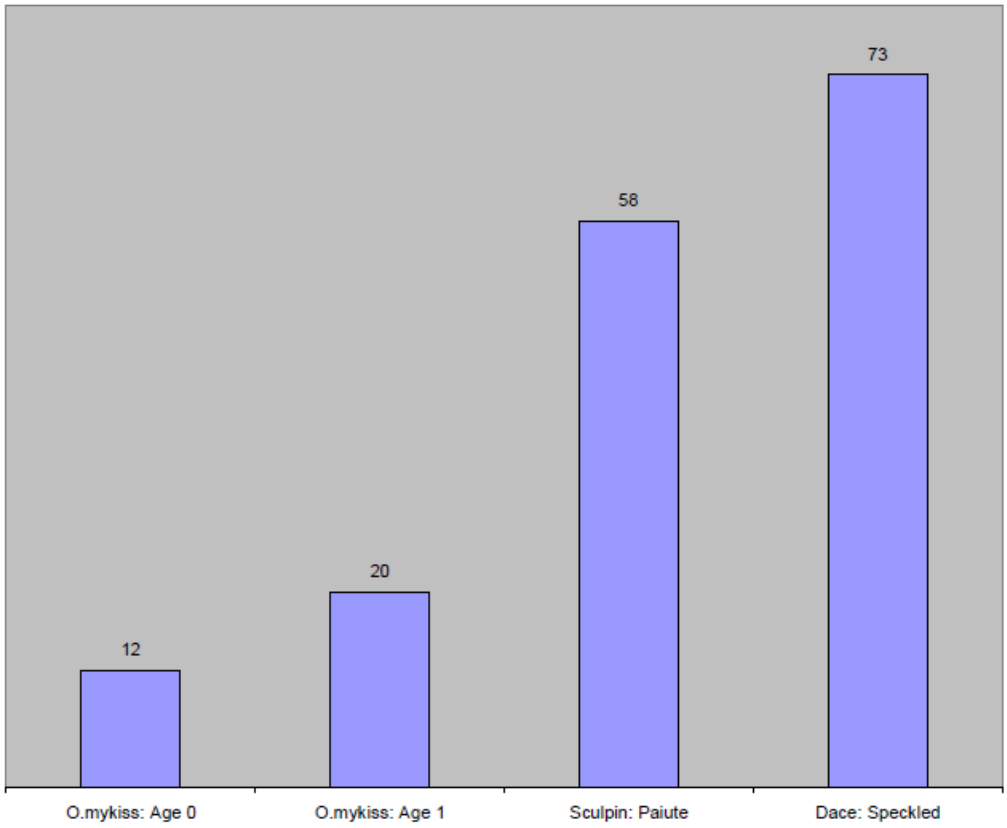
Species	Number Sampled	Sample Composition	Fork-Length Avg. (mm)	Weight Avg. (g)	Biomass (g)	Biomass Composition
O.mykiss: Age 0	13	7.98%	57.8	2.1	27	2.47%
O.mykiss: Age 1	29	17.79%	115.7	17.1	494	45.24%
O.mykiss: Age 2	1	0.60%	172	51.4	51	4.70%
Sculpin: Paiute	46	45.40%	61.6	3.5	260	23.70%
Dace: Speckled	74	28.20%	75.3	5.7	261	23.90%
TOTAL	**163**				**1092**	



Lapwai Creek km 25.07

Species	Age Classes	Site Density		Site Biomass		Condition
Oncorhynchus mykiss	All	.16/m²	1.33/m³	1.87g/m²	15.41g/m³	-
	Age 0	**.06/m²**	**.50/m³**	**.10g/m²**	**.83g/m³**	**1.023**
	Age 1	.10/m²	.83/m³	1.77g/m²	14.58g/m³	1.110
	Age 2	-	-	-	-	-
	Age 2+	-	-	-	-	-
All	All	.82/m²	6.77/m³	4.79g/m²	39.39g/m³	N/A

Species	Number Sampled	Sample Composition	Fork-Length Avg. (mm)	Weight Avg. (g)	Biomass (g)	Biomass Composition
O.mykiss: Age 0	12	7.36%	54.5	1.7	20	2.11%
O.mykiss: Age 1	20	12.27%	115.4	17.5	351	37.03%
Sculpin: Paiute	58	35.50%	64.3	4	232	24.40%
Dace: Speckled	73	44.80%	72.4	4.7	346	36.40%
TOTAL	**163**				**948**	



Appendix B: Water Quality Criteria Summary

This appendix, as noted in Section III.C. of this Fact Sheet, provides a summary of referenced water quality criteria applicable to Lapwai Creek.

The EPA is using the reference criteria below based on (1) the applicable beneficial uses of the river **(**i.e., cold water aquatic life, primary contact recreation, agricultural water supply, industrial water supply, wildlife habitats, and aesthetics**)**, (2) the type of facility, (3) a review of the application materials submitted by the permittee, and (4) the quality of the water in Lapwai Creek.

A. General Criteria (IDAPA 58.01.02.200)

Surface waters of the state shall be free from:

- hazardous materials,
- toxic substances in concentrations that impair designated beneficial uses,
- deleterious materials,
- radioactive materials,
- floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses,
- excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses,
- oxygen demanding materials in concentrations that would result in an anaerobic water condition

Surface water level shall not exceed allowable level for:

- radioactive materials, or
- sediments

B. Numeric Criteria for Toxics (IDAPA 58.01.02.210)

As discussed in Section III.C of this Fact Sheet, the EPA has used the Idaho water quality standards as reference. Monitoring of the effluent has shown that the following toxic pollutants have been present at detectable levels in the effluent.

Ammonia
Chlorine

C. Surface Water Criteria For Aquatic Life Uses (IDAPA 58.01.02.250)

1. pH: Within the range of 6.5 to 9.0
2. Total Dissolved Gas: <110% saturation at atm. pressure.
3. Dissolved Oxygen: Exceed 6 mg/L at all times.

4. Ammonia:

Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. The table below details the equations used to determine water quality criteria for ammonia.

The Nez Perce Tribe has collected pH and temperature data in Lapwai Creek upstream of the facility in 2003 and through 2004. These data were used to determine the appropriate pH and temperature values to calculate the ammonia criteria.

As with any natural water body the pH and temperature of the water will vary over time. Therefore, to protect water quality criteria it is important to develop the criteria based on pH and temperature values that will be protective of aquatic life at all times. The EPA used the 95th percentile of the pH and temperature data for the calculations, which were calculated to be 8.40 and 20.6 on an annual basis. Culdesac asked for seasonal ammonia limits. The 95th percentile pH in the winter is 8.57 and the 95th percentile winter temperature is 10.0. The 95th percentile summer pH is 8.0 and the summer temperature is 20.9.

Table B-1: Water Quality Criteria for Ammonia µg/L Including Protection of Early Life Stages of Fish

	Acute Criterion	Chronic Criterion
Equations:	$\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}$	$\left(\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right)\times MIN\left(2.85,1.45\times10^{0.028\times(25-T)}\right)$
Results May 1- September 30:	5,479	1,581
Results October 1 – April 30:	1,873	968

D. Surface Water Quality Criteria For Recreational Uses (IDAPA 58.01.02.251)

a. Geometric Mean Criterion. Waters designated for primary or secondary contact recreation are not to contain *E. coli* in concentrations exceeding a geometric mean of 126 *E. coli* organisms per 100 ml based on a minimum of 5 samples taken every 3 to 7 days over a 30 day period.

b. Use of Single Sample Values: This section states that that a water sample that exceeds certain "single sample maximum" values indicates a likely exceedance of the geometric mean criterion. For waters designated for primary contact recreation, the "single sample maximum" value is 406 organisms per 100 ml (IDAPA 58.01.02.251.01.b.ii.). for primary and contact recreation.

Appendix C: Low Flow Conditions and Dilution

A. Low Flow Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits. For reference, Idaho's water quality standards were used to evaluate low flow receiving water conditions as defined below:

Acute aquatic life	1Q10 or 1B3
Chronic aquatic life	7Q10 or 4B3
Non-carcinogenic human health criteria	30Q5
Carcinogenic human health criteria	harmonic mean flow
Ammonia	30B3 or 30Q10
1. The 1Q10 represents the lowest one day flow with an average recurrence frequency of once in 10 years. 2. The 1B3 is biologically based and indicates an allowable exceedence of once every 3 years. 3. The 7Q10 represents lowest average 7 consecutive day flow with an average recurrence frequency of once in 10 years. 4. The 4B3 is biologically based and indicates an allowable exceedance for 4 consecutive days once every 3 years. 5. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 5 years. 6. The 30Q10 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 10 years. 7. The harmonic mean is a long-term mean flow value calculated by dividing the number of daily flow measurements by the sum of the reciprocals of the flows.	

The EPA's *Water Quality Criteria; Notice of Availability; 1999 Update of Ambient Water Quality Criteria for Ammonia; Notice* (64 FR 719769 December 22, 1999) identifies the appropriate flows to be used.

Monitoring upstream of Culdesac by the Nez Perce tribe between June, 2003 and June 2004 measured the lowest one day average flow of 1.35 cfs for the summer and 2.57 1Q10 for the winter. These 1Q10s are used. However, a 7Q10 and 30B3 is not available from the Nez Perce monitoring.

USGS Station: USGS 13342450 LAPWAI CREEK NR LAPWAI, ID is downstream of Culdesac. However, Sweetwater Creek, Mission Creek and other tributaries to Lapwai Creek discharge between Culdesac and this USGS station increasing the available dilution for Culdesac. Monitoring is not available for Sweetwater Creek, Mission Creek or other tributaries between Culdesac and the USGS station. Based on ten Nez Perce samples upstream the lowest daily flow is 1.35 cfs occurring in the summer season. The lowest daily flow over ten years (1Q10) at the USGS station during the summer season is 1.46 cfs or about 10.6 percent higher. Based on this small difference in flows using the downstream USGS station is an acceptable estimate of 7Q10 and 30B3 flows to determine reasonable potential and to calculate effluent limitations. Even with the additional dilution of the higher instream flow Culdesac still has a reasonable potential to violate the water quality standards for ammonia and total residual chlorine.

Upstream surface water monitoring is required to improve the quality of the receiving water data for use in developing the next permit.

The estimated low flows for the station are presented in Table C-1. The 7Q10 and 30B3 flow are calculated based on USGS Station 13090500, the summer 1Q10 is based on Nez Perce Tribe's monitoring.

Table C-1: Critical Flows (cfs)			
Flows	**Annual Basis**	**May 1st – September 30th**	**October 1st – April 30th**
1Q10	1.35	1.35	2.57
7Q10	1.88	1.64	4.2
30B3	3.12	3.8	3.76

B. Mixing Zones and Dilution

In some cases a dilution allowance or mixing zone is permitted. A mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where the water quality standards may be exceeded as long as acutely toxic conditions are prevented (the EPA, 1994). The federal regulations at 40 CFR 131.13 states that "States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances."

The Idaho Water Quality Standards at IDAPA 58.01.02.060 provides Idaho's mixing zone policy for point source discharges.

The following formula is used to calculate a dilution factor based on the allowed mixing zone.

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e}$$

Where:

D = Dilution Factor
Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
Q_u = Receiving water low flow rate upstream of the discharge (1Q10, 7Q10, 30B3, etc)
%MZ = Percent Mixing Zone

The EPA calculated dilution factors for year round critical low flow conditions except for ammonia where summer and winter dilution factors were calculated. All dilution factors are calculated with the effluent flow rate set equal to the design flow of 0.055 mgd. The dilution factors are listed in Table C-2 and C-3.

Table C-2: Year-Round Dilution Factors	
Flows	
1Q10	5.0
7Q10	5.3
30B3	11.4

Table C-3: Seasonal Dilution Factors for Ammonia		
Flows	**Summer May 1st – September 30th**	**Winter October 1st – April 30th**
1Q10	5.0	8.6
30B3	12.2	12.0

Appendix D: Basis for Effluent Limits

The following discussion explains the derivation of technology and water quality based effluent limits proposed in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, Part C discusses anti-backsliding provisions, Part D discusses the effluent limits imposed due to the State's anti-degradation policy, and Part E presents a summary of the facility specific limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which all POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Table D-1: Secondary Treatment Effluent Limits (40 CFR 133.102)

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	---
pH	within the limits of 6.0 - 9.0 s.u.	

The current permit TSS limits were in accordance with 40 CFR 133.103(c) and (IDAPA16.01.01.420.02.b.ii). These alternative state requirements (ASRs) for TSS were a monthly limit of 70 mg/L. However, this limitation was never submitted to nor approved by EPA as ASRs. Therefore, it should not have been included in the previous permit. Additionally, the State of Idaho eliminated IDAPA16.01.01.420.02.b.ii. The weekly limit was calculated as 100 mg/L by multiplying the monthly ASR of 70 by 1.4 times. Since this was based on the unapproved and eliminated monthly ASR limit it also cannot be used as a TSS effluent limitation.

On September 20, 1984, EPA revised the Secondary Treatment Regulations (40CFR 133.102) for facilities that use waste stabilization ponds as the principal process. These revisions established effluent limitations for Treatment Equivalent to Secondary Treatment (40 CFR 133.105). These provisions allow alternative limits for BOD_5 and TSS for such facilities, provided the following requirements are met (40 CFR 133.101(g) and 40 CFR 133.105(d)):

(1) The BOD_5 and TSS effluent concentrations consistently achievable through proper operation and maintenance (§ 133.101(f)) of the treatment works exceed

the minimum level of the effluent quality set forth in §§ 133.102(a) and (b).

The regulation at 133.101(f) defines effluent concentrations consistently achievable through proper operation and maintenance as the 95th percentile value for a given pollutant for the 30-day average effluent quality achieved by a treatment works in a period of at least two years and a 7-day average value equal to 1.5 times the value derived from that value.

Also, 40 CFR 133.105(f) states:

"Furthermore, permitting authorities shall require more stringent limitations when adjusting permits if: (1) For existing facilities the permitting authority determines that the 30-day average and the 7- day average BOD_5 and TSS effluent values that could be achievable through proper operating and maintenance of the treatment work, based on an analysis of the past performance of the treatment works, would enable the treatment works to achieve more stringent limitations"

(2) A trickling filter or waste stabilization pond (lagoon) is used as the principal process, and

(3) The treatment works provide significant biological treatment of municipal wastewater. The regulations at § 133.101(k) defines *significant biological treatment* as the use of an aerobic or anaerobic biological treatment process in a treatment works to consistently achieve a 30-day average of at least 65 percent removal of BOD_5.

Requirements for Treatment Equivalent to Secondary

The City of Culdesac does not meet the requirements for Treatment Equivalent to Secondary.

(1) Culdesac's BOD_5 and TSS effluent concentrations do not consistently exceed the minimum level of effluent quality set forth in §§ 133.102(a) and (b) shown in Table B-1. Based on an analysis of past performance of the treatment works Culdesac can achieve more stringent limitations than Treatment Equivalent to Secondary Treatment.

BOD_5

An analysis of the BOD_5 monitoring data over the last three years reported from July, 2012 to June, 2015 found the 95th percentile 30-day average effluent quality achieved by the treatment works for TSS was 24 mg/L. Therefore, the City of Culdesac exceeds the minimum requirement for the 30-day monthly limit of 30 mg/L.

The 7-day average TSS value is equal to:

1.5 x 24 mg/L = 36 mg/L

Therefore, Culdesac does not exceed the minimum level of control for the average weekly limit of 45 mg/L. The proposed permit will require secondary treatment concentration limits for BOD_5 as shown in Table B-1.

Based on past performance over the last three years Culdesac can achieve through proper operation and maintenance of the treatment work a BOD_5 removal rate of

85 percent. Over the last three years Culdesac achieved this level of control with only two exceptions. Therefore, the proposed permit will require Secondary Treatment removal requirements of 85 percent for BOD_5.

TSS

An analysis of the TSS monitoring data over the last three years reported from July, 2012 to June, 2015 found the 95th percentile 30-day average effluent quality achieved by the treatment works for TSS was 15 mg/L. Therefore, the City of Culdesac exceeds the minimum requirement for the 30-day monthly limit of 30 mg/L.

The 7-day average TSS value is equal to:

1.5 x 15 mg/L = 22.5 mg/L

Therefore, Culdesac does not exceed the minimum level of control for the average weekly limit of 45 mg/L. The proposed permit will require secondary treatment concentration limits for TSS as shown in Table B-1.

Based on past performance over the last three years Culdesac can achieve through proper operation and maintenance of the treatment work a TSS removal rate of 85 percent. Over the last three years Culdesac achieved this level of control with no exceptions. Therefore, the proposed permit will require Secondary Treatment removal requirements of 85 percent for TSS.

Mass-based Limits

The federal regulations at 40 CFR §122.45(b) and (f) require that POTW limitations be expressed as mass-based limits using the design flow of the facility. The mass-based limits, expressed in lbs/day, are calculated as follows based on the design flow:

Mass-based limit (lbs/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

The mass limits for BOD_5 are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.055 mgd × 8.34 = 13.7 lbs/day

Average Weekly Limit = 45 mg/L × 0.055 mgd × 8.34 = 20.6 lbs/day

The mass limits for TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.055 mgd × 8.34 = 13.7 lbs/day

Average Weekly Limit = 45 mg/L × 0.055 mgd × 8.34 = 20.6 lbs/day

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Discharges to State and Tribal waters must also comply with limitations imposed by the State and Tribe as part of its certification of NPDES permits under

section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States.

The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State and Tribal water quality standard, including narrative criteria for water quality, and that the level of water quality to be achieved by limits on point sources is derived from and complies with all applicable water quality standards.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

Reasonable Potential Analysis

When evaluating the effluent to determine if the pollutant parameters in the effluent are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State and Tribal water quality criterion, the EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. The EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific pollutant, then the discharge has the reasonable potential to cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it may be appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the concentration of the pollutant in the receiving water is less than the criterion necessary to protect the designated uses of the water body.

The reasonable potential analysis for Culdesac was based on a mixing zone of 25%. The EPA is utilizing this mixing zone for the following reasons:

- The Idaho WQS were used as reference for setting permit limits, and to protect downstream uses in the State of Idaho.
- To protect the designated uses of Lapwai Creek.

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. Wasteload allocations are determined in one of the following ways:

1. TMDL-Based Wasteload Allocation

Where the receiving water quality does not meet water quality standards, the wasteload allocation is generally based on a TMDL developed by the State. A TMDL is a determination of the amount of a pollutant from point, non-point, and natural background sources that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity risks violating water quality standards.

To ensure that these waters will come into compliance with water quality standards Section 303(d) of the CWA requires States to develop TMDLs for those water bodies that will not meet water quality standards even after the imposition of technology-based effluent limitations. The first step in establishing a TMDL is to determine the assimilative capacity (the loading of pollutant that a water body can assimilate without exceeding water quality standards). The next step is to divide the assimilative capacity into allocations for non-point sources (load allocations), point sources (wasteload allocations), natural background loadings, and a margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the wasteload allocation for the point source.

2. Mixing zone based WLA

When a mixing zone is allowed for the discharge, the WLA is calculated by using a simple mass balance equation. The equation takes into account the available dilution provided by the mixing zone, and the background concentrations of the pollutant. The WLAs for ammonia and cadmium were derived using a mixing zone.

3. Criterion as the Wasteload Allocation

In some cases a mixing zone cannot be authorized, either because the receiving water is already at, or exceeds, the criterion, the receiving water flow is too low to provide dilution, or the facility can achieve the effluent limit without a mixing zone. In such cases, the criterion becomes the wasteload allocation. Establishing the criterion as the wasteload allocation ensures that the effluent discharge will not contribute to an exceedance of the criteria. The WLA for ammonia and cadmium were derived using this method.

Once the wasteload allocation has been developed, the EPA applies the statistical permit limit derivation approach described in Chapter 5 of the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991, hereafter referred to as the TSD) to obtain monthly average, and weekly average or daily maximum permit limits. This approach takes into account effluent variability, sampling frequency, and water quality standards.

Summary - Water Quality-based Effluent Limits

The water quality based effluent limits in the draft permit, developed as disclosed above, are summarized below.

Ammonia

A reasonable potential calculation showed that the Culdesac discharge would have the reasonable potential to cause or contribute to a violation of the water quality criteria for

ammonia. Therefore, the draft permit contains a water quality-based effluent limit for ammonia Culdesac requested seasonal limits. The EPA calculated seasonal limits that resulted in higher limits while maintaining compliance with IDEQ water quality standards for ammonia.

Salmonid spawning is an existing beneficial use of Lapwai Creek. The reference ammonia criteria protects early life stages of fish.

See Appendices D and E for reasonable potential and effluent limit calculations for ammonia.

Chlorine

A reasonable potential calculation showed that the Culdesac discharge would have the reasonable potential to cause or contribute to a violation of the water quality criteria for chlorine. Therefore, the draft permit contains a water quality-based effluent limit for chlorine. See Appendices D and E for reasonable potential and effluent limit calculations for chlorine. The chlorine criteria protects salmonid spawning.

pH

The Idaho water quality standards at IDAPA 58.01.02.250.01.a, require pH values of the river to be within the range of 6.5 to 9.0. Mixing zones are generally not granted for pH, therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water. Culdesac has achieved this level of control therefore no mixing zone is necessary for this discharge.

E. coli

The Idaho water quality standards state that waters of the State of Idaho, that are designated for recreation, are not to contain *E. coli* bacteria in concentrations exceeding 126 organisms per 100 ml based on a minimum of five samples taken every three to seven days over a thirty day period. Therefore, the draft permit contains a monthly geometric mean effluent limit for *E. coli* of 126 organisms per 100 ml (IDAPA 58.01.02.251.01.a.).

The Idaho water quality standards also state that a water sample that exceeds certain "single sample maximum" values indicates a likely exceedance of the geometric mean criterion, although it is not, in and of itself, a violation of water quality standards. For waters designated for primary contact recreation, the "single sample maximum" value is 406 organisms per 100 ml (IDAPA 58.01.02.251.01.b.ii.).

The goal of a water quality-based effluent limit is to ensure a low probability that water quality standards will be exceeded in the receiving water as a result of a discharge, while considering the variability of the pollutant in the effluent. Because a single sample value exceeding 406 organisms per 100 ml indicates a likely exceedance of the geometric mean criterion, the EPA has imposed an instantaneous (single grab sample) maximum effluent limit for *E. coli* of 406 organisms per 100 ml, in addition to a monthly geometric mean limit of 126 organisms per 100 ml, which directly implements the water quality criterion for *E. coli*. This will ensure that the discharge will have a low probability of exceeding water quality standards for *E. coli*.

Regulations at 40 CFR 122.45(d)(2) require that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable. Additionally, the terms "average monthly limit" and "average weekly limit" are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic

average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

Residues

The Idaho water quality standards require that surface waters of the State be free from floating, suspended or submerged matter of any kind in concentrations impairing designated beneficial uses. The draft permit contains a narrative limitation prohibiting the discharge of such materials.

C. Anti-backsliding Provisions

Basis for Less Stringent Effluent Limits

Section 402(o) of the Clean Water Act and federal regulations at 40 CFR §122.44 (l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. Section 402(o)(1) of the CWA states that a permit may not be reissued with less-stringent limits established based on Sections 301(b)(1)(C), 303(d) or 303(e) (i.e. water quality-based limits or limits established in accordance with State treatment standards) except in compliance with Section 303(d)(4). Section 402(o)(1) also prohibits backsliding on technology-based effluent limits established using best professional judgment (i.e. based on Section 402(a)(1)(B)), but in this case, the effluent limits being revised are water quality-based effluent limits (WQBELs).

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's and Tribe's antidegradation policy. Additionally, Section 402(o)(2) contains exceptions to the general prohibition on backsliding in 402(o)(1). According to the EPA NPDES Permit Writers' Manual (EPA-833-K-10-001) the 402(o)(2) exceptions are applicable to WQBELs (except for 402(o)(2)(B)(ii) and 402(o)(2)(D)) and are independent of the requirements of 303(d)(4). Therefore, WQBELs may be relaxed as long as either the 402(o)(2) exceptions or the requirements of 303(d)(4) are satisfied.

Even if the requirements of Sections 303(d)(4) or 402(o)(2) are satisfied, Section 402(o)(3) prohibits backsliding which would result in violations of water quality standards or effluent limit guidelines.

An anti-backsliding analysis was done for total residual chlorine. As a result of the analysis the limitations in the Culdesac permit for the effluent limitations for total residual chlorine are not being retained in the proposed permit but less stringent limitations are established. The anti-backsliding analysis for chlorine is discussed in more detail below.

The monthly effluent limit for total residual chlorine has increased from 9 µg/L to 51 µg/L and the weekly limit has increased from 17 µg/L to 94 µg/L. The mass limits are also less stringent. The chlorine limit being revised is a water quality based effluent limit. The receiving water, Lapwai Creek, exceeds the level necessary to support the water body's designated uses. Therefore the chlorine limits maybe revised as long as the revision is consistent with the

reference State's antidegradation policy. The EPA determines it is consistent with the reference State's antidegradation policy satisfying the CWA section 303(d)(4) exception (See Appendix F).

The proposed total chlorine effluent limits do not result in violations of the water quality standards (See Appendix E, Reasonable Potential and Water Quality-Based Effluent Limit Calculations, Table Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit WQBEL Calculations). Therefore it is allowable under Section 402(o)(3) that prohibits permits that result in violations of the water quality standards.

The effective limit for total residual chlorine i.e. quantifiable level, was 100 µg/L. The new limits are a AML of 51 µg/L and an MDL of 15.2 µg/L thus the effective chlorine limit is more stringent than that in the previous permit. The mass based limits are derived from the concentration limits and are therefore also effectively more stringent than that in the previous permit.

D. Antidegradation

An anti-degradation analysis is set forth in Appendix F.

Appendix E: Reasonable Potential and Water Quality-Based Effluent Limit Calculations

Part A of this appendix explains the process the EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to an excursion above water quality standards. Part B demonstrates how the water quality-based effluent limits (WQBELs) in the draft permit were calculated.

A. Reasonable Potential Analysis

The EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This following section discusses how the maximum projected receiving water concentration is determined

Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{Equation 1}$$

where,

- C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
- C_e = Maximum projected effluent concentration
- C_u = 95th percentile measured receiving water upstream concentration
- Q_d = Receiving water flow rate downstream of the effluent discharge = Q_e+Q_u
- Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
- Q_u = Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \text{Equation 2}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \text{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \text{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e} \qquad \text{Equation 5}$$

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{Equation 6}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u \qquad \text{Equation 7}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for C_d are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) the EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter

has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$p_n = (1 - \text{confidence level})^{1/n}$ Equation 8

where,
p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}}$$ Equation 9

Where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile)
Z_{Pn} = z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)
CV = coefficient of variation (standard deviation ÷ mean)

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$C_e = (RPM)(MRC)$ Equation 10

where MRC = Maximum Reported Concentration

Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

Results of Reasonable Potential Calculations

It was determined that both ammonia and cadmium have reasonable potential to cause or contribute to an exceedance of water quality criteria at the edge of the mixing zone. The results of the calculations are presented at the end of this appendix.

B. WQBEL Calculations

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The draft permit includes WQBELs for ammonia and cadmium. The following discussion presents the general equations used to calculate the water quality-based effluent limits.

Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equations 9 and 10). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{Equation 11}$$

The Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, the EPA must calculate a wasteload allocation in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation 12. The criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

$$C_e = WLA = \frac{D \times (C_d - C_u) + C_u}{CT} \qquad \text{Equation 12}$$

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from the EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\sigma)} \qquad \text{Equation 13}$$

$$LTA_c = WLA_c \times e^{(0.5\sigma_4^2 - z\sigma_4)} \qquad \text{Equation 14}$$

where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile probability basis)
CV = coefficient of variation (standard deviation ÷ mean)
σ_4^2 = $\ln(CV^2/4 + 1)$

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c = WLA_c \times e^{(0.5\sigma_{30}^2 - z\sigma_{30})} \quad \text{Equation 15}$$

where,

$\sigma_{30}^2 = \ln(CV^2/30 + 1)$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)} \quad \text{Equation 16}$$

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2)} \quad \text{Equation 17}$$

where σ, and σ^2 are defined as they are for the LTA equations above, and,

σ_n^2 = $\ln(CV^2/n + 1$

z_a = 1.645 (z-score for the 95th percentile probability basis)

z_m = 2.326 (z-score for the 99th percentile probability basis)

n = number of sampling events required per month. With the exception of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 30.

The table below details the calculations for reasonable potential analysis and water quality-based effluent limits.

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	City of Culdesac
Facility Flow (mgd)	0.055
Facility Flow (cfs)	0.085

Critical River Flows	(IDAPA 58.01.02 03. b)	Annual Crit. Flows	Seasonal Summer	Seasonal Winter	Annual Crit. Flows
Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC)	**1Q10**	1.35	1.35	2.57	1.35
Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC)	**7Q10 or 4B3**	1.88	1.64	4.20	1.88
Ammonia	**30B3/30Q10** (seasonal)	3.54	3.80	3.76	3.54
Human Health - Non-Carcinogen	**30Q5**	3.12			3.12
Human Health - carcinogen	**Harmonic Mean Flow**	12.50			12.50

Receiving Water Data		Notes:	Annual Crit. Flows	Seasonal Summer	Seasonal Winter
Hardness, as mg/L $CaCO_3$	*** Enter Hardness on WQ Criteria tab ***	5th % at critical flows			
Temperature, °C	Temperature, °C	95th percentile	20.6	20.92	10.012
pH, S.U.	pH, S.U.	95th percentile	8.4025	8.013	8.57

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present	AMMONIA, default: cold water, fish early life stages present	AMMONIA, default: cold water, fish early life stages present	CHLORINE (Total Residual)
Effluent Data	**Number of Samples in Data Set (n)**		59	23	35	60
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.92	1.17	0.70	0.499
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		21,688	13,800	22,490	90
	Calculated 50th % Effluent Conc. (when n>10), Human Health Only					
Receiving Water Data	**90th Percentile Conc., µg/L - (C_u)**			50	110	0
	Geometric Mean, µg/L, Human Health Criteria Only					
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	2,580.844	5,478.789	1,873.399	19.
	Aquatic Life Criteria, µg/L	Chronic	867.798	1,580.615	967.562	11.
	Human Health Water and Organism, µg/L		--	--	--	--
	Human Health, Organism Only, µg/L		--	--	--	--
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute				--
		Chronic				--
	Carcinogen (Y/N), Human Health Criteria Only		--	--	--	--
Percent River Flow Default Value = **25%**	**Aquatic Life - Acute**	**1Q10**	25%	25%	25%	25%
	Aquatic Life - Chronic	7Q10 or 4B3	--	--	--	25%
	Ammonia	30B3 or 30Q10	25%	25%	25%	25%
	Human Health - Non-Carcinogen	30Q5	--	--	--	25%
	Human Health - carcinogen	Harmonic Mean	--	--	--	25%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	5.0	5.0	8.6	5.0
	Aquatic Life - Chronic	7Q10 or 4B3	--	--	--	6.5
	Ammonia	30B3 or 30Q10	11.4	12.2	12.0	11.4
	Human Health - Non-Carcinogen	30Q5	--	--	--	10.2
	Human Health - carcinogen	Harmonic Mean	--	--	--	37.7

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.783	0.929	0.631	0.472
P_n	$=(1\text{-confidence level})^{1/n}$, where confidence level =	**99%**	0.925	0.819	0.877	0.926
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)-0.5\sigma^2]$, where	**99%**	2.0	3.7	2.1	1.5
Statistically projected critical discharge concentration (C_e)			43453.53	51425.52	47012.82	136.21
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	8749.11	10394.16	5594.89	27.43
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	3811.26	4273.12	4003.07	20.88
Reasonable Potential to exceed Aquatic Life Criteria			**YES**	**YES**	**YES**	**YES**

Aquatic Life Effluent Limit Calculations

Number of Compliance Samples Expected per month (n)			4	4	4	4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			4	4	4	4
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		0.920	1.170	0.700	0.499
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		0.920	1.170	0.700	0.499
Acute WLA, ug/L	$C_d = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a\text{-}1)$	Acute	12,818.1	27,012.7	15,189.3	94.4
Chronic WLA, ug/L	$C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c\text{-}1)$	Chronic	9,894.1	18,670.4	10,441.7	71.8
Long Term Ave (LTA), ug/L	WLAc x $\exp(0.5\sigma^2\text{-}z\sigma)$, Acute	**99%**	2,817.1	4,792.8	4,267.0	35.2
(99th % occurrence prob.)	WLAa x $\exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic	**99%**	6,806.0	11,679.6	7,828.7	41.8
Limiting LTA, ug/L	used as basis for limits calculation		2,817.1	4,792.8	4,267.0	35.2
Applicable Metals Criteria Translator (metals limits as total recoverable)			--	--	--	--
Average Monthly Limit (AML), ug/L	where % occurrence prob =	**95%**	**5,261**	**10,098**	**7,045**	**51**
Maximum Daily Limit (MDL), ug/L	where % occurrence prob =	**99%**	**12,818**	**27,013**	**15,189**	**94**
Average Monthly Limit (AML), mg/L			**5.3**	**10.1**	**7.0**	**0.051**
Maximum Daily Limit (MDL), mg/L			**12.8**	**27.0**	**15.2**	**0.094**
Average Monthly Limit (AML), lb/day			**2.41**	**4.63**	**3.23**	**0.023**
Maximum Daily Limit (MDL), lb/day			**5.88**	**12.39**	**6.97**	**0.043**

Appendix F: Antidegradation Analysis

The WQS contain an antidegradation policy providing Tier 1 and Tier 2 levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

- Tier 1 Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier 2 Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).

The EPA is employing a water body by water body approach in conducting the antidegradation analysis. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier 1 protection for that use, unless specific circumstances warranting Tier 2 protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data was used to determine support status and the Tier protection. (IDAPA 58.01.02.052.05).

According to the 2012 Integrated Report Lapwai Creek in the vicinity of the discharge is fully supporting beneficial uses. Therefore the EPA will provide a Tier 2 antidegradation analysis.

Pollutants with Limits in the Current and Proposed Permit

For pollutants that are currently limited and will have limits under the reissued permit, the current discharge quality is based on the limits in the current permit or license (IDAPA 58.01.02.052.06.a.i), and the future discharge quality is based on the proposed permit limits (IDAPA 58.01.02.052.06.a.ii). For the Culdesac permit, this means determining the permit's effect on water quality based upon the limits for BOD_5, TSS, *E. coli*, total ammonia as nitrogen, total residual chlorine and pH in the current and proposed permits. Table F-1 provides a summary of the current permit limits and the proposed or reissued permit limits.

Table F-1. Comparison of Current and Proposed Permit Limits

Pollutant	Units	Existing Permit			Proposed Reissued Permit		
		Average Monthly	Average Weekly	Max Daily	Average Monthly	Average Weekly	Max Daily
BOD_5	mg/l	45	65	---	30	45	---
	lbs/day	21	30	---	13.7	20.6	---
TSS	mg/l	70	100	---	30	45	---
	lbs/day	32	46	---	13.7	20.6	---
E. coli	counts/ 100m	#/100 ml	---	406	#/100 ml	---	406

Total Residual Chlorine	µg/L	9[1] µg/L	---	51	94	---	94
	lbs/day	0.0041	---	0.0082	0.023	---	0.043
pH	s.u.	6.5 – 9.0			6.5 – 9.0		

The proposed permit limits in Table F-1 for BOD_5, TSS, *E. coli*, and pH are the same as, or more stringent than, those in the previous permit. Therefore, no adverse change in water quality and no degradation will result from the discharge of these pollutants in the reissued permit. The effective limit for total residual chlorine i.e. quantifiable level, has been reduced from 100 µg/L to 51 µg/L and 94 µg/L and thus is more stringent than that in the previous permit. The mass based limits are derived from the concentration limits and are therefore also effectively more stringent than that in the previous permit. Therefore, no adverse change in water quality and no degradation will result from the discharge of total residual chlorine.

New Permit Limits for Pollutants Currently Discharged

When new limits are proposed in a reissued permit for pollutants in the existing discharge, the effect on water quality is based upon the current discharge quality and the proposed discharge quality resulting from the new limits. Current discharge quality for pollutants that are not currently limited is based upon available discharge quality data (IDAPA 58.01.02.052.06.a.i). Future discharge quality is based upon proposed permit limits (IDAPA 58.01.02.052.06.a.ii).

The reissued permit for Culdesac includes new limits for ammonia (Table 4). The average monthly limits are less than the 95th percentile concentrations of the average monthly discharge quality and are more stringent. Therefore, no adverse change in water quality and no degradation will result from the discharge of these pollutants in the reissued permit.

In sum, the EPA concludes that this discharge permit complies with the Tier 2 provisions of Idaho's WQS (IDAPA 58.01.02.051.02 and IDAPA 58.01.02.052.06).