Fact Sheet

Public Comment Start Date: May 13, 2004
Public Comment Expiration Date: June 14, 2004

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PROPOSED ISSUANCE OF A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE POLLUTANTS PURSUANT TO THE PROVISIONS OF THE CLEAN WATER ACT (CWA)

JUG MOUNTAIN RANCH

EPA Proposes To Issue NPDES Permit

EPA proposes to issue an NPDES permit to 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. 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

401 Certification

EPA is requesting that the Idaho Department of Environmental Quality certify the NPDES permit for this facility, under section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Regional Administrator
Idaho Department of Environmental Quality
1445 N. Orchard
Boise, ID 83706

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 EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water 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 comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting 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 website at "http://www.epa.gov/r10earth/water.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-6251 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
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

Idaho Department of Environmental Quality
Boise Regional Office
1445 N. Orchard Street
Boise, ID 83706
(208) 373-0550

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
°C	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OW	Office of Water
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
s.u.	Standard Units
TES	Treatment Equivalent to Secondary
TMDL	Total Maximum Daily Load
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
WWTP	Wastewater treatment plant

I. Applicant

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

Jug Mountain Ranch
NPDES Permit # ID-002802-9

Mailing Address:
P.O. Box 70
McCall, ID 83638

Facility Address:
Jug Mountain Road
Lake Fork, ID 83635

Contact:
Jim Fronk
Owner's Representative
Jug Mountain Ranch

II. Facility Information

Jug Mountain Ranch is a planned unit development with 325 residential units and an 18-hole golf course. The wastewater treatment plant is an NPDES minor facility treating domestic sewage from owners of the residential units and amenities associated with the golf course (club house, restaurant, etc.) The plant provides tertiary (biological) treatment of the wastewater using an onsite package treatment plant The facility receives no wastewater from industrial users.

The wastewater treatment system consists of a gravity sewer collection system, dual-train sequencing batch reactor (SBR) package treatment plant, coagulant injection system, sand filter, sludge storage and treatment tank, ultra-violet disinfection, and chlorine disinfection. The worst case monthly average design flow rate is 0.07 mgd (0.11 cfs), and the yearly average design flow rate is 0.05 mgd (0.08 cfs).

III. Receiving Water

This facility will discharge to Cold Creek, a tributary of Boulder Creek in Valley County, Idaho. Boulder Creek is a tributary of Cascade Reservoir.

A. Calculated Baseline (Exchange) Flows for Cold Creek

The following table contains calculated baseline (exchange) flows for Cold Creek. Calculations were based on interpolations from data collected from three locations on Boulder Creek (one upstream and two downstream of the Cold Creek drainage). Known flow volumes and patterns were identified for Boulder Creek and then normalized to be representative of the relative area of the Cold Creek drainage. Additional assumptions made and related considerations are listed below.

Table 1: Calculated Baseline (Exchange) Flows for Cold Creek (cfs)					
	Natural Flow[1]	GW Inflow[2]	Storage Flow[3]	Diversion Flow[4]	Total
Baseline	3.2	0.47	2.8	0.63	7.1
Low end range	2.3	0.35	2.8	0.46	5.9
High end range	8.1	0.41	5.0	0.41	13.9

[1] Baseline natural flow of Cold Creek was calculated based on measured flows in the Boulder Creek drainage (for average water years 1995-1996) normalized to correspond to the relative size of the Cold Creek drainage.
[2] Ground water inflow was calculated based on estimates of ground water flows within the Cascade Reservoir Watershed (mean and seasonal) normalized to correspond to the relative size of the Cold Creek drainage.
[3] Storage flows were calculated based on retention and use over a 90-day growing/irrigation season.
[4] Ungaged diversion flow volume was calculated based on estimates from the Cascade Reservoir Watershed (mean and seasonal) and a general knowledge of irrigation practices in the Cold Creek drainage.

The following assumptions were applied in the calculation of flow projections:

- Irrigation and downstream flows of between 2.3 and 3.2 cfs are common during growing season.
- Golf course irrigation will generally remove from 500,000 to 1,000,000 gallons per day (0.75 to 1.5 cfs) from the pond during the growing season.

Extreme flows were not calculated, as few representative data were available for Boulder Creek and the potential for error in estimation increases greatly due to the complexity of characterizing variables associated with extreme events.

Additional considerations:

- Once the pond is full (in the spring), the outflow volume will generally be equal to or greater than the inflow volume through the late spring and summer months.
- During fill, inflow will exceed outflow (low end range flows) but longer retention times inside the pond will result in greater dissipation of residual chlorine.
- Substantial potential for aeration exists at the outlet of the pond as the outflow stream is shallow (increased surface area of air-water interface) and relatively slow moving. This will act to enhance dissipation of residual chlorine.
- During spring melt events, higher flow rates are projected to result in greater dilution capacity and lower chlorine concentrations in the outflowing waters.

B. Water Quality Standards

Federal regulations at 40 CFR 122.4(d) require NPDES permits to ensure compliance with the water quality standards of all affected States. A States's water quality standards[1] 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 (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State 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.

Undesignated waters are protected for cold water aquatic life and primary or secondary contact recreation (IDAPA 58.01.02.101.01). Idaho water quality standards (IDAPA 58.01.02.100) specify that all surface waters of the state are to be protected for agricultural water supply, industrial water supply, wildlife habitat and aesthetics.

Idaho water quality standards (IDAPA 58.01.02.252.02) specify the use of "Water Quality Criteria 1972 (Blue Book), Section V, Agricultural Uses of Water" when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 100 mg/L nitrate-nitrite as N and 10 mg/L nitrite as N are listed for agricultural water supplies intended as drinking water for livestock.

Idaho water quality standards (IDAPA 58.01.02.252.03, 253.01 and 253.02) specify that water quality criteria for industrial water supplies, wildlife habitat and aesthetics will generally be satisfied by the criteria set forth in Section 200 (General Surface Water Quality Criteria). This section of the fact sheet discusses Idaho water quality standards (IDAPA 58.01.02.200) and conditions in the draft permit in more detail.

At the point of discharge, Cold Creek is an undesignated stream as is Boulder Creek. Cascade Reservoir is protected for cold water biota, salmonid spawning, primary contact recreation and drinking water supply. A TMDL to improve the water quality of the reservoir to meet those standards was completed and signed in March of 1999.

Because the effluent limits in the draft permit are based on current water quality criteria or technology-based limits that have been shown to not cause or

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1 Idaho's water quality standards are codified in *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).

contribute to an exceedance of water quality standards, the discharge authorized in the draft permit will not result in degradation of the receiving water.

C. Water Quality Limited Segment

A water quality limited segment is any water body, or definable portion of a water body, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. In accordance with section 303(d) of the Clean Water Act, the state of Idaho must identify state waters not achieving water quality standards in spite of application of technology-based controls in the National Pollutant Discharge Elimination System (NPDES) permits for point sources. Such water bodies are known as water quality limited segments (WQLSs).

Once a water body is identified as a WQLS, the state of Idaho is required under the Clean Water Act and Idaho Code 39-3601 et seq. to develop a total maximum daily load (TMDL). A TMDL is a mechanism for determining the assimilative capacity of a water body and allocating that capacity among point and non-point pollutant sources, taking into account natural background and a margin of safety. 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. The assimilative capacity is based on the stream flow and the state water quality standards. The allocations for point sources are referred to as “waste load allocations” (WLAs) and are implemented through NPDES permits. Allocations for non-point sources are referred to as “load allocations” (LAs) and are implemented through the use of best management practices.

The TMDL for Cascade Reservoir includes WLAs and LAs for existing sources in the watershed for phosphorus. Any new facility without a WLA identified in the TMDL would be required to meet a waste load allocation of zero for the pollutant(s) causing the water quality impairment unless it can be demonstrated that the new discharge will improve the water quality of the receiving stream.

Improvements underway or scheduled for implementation at Jug Mountain Ranch include changes in grazing management and streambank/habitat improvements along the riparian corridor.

Grazing Management

Approximately 605 acres associated with the Jug Mountain Ranch (JMR) project area located within the Boulder/Willow subwatershed were identified as grazed land (primarily cattle) in which grazing would be eliminated or substantially reduced. The identified grazed land is present in both the flat valley floor and (to a lesser extent) in the forested regions of the project area. Of the 605 acres, 130 acres are directly associated with riparian areas (Tier 1 land), 280 acres are irrigated pasture (Tier 2 land) and 195 acres are dry, (non-irrigated) upland pasture (Tier 3 land).

Primary pollutants associated with grazed lands in the Cascade Reservoir Watershed are sediment and nutrients (phosphorus and nitrogen) present in both dissolved and sediment-bound forms. Related impacts are elevated water temperatures and alteration of stream flows.

Grazing management changes identified for the JMR project area include removal of livestock (no grazing) and reduced use/density. Reductions in agricultural total phosphorus loading for lands within the JMR project area were calculated based on the transport and delivery coefficients identified for the Boulder/Willow subwatershed by the Cascade Reservoir Watershed Phase II TMDL (approved 1999). Site-specific total phosphorus load reductions from the changes in management practices and land use associated with the JMR project area were calculated based on pre-implementation grazed acres, proximity to stream, animal density and location in the Cascade Reservoir Watershed.

Total phosphorus reductions specific to grazing practices represent that portion of the total phosphorus loading directly associated with livestock (manure and vegetation degradation). The estimated total phosphorus reductions resulting from changes in grazing management including reduction in grazing and forested land improvements are projected to equal 167 kg/year as displayed in Table 2.

Streambank/Habitat Improvements

Historical grazing and associated agricultural land use activities within the project area, combined with extreme flow events have acted to destabilize streambanks and increase the potential for significant instream erosion. The primary pollutant associated with streambank destabilization in the Cascade Reservoir Watershed is sediment. Related impacts are loss of riparian vegetation, elevated water temperatures and degraded spawning habitat due to increased cobble embeddedness.

Approximately 5,000 linear feet of degraded streambank within the JMR project area are targeted for stabilization and revegetation. Sediment loading reductions resulting from these activities were estimated from calculated sediment loading in similarly degraded areas of the Cascade Reservoir Watershed. Estimated sediment and total phosphorus reductions are displayed in Table 2. Total phosphorus reductions specific to streambank stabilization practices represent that portion of the total loading directly associated with in-channel erosion processes.

Table 2: Total Phosphorus (TP) Reductions Estimated for the Jug Mountain Ranch Project Area				
Reduction in Grazing				
	Acres	TP Delivery Coefficient	Animal Unit Month (AMU) Density Factor	Total Phosphorus (kg/year)
Tier 1	130	0.3484	1.2	54
Tier 2	280	0.2300	1.2	77
Tier 3	195	0.0303	1.2	7
Total	605		1.2	138
Forested Land Improvements				
			TP Delivery Coefficient	Total Phosphorus (kg/year)
			0.0480	29
Streambank Stabilization				
	Linear feet	Sediment (yds^3/ ln ft)	Sediment (tons/year)	Total Phosphorus (kg/year)
Highly Degraded	2,600	0.80	1,572	249
Moderately Degraded	2,400	0.35	656	104
Total	5,000		2,228	353
Total Estimated Reduction Realized				520 kg/year
Total Reduction Required by the TMDL (30% of Reduction in Grazing and Forested Land Improvements)				50 kg/year

Estimated sediment and total phosphorus reductions are displayed in Table 2. Total phosphorus reductions specific to streambank stabilization practices represent that portion of the total loading directly associated with in-channel erosion processes.

Sediment loading reductions from the stabilization of highly degraded stream segments (approximately 2,600 linear feet total) are projected at 1,572 tons/year (~0.8 cubic yards per linear foot). Associated reductions in total phosphorus loading were calculated from soil-phosphorus surveys at 249 kg/year. Sediment loading reductions resulting from the stabilization of moderately degraded segments (approximately 2,400 linear feet) were calculated at 656 tons/year (~0.35 cubic yards per linear foot). Associated reductions in total phosphorus loading were calculated at 104 kg/year (Table 2).

The values identified in Table 2 represent a conservative estimate of the total reductions realized. Additional reductions in total phosphorus loading (not included in these estimates) are projected to occur due to uptake of nutrients by improved riparian vegetation and increased wetland processing capacity. Based on the above and not counting the reduction required by TMDL, the estimated reduction in phosphorus loading attributable to this project is 470 kg/year. Assuming the maximum discharge from the wastewater treatment system is 18 millions per year, the saving in phosphorus is equivalent to a phosphorus concentration in the effluent of 3 mg/l. Based on the SBR manufacturer's data and on the historical performance of similar systems in the state, the maximum phosphorus discharged from the system can be limited to 3 mg/l or less.

IV. Effluent Limitations

A. Basis for Permit Effluent Limits

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 of a waterbody are being met and may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits in the draft permit are provided in Appendix B.

B. Proposed Effluent Limits

Below are the proposed effluent limits that are in the draft permit.

1. The pH must be no less than 6.5 and no greater than 9.0 standard units.
2. The monthly average effluent concentration of five-day Biochemical Oxygen Demand (BOD_5) shall not exceed 10 percent of the monthly average influent concentration of BOD_5.
3. The monthly average effluent concentration of Total Suspended Solids (TSS) shall not exceed 10 percent of the monthly average influent concentration of TSS.
4. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.
5. Table 3 presents the proposed average monthly, average weekly, average daily, and instantaneous maximum effluent limits for flow, BOD_5, TSS, E. Coli bacteria, nitrogen, phosphorus, and residual chlorine.

Table 3: Effluent Limits					
Parameter	**Units**	**Average Monthly Limit**	**Average Weekly Limit**	**Maximum Daily Limit**	**Maximum Instantaneous Limit**
Flow	mgd	0.05	0.07	0.12	0.13
BOD_5	mg/L	5	7.5	—	—
	lbs/day	3	4.4	—	—
TSS	mg/L	5	7.5	—	—
	lbs/day	3	4.4	—	—
E. Coli Bacteria	#/100ml	126	—	—	406
Total Nitrogen	mg/l	10	—	—	---
	lbs/day	5.8	—	—	---
Total Phosphorus	mg/l	3	—	—	---
	lbs/day	1.8	—	—	---
Total Residual Chlorine	mg/L	0.14	0.28	—	—
	lbs/day	0.08	0.16	—	—

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 permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to the U.S. Environmental Protection Agency (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 can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits.

Table 4 presents the monitoring requirements for Jug Mountain Ranch in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The monitoring samples must not be influenced by combination with other effluent. If no discharge occurs during the reporting period, “no discharge” shall be reported on the DMR.

Table 4: Effluent Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency[1]	Sample Type
Flow	mgd	Effluent	continuous	recorder
BOD_5	mg/L	Influent and Effluent	1/week	composite[2]
	lbs/day	Influent and Effluent	1/week	calculation[3]
	% removal	--	--	calculation[4]
TSS	mg/L	Influent and Effluent	1/week	composite[2]
	lbs/day	Influent and Effluent	1/week	calculation[3]
	% removal	--	--	calculation[4]
pH	standard	Effluent	daily	grab
E. Coli Bacteria	#/100 ml	Effluent	min of 5/month[5]	grab
Total Residual Chlorine	mg/l	Effluent	daily	grab
Total Ammonia as N	mg/l	Effluent	1/month	composite[2]
Total Nitrogen (Total Kjeldahl Nitrogen + Nitrate-Nitrogen)	mg/l	Effluent	1/month	composite[2]
Total Phosphorus	mg/l	Effluent	1/week[6]	composite[2]
Ortho-Phosphorus	mg/l	Effluent	1/week[6]	composite[2]

Table 4: Effluent Monitoring Requirements
Notes: 1 Daily and weekly sampling presumes a 5-day week. 2 Composite samples shall consist of a minimum of 4 equal aliquots taken during 4 consecutive SBR discharge cycles. Sample analysis shall be done by approved methods as outlined in 40 CFR, Part 136. Other sampling and analysis methods may be used with EPA's prior approval. 3 Loadings are calculated by multiplying the concentration in mg/L by the flow in mgd and a conversion factor of 8.34. 4 Percent removal is calculated using the following equation: (average monthly influent - effluent) ÷ average monthly influent. 5 The geometric mean for E.coli based on a minimum of 5 samples taken every 3 to 5 days over a 30-day period. 6 Permittee may request that sampling frequency be reduced to 1/month after 80% of the residences have been occupied and sufficient data has been collected to statistically determine variability.

C. Surface Water Monitoring

Table 5 presents the proposed surface water monitoring requirements for the draft permit. The Jug Mountain Ranch should work with the Idaho Department of Environmental Quality (IDEQ) Boise Regional Office to establish an appropriate upstream monitoring location. Sampling shall occur through the term of the permit.

Table 5: Surface Water Monitoring Requirements

Parameter (units)	**Sample Locations**	**Sample Frequency[1]**	**Sample Type**
Flow (mgd)	See Note 2	1/month	measure
Total Ammonia as N (mg/L)	See Note 2	1/month	grab
Total Nitrogen as N (mg/L)	See Note 2	1/month	grab
Total Phosphorus as P (mg/L)	See Note 2	1/week[3]	grab
Ortho-Phosphorus (mg/L)	See Note 2	1/week[3]	grab
E. Coli	See Note 2	1/month	grab

Table 5: Surface Water Monitoring Requirements			
pH (s. u.)	See Note 2	1/month	grab
Temperature (°C)	See Note 2	1/month	measure

Notes:
1 Monitoring as long as it is safe to do so and the receiving water is not iced over. If the surface water samples cannot be collected at the required frequency, an explanation must be included in the Surface Water Monitoring report.
2 Upstream (out of backwater) and downstream (away from pond outfall influence). Sampling locations to be approved by EPA and IDEQ.
3 Permittee may request that sampling frequency be reduced to 1/month after 80% of the residences have been constructed and sufficient data has been collected to statistically determine variability.

VI. Sludge (biosolids) Requirements

EPA Region 10 separates wastewater and sludge permitting. Under the CWA, EPA has the authority to issue separate sludge-only permits for the purposes of regulating biosolids. 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

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. Jug Mountain Ranch is required to develop and implement a Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Operation and Maintenance Plan

The permit requires Jug Mountain Ranch 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 shall be retained on site and made available to EPA and IDEQ upon request.

C. Additional Permit Provisions

Sections II, III, and IV of the draft permit contains standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. 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 the 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. A biological assessment has been completed for this project with a tentative determination that discharges from the Jug Mountain Ranch WWTP will not affect any endangered species in the vicinity of the discharge; therefore, consultation is not required. Appendix E contains the biological assessment.

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 EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has tentatively determined that the discharge from the Jug Mountain Ranch WWTP will not affect any EFH species in the vicinity of the discharge; therefore, consultation is not required for this action. Appendix E contains the biological assessment..

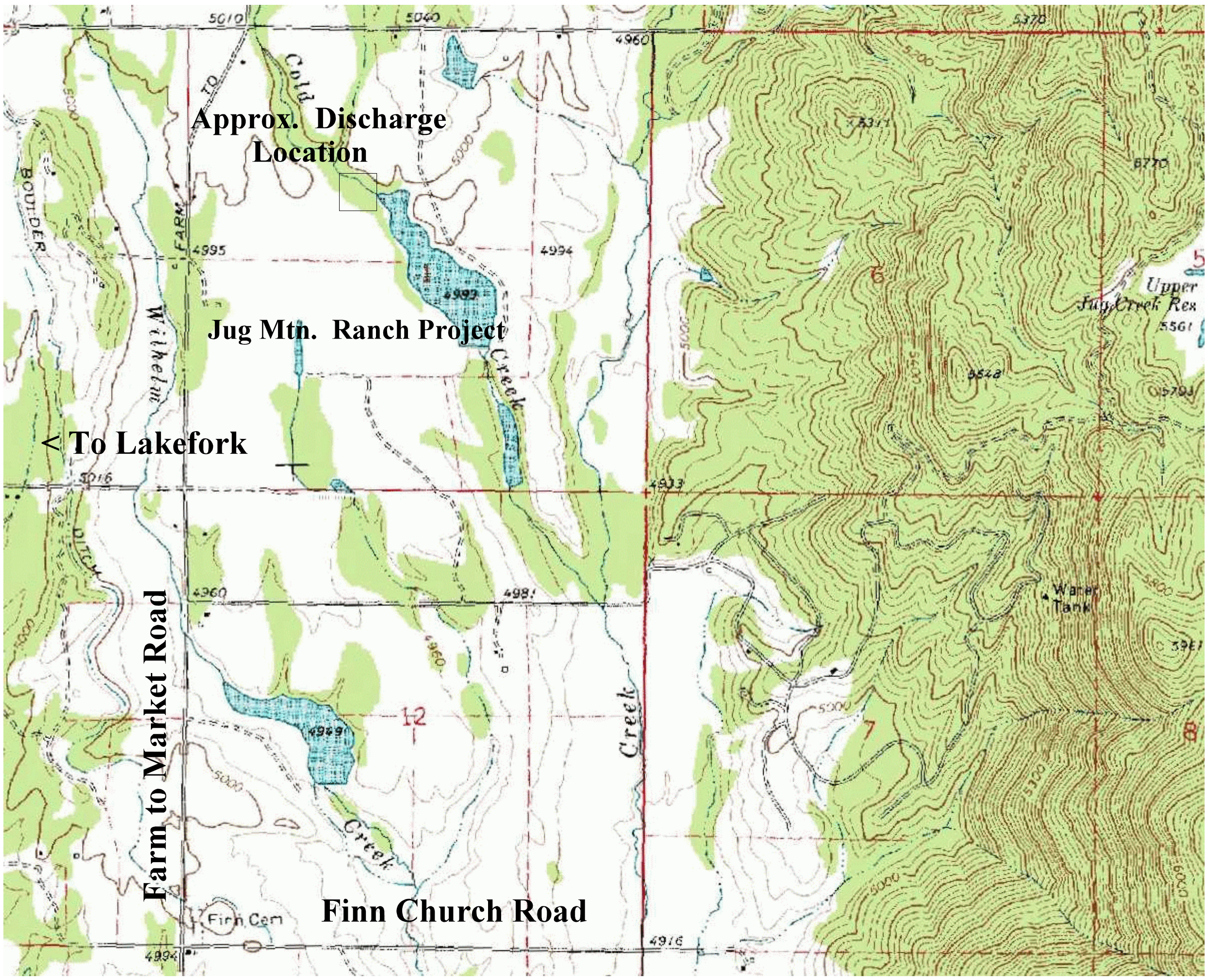
C. State/Tribal Certification

Section 401 of the CWA requires EPA to seek State or Tribal certification before issuing a final permit. Jug Mountain Ranch is not upstream of nor on Indian lands; therefore, tribal consultation was not pursued for this permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

D. Permit Expiration

The permit will expire five years from the effective date.

Appendix A - Facility Information



General Information	
NPDES ID Number:	
Facility Location:	Jug Mountain Road, East of Lake Fork, Idaho
Mailing Address:	P.O. Box 70 Lake Fork, ID 83635
Facility Background:	This is the facility's first NPDES permit.
Collection System Information	
Service Area:	Jug Mountain Ranch Subdivision & Golf Course
Service Area Population:	325 homes
Collection System Type:	100% separate sanitary sewer
Facility Information	
Treatment Train:	Gravity sewer collection system, dual-train sequencing batch reactor (SBR) package treatment system, coagulant injection system, sand filter, sludge storage and treatment tank, ultra-violet disinfection system, and a chlorine disinfection system
Design Flow:	The average annual design flow is 0.054 mgd, with a maximum monthly design flow of 0.070 mgd.
Outfall Location:	latitude 44°50'30" N; longitude 116°02'22" E
Receiving Water Information	
Receiving Water:	Cold Creek, tributary of Boulder Creek, tributary of Cascade Reservoir
Subbasin:	Payette River Basin (HUC 17050123)
Beneficial Uses:	Cold water biota, salmonid spawning, primary contact recreation and drinking water supply.
Low Receiving Water Flow:	The minimum exchange flow ranges from approximately 6 cfs to 14 cfs in the run-of-the-river reservoir area.

Additional Notes

Basis for BOD_5/TSS Limits:	The draft permit proposes technology-based limits that are more restrictive than secondary treatment requirements. The SBR manufacturer's data and the historic performance of similar systems in the state suggest that the system is capable of meeting the more restrictive limits.

Appendix B - Basis for Effluent Limitations

The Clean Water Act (CWA) requires Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology. These types of effluent limits are called secondary treatment effluent limits.

EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent water quality-based effluent limits which are designed to ensure that the water quality standards of the receiving water are met.

Secondary treatment effluent limits may not limit every parameter that is in an effluent. Secondary treatment effluent limits for POTWs have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH, yet effluent from a POTW may contain other pollutants such as bacteria, chlorine, ammonia, or metals depending on the type of treatment system used and the service area of the POTW (i.e., industrial facilities as well as residences may discharge into a POTW). When technology based effluent limits do not exist for a particular pollutant expected to be in the effluent, EPA must determine if the pollutant has the reasonable potential to cause or contribute to an exceedance of the water quality standards for the water body. If a pollutant causes or contributes to an exceedance of a water quality standard, water quality-based effluent limits for the pollutant must be incorporated into the permit.

The following discussion explains in more detail the derivation of technology and water quality-based effluent limits. Part A discusses technology based effluent limits, Part B discusses water quality based effluent limits, and Part C discusses facility specific limits.

A. Technology Based Effluent Limits

1. BOD_5, TSS and pH

Secondary Treatment

The CWA requires POTWs to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” that all POTWs were required to meet by July 1, 1977. EPA developed “secondary treatment” regulations which are codified 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 secondary treatment in terms of BOD_5, TSS, and pH. The secondary treatment effluent limits are listed in Table B-1.

Table B-1: Secondary Treatment Effluent Limits			
Parameter	**Average Monthly Limit**	**Average Weekly Limit**	**Range**
BOD_5	30 mg/L	45 mg/L	---
TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD_5 and TSS	85%	---	---
pH	---	---	6.0 - 9.0 s.u.

2. Chlorine

The Jug Mountain Ranch WWTP uses UV disinfection followed by chlorine disinfection. A 0.5 mg/L average monthly limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable. The AWL is calculated to be 1.5 times the AML, resulting in an AWL for chlorine of 0.75 mg/L.

3. Mass-based Limits

The federal regulation at 40 CFR § 122.45 (f) require that effluent limits be expressed in terms of mass using the design flow of the facility, unless impracticable. The mass based limits are expressed in lbs/day and are calculated as follows:

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

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality-based effluent limits in NPDES permits, Section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, Section 3 discusses the procedures used to develop water quality based effluent limits, and Section 4 discusses the specific water quality based limits.

1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or 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 which 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 or Tribal water quality standard, including narrative criteria for water quality.

The regulations require that this evaluation be made 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.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is 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 decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Per IDAPA 58.01.02.060, the Idaho Department of Environmental Quality (IDEQ) must determine if the use of a mixing zone is appropriate for appraising the effect of a discharge on the receiving water. IDAPA 58.01.02.401.03.c indicates that the use of a mixing zone is appropriate for analyzing the effects of residual chlorine on the receiving water as long as the residual chlorine in the water outside the mixing zone does not exceed a concentration of 0.011 mg/L. The water quality-based effluent limit for chlorine has been calculated using a mixing zone contingent on that restriction.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit 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.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion. The wasteload allocations have been determined in this way for pH, and E.Coli bacteria, because the State does not generally authorize a mixing zone for these pollutants.

4. Specific Water Quality-Based Effluent Limits

(a) Toxic Substances

The water quality standards for Idaho require surface waters of the State to be free from toxic substances in concentrations that impair designated uses. Because there are no significant industrial discharges to the facility, and concentrations of priority pollutants from domestic systems without a significant industrial component are low, it is anticipated that toxicity will not be a problem in the facility's discharge. Therefore, a water quality-based effluent limit for toxicity has not been proposed for the draft permit.

(b) Floating, Suspended or Submerged Matter/Oil and Grease

The Idaho Water Quality Standards require surface waters of the State to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions that may impair designated beneficial uses. The draft permit addresses these requirements with a narrative condition that states there must be no discharge of floating solids or visible foam or oil and grease other than trace amounts.

(c) Sediment/Total Suspended Solids (TSS)

The draft permit includes advanced technology-based limits for TSS.

(e) pH

The Idaho water quality standards require surface waters of the State of Idaho to have a pH value within the range of 6.5 - 9.5 standard units. It is not expected that the Idaho Department of Environmental quality will authorize a mixing zone for pH. Therefore, at a minimum, the effluent must meet the Idaho water quality criteria as well as technology-based limits before it is discharged to the receiving water.

(f) Dissolved Oxygen (DO)

The Idaho water quality standards require the level of DO to exceed 6 mg/L at all times for water bodies that are protected for aquatic life use.

Cold Creek is not water quality limited for DO and it is not expected that the discharge from Jug Mountain Ranch will cause a violation of the DO criteria; therefore, the draft permit does not contain a water-quality based limit for DO. The draft permit does contain an advanced technology-based limit for BOD_5.

(g) Ammonia

The Idaho water quality standards contain water quality criteria to protect aquatic life, including salmonids, against short-term and long-term adverse impacts from ammonia. Currently, there are no known effluent or upstream ammonia data to determine if the facility may cause or contribute to a water quality standard violation for ammonia. Therefore, the draft permit does not propose effluent limits for ammonia. However, it does require effluent sampling for ammonia, and surface water sampling for ammonia, pH and temperature. These data will be used to determine if an ammonia limit is needed for the effluent discharge for the next permit.

(h) E. Coli Bacteria

Cold Creek is an undesignated stream in the State water quality standards. According to the Idaho standards, waters that are undesignated are protected for recreational use in or on the water and cold water aquatic life. Such waters are not to contain E.Coli bacteria in concentrations exceeding:

i. A single sample of 406 E.Coli organisms per 100 ml; or
ii. A geometric mean of 126 E.Coli organisms per 100 ml based on a minimum of five samples taken every three to five days over a thirty day period..

EPA does not expect the Idaho Department of Environmental Quality to grant a mixing zone for bacteria. At a minimum, the effluent must meet the Idaho water quality criterion before it is discharged to the receiving water.

(j) Total Residual Chlorine

The water quality standards for Idaho contain water quality criteria to protect aquatic life against short-term and long-term adverse impacts from chlorine. The Jug Mountain Ranch facility uses both UV and chlorine disinfection. The results of a reasonable potential analysis indicated that the facility would have the potential to exceed water quality criterion. Therefore, the draft permit includes a water quality-based effluent limit for residual chlorine. For additional information on the reasonable potential analysis see Appendix C; for information on calculating effluent limits see Appendix D.

(k) Total Nitrogen

Idaho water quality standards (IDAPA 58.01.02.250.03.b) specify the use of "Water Quality criteria 1972 (Blue Book), Section V, Agricultural Uses of Water" when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 100 mg/L nitrate-nitrite as N is listed for agricultural water supplies intended as drinking water for livestock.

Idaho water quality standards (IDAPA 58.01.02.250.03.b) specify the use of "Water Quality Criteria 1972 (Blue Book), Section V, Agricultural Uses of Water" when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 10 mg/L nitrite as N is listed for agricultural water supplies intended as drinking water for livestock.

Although the Cascade Reservoir Phase I Watershed Management Plan designates phosphorus as the primary nutrient pollutant of concern, it also indicates that nitrogen-based nutrients such as ammonia and nitrates are contributing to the problem. No stream data are available for the concentrations of these nitrogen-based nutrients in Cold Creek or Boulder Creek. No information is available to estimate the expected reduction in nitrogen-based nutrient loadings to those creeks that will result from this project. Furthermore, there currently are no TMDLs or targeted reduction goals for nitrogen-based nutrients in the Cascade Reservoir Watershed.

A review of the SBR manufacturer's data and the performance of similar systems in the state suggest that the systems are consistently capable of achieving total nitrogen effluent values less than 10 mg/L.

Without sufficient data available to determine if water-quality based discharge limits are required, EPA has included technology-based limits on total nitrogen concentration in the effluent in the draft permit. Additionally, EPA has included requirements for the monitoring of total nitrogen concentrations in the receiving waters. EPA will use this data to re-evaluate total nitrogen limits when the permit is renewed.

(l) Total Phosphorus

The Cascade Reservoir Phase I and II Watershed Management Plans designate phosphorus as the primary nutrient pollutant. No data are available regarding phosphorus concentration in the receiving water. EPA's conservative analysis indicates a reduction in phosphorus loadings due to the change in land use as a result of this project roughly equivalent to 3 mg/L at the design discharge of 18 million gallons per year. A review of the SBR manufacturer's data and the performance of similar systems in the state suggest that the systems are consistently capable of achieving total phosphorus effluent concentrations of 3 mg/L or less.

Without sufficient data available to determine if water-quality based discharge limits are required, EPA has included technology-based limits on total phosphorus concentration in the effluent in the draft permit. Additionally, EPA has included requirements for the monitoring of total phosphorus in the receiving waters. EPA has also included requirements to monitor ortho-phosphorus, the type of phosphorus of particular concern with regards to the degradation of natural water body water quality, in both the effluent and the receiving water. EPA will use these data to re-evaluate total phosphorus limits when the permit is renewed.

Appendix C - Reasonable Potential Determination

To determine if a water quality based effluent limitation is required, the receiving water concentration of pollutants is determined downstream of where the effluent enters the receiving water. If the projected receiving water concentration is greater than the applicable numeric criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard and an effluent limit must be incorporated into the NPDES permit. The receiving water concentration is determined using the following mass balance equation:

$C_dQ_d = C_eQ_e + C_uQ_u$, which can be rearranged as follows:

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_d}$$

C_d = receiving water concentration downstream of the effluent discharge
$Q_d = Q_e + Q_u$ = receiving water flow downstream of the effluent discharge
C_e = maximum projected effluent concentration
Q_e = maximum effluent flow
C_u = upstream concentration of pollutant
Q_u = upstream low flow

Flow Conditions / Mixing Zones

The *Idaho Water Quality Standards and Wastewater Treatment Requirements* at IDAPA 58.01.02.060 allow twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. The flows used to evaluate compliance with the criteria are:

- For the acute criteria, the low range of the calculated exchange flows in Cold Creek was used (6 cfs).

- For the chronic criteria, the high range of the calculated exchange flows in Cold Creek was used (14 cfs).

In accordance with their water quality standards, the Idaho Department of Environmental Quality (IDEQ) determines if the use of mixing zones is appropriate when analyzing the effects of an effluent discharge on the receiving water. The reasonable potential calculations are based on an assumed mixing zone of 25% for aquatic life. IDEQ has done an assessment and determined that the use of a mixing zone in the analysis is appropriate contingent on the water outside the mixing zone no exceeding 0.011 mg/L (IDAPA 58.01.02.401.03.c) which is also the aquatic life chronic concentration criteria for residual chlorine from IDAPA 58.01.02.210. Use of that concentration in the process to derive the water quality based effluent limitations for total residual chlorine automatically complies with the requirement for use of a mixing zone in the analysis.

The mass balance equation for an analysis with a mixing zone (%MZ) is:

$$C_d = \frac{C_e Q_e + C_u (Q_u \%MZ))}{Q_e + (Q_u \%MZ)}$$

Maximum Projected Effluent Concentration

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. The technology-based chlorine limit is 0.5 mg/L (average monthly limit). At a minimum, facilities must meet the technology-based effluent limit. When doing a reasonable potential calculation to determine if the technology-based chlorine limit would be protective of water quality standards it was assumed that the maximum effluent concentration would be 0.5 mg/L (500 µg/L).

Reasonable Potential Calculations

The following are the calculations used to determine if the effluent chlorine has the reasonable potential to cause or contribute to an exceedance of the water quality standard.

Information and assumptions for this calculation are:

- Facility is discharging at a maximum chlorine concentration of 0.5 mg/L
- Wastewater treatment plant design flow = 0.07 mgd
- The upstream concentration of chlorine is assumed to be zero since there are no sources of chlorine upstream of the discharge.
- The minimum stream flow is 3.9 mgd
- Percent of the river available for mixing is 25%

(1) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated.

MZ = 25% (0.25)
C_e = 0.5 mg/L
Q_e = 0.07 mgd
C_u = 0 mg/L
Q_u = 3.9 mgd

$$C_d = \frac{(0.5 \times 0.07) + (0 \times (3.9 \times 0.25))}{0.07 + (3.9 \times 0.25)} = 0.033 \text{ mg/L}$$

Since 0.033 mg/L is greater than the acute aquatic life criterion (0.019 mg/L), there is a reasonable potential for the effluent to cause an exceedance to the water quality standard.

Therefore, a water quality based effluent limit is required based on the acute aquatic life criterion.

(2) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated.

MZ = 25% (0.25)
C_e = 0.5 mg/L
Q_e = 0.07 mgd
C_u = 0 mg/L
Q_u = 9 mgd

$$C_d = \frac{(0.5 \times 0.07) + (0 \times (9 \times 0.25))}{0.07 + (9 \times 0.25)} = 0.015 \text{ mg/L}$$

Since 0.015 mg/L is greater than the chronic aquatic life criterion (0.011 mg/L), there is a reasonable potential for the effluent to cause an exceedance of the water quality standard. Therefore, a water quality based effluent limit is required based on the chronic aquatic life criterion.

Appendix D
Derivation of Water Quality Based
Effluent Limitations for Total Residual Chlorine

The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality based requirements, the permit limits are based on maintaining the effluent quality at a level that will comply with the water quality standards, even during critical conditions in the receiving water (i.e., low flows). These requirements are determined by the wasteload allocation (WLA). The WLA dictates the required effluent quality which, in turn, defines the desired level of treatment plant performance or target long-term average (LTA).

To support the implementation of EPA's national policy for controlling the discharge of toxicants, EPA developed the "*Technical Support Document for Water Quality-Based Toxics Control*" (EPA/505/2-90-001, March 1991, TSD). The following is a summary of the procedures recommended in the TSD in deriving water quality-based effluent limitations for toxicants. This procedure translates wasteload allocations for total residual chlorine to "end of the pipe" effluent limits.

Calculation of Total Residual Chlorine Limits

Step 1. Calculate Wasteload Allocations

Acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the criterion and C_e is replaced by the WLA_{acute} or $WLA_{chronic}$. The WLAs define the appropriate concentration of pollutant allowed in the effluent.

$$WLA = \frac{C_d(Q_u\%MZ) + (C_dQ_e)}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e}$$

$WLA_{acute} = 0.284$ mg/L
$WLA_{chronic} = 0.365$ mg/L

Step 2. Convert the WLAs to Long Term Averages (LTAs)

The acute and chronic WLAs are converted to acute and chronic LTA concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations from Section 5.4 of EPA's TSD:

$LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$ where,

CV= coefficient of variation = 0.6 (default when less than 10 data points)
$\sigma^2 = \ln(CV^2 + 1) = 0.307$
$z = 2.326$ for 99^{th} percentile probability basis

LTA_{acute} = 0.091 mg/L

$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$ where,

CV= coefficient of variation of the effluent concentration = 0.3
σ^2 = ln(CV^2/4 + 1) = 0.086
z = 2.326 for 99th percentile probability basis

$LTA_{chronic}$ = 0.192 mg/L

Step 3. Calculate Average Monthly and Maximum Daily Permit Limits

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

$MDL = LTA_{acute} e^{(z\sigma - 0.5\sigma 2)}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation

MDL = 0.28 mg/L

$AML = LTA_{acute} e^{(z\sigma n - 0.5\sigma n 2)}$
where,
$\sigma_n^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation
n = number of sampling events required per month for chlorine = 4

AML = 0.14 mg/L

Appendix E - Endangered Species

This document represents a preliminary assessment of the potential for project-related effects from the Jug Mountain development and proposed mechanism for wastewater treatment on endangered species act (ESA) species listed for Valley County, Idaho. It was prepared for the Jug Mountain Ranch Project by SWCA Environmental Consultants.

Valley County covers a huge area in central Idaho, from Long Valley and McCall east to the Middle Fork of the Salmon River (Figure E1). The South Fork of the Salmon divides the county in two, flowing north toward the main Salmon River, which is north across the border in Idaho County. The Payette River drains southward in the western part of the county (Digital Atlas of Idaho, 2003). The proposed project site is located in the Boulder Creek drainage. Boulder Creek is a tributary to the North Fork Payette River, flowing into Cascade Reservoir from the northeast.

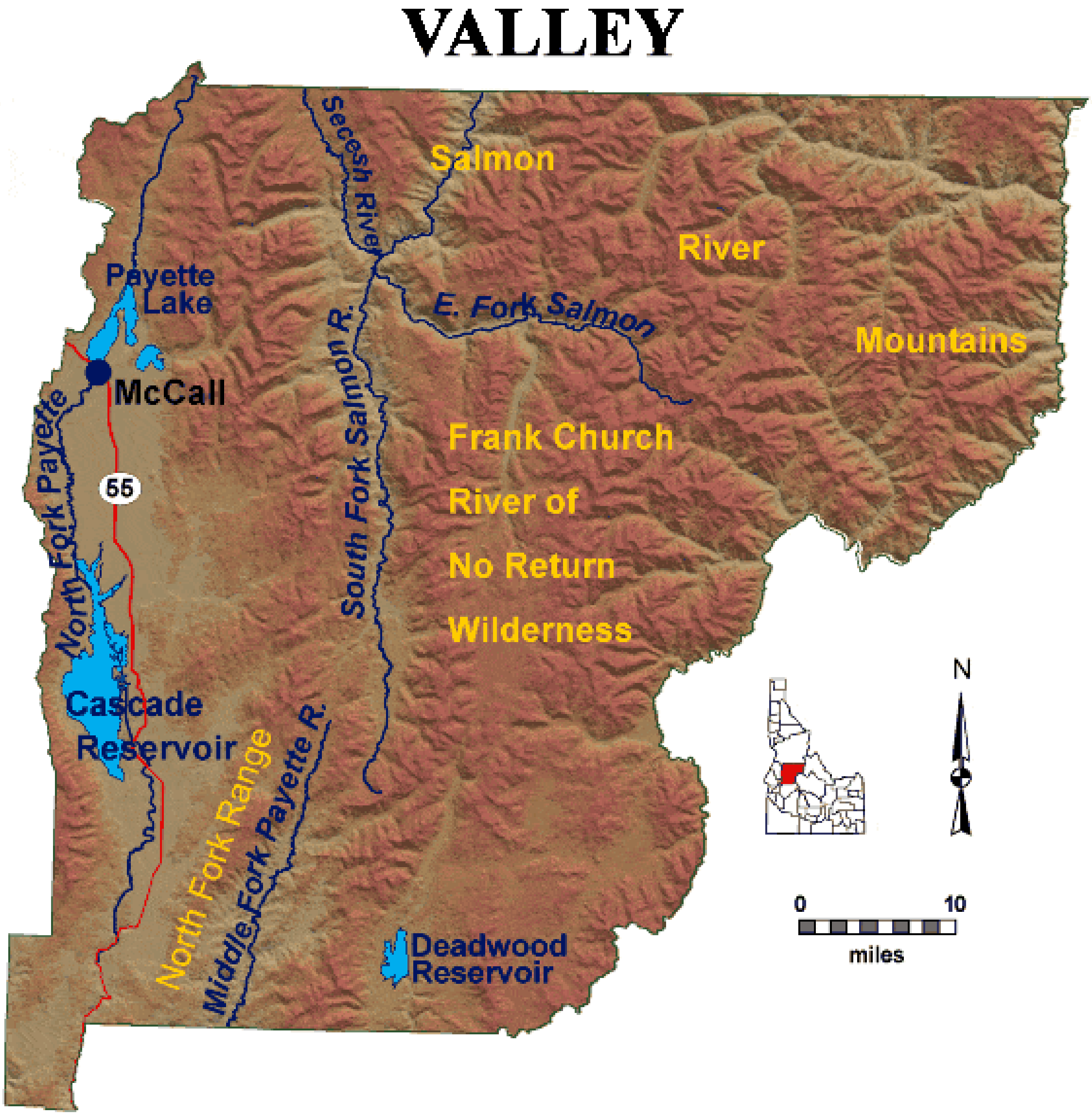


FIGURE E1. VALLEY COUNTY, IDAHO (DIGITAL ATLAS OF IDAHO, 2003).

ESA SPECIES

Information from the US Fish and Wildlife Service website identified the following species in Valley County, Idaho:

LISTED SPECIES		**STATUS**
Common Name	Scientific Name	
Gray wolf	(Canis lupus)	XN
Canada lynx	(Lynx canadensis)	LT
Northern Idaho ground squirrel	Spermophilus brunneus brunneus)	LT
Bald eagle	(Haliaeetus leucocephalus)	LT - Wintering/Nesting area
Steelhead trout	(Oncorhynchus mykiss)	LT - NOAA Fisheries jurisdiction
Fall chinook salmon	(Oncorhynchus tshawytscha)	LT - NOAA Fisheries jurisdiction
Spring/summer chinook salmon	(Oncorhynchus tshawytscha)	LT - NOAA Fisheries jurisdiction
Bull trout	(Salvelinus confluentus)	LT
PROPOSED SPECIES		
None		
CANDIDATE SPECIES		
Yellow-billed cuckoo	(Coccyzus americanus)	C

LT - Listed threatened
XN - Experimental/non-essential population
C - Candidate

The National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) website did not list any anadromous fish species that are either proposed, listed or candidates for listing under the ESA known to occur in Boulder Creek in the vicinity of the proposed project. The proposed project, as it relates to each identified species is discussed below.

GRAY WOLF

In Idaho, wolves north of Interstate 90 are listed as an endangered species. While wolves south of Interstate 90 in Idaho are listed as an experimental, nonessential population (59 FR 60264; November 22, 1994 and 59 FR 60279; November 22, 1994). The proposed wastewater treatment facility is located south of Interstate 90.

Gray wolves are highly social animals, and often live in packs of two to eight. The packs act as a unit to hunt big game such as deer, elk, caribou, moose and some small mammals. Wolves concentrate naturally in areas that have large deer and elk populations. They were reintroduced to Central Idaho in 1995 and 1996. The current range of the gray wolf extends throughout Idaho (USFWS, 2003).

Information obtained from USFWS identifies human intervention (hunting and habitat destruction) as the single greatest reason for the decline of the gray wolf. Such intervention remains the greatest threat to reintroduced wolves in Idaho today. These activities are unrelated to the operations and/or management of the proposed wastewater treatment facility;

therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect the gray wolf population.

CANADA LYNX

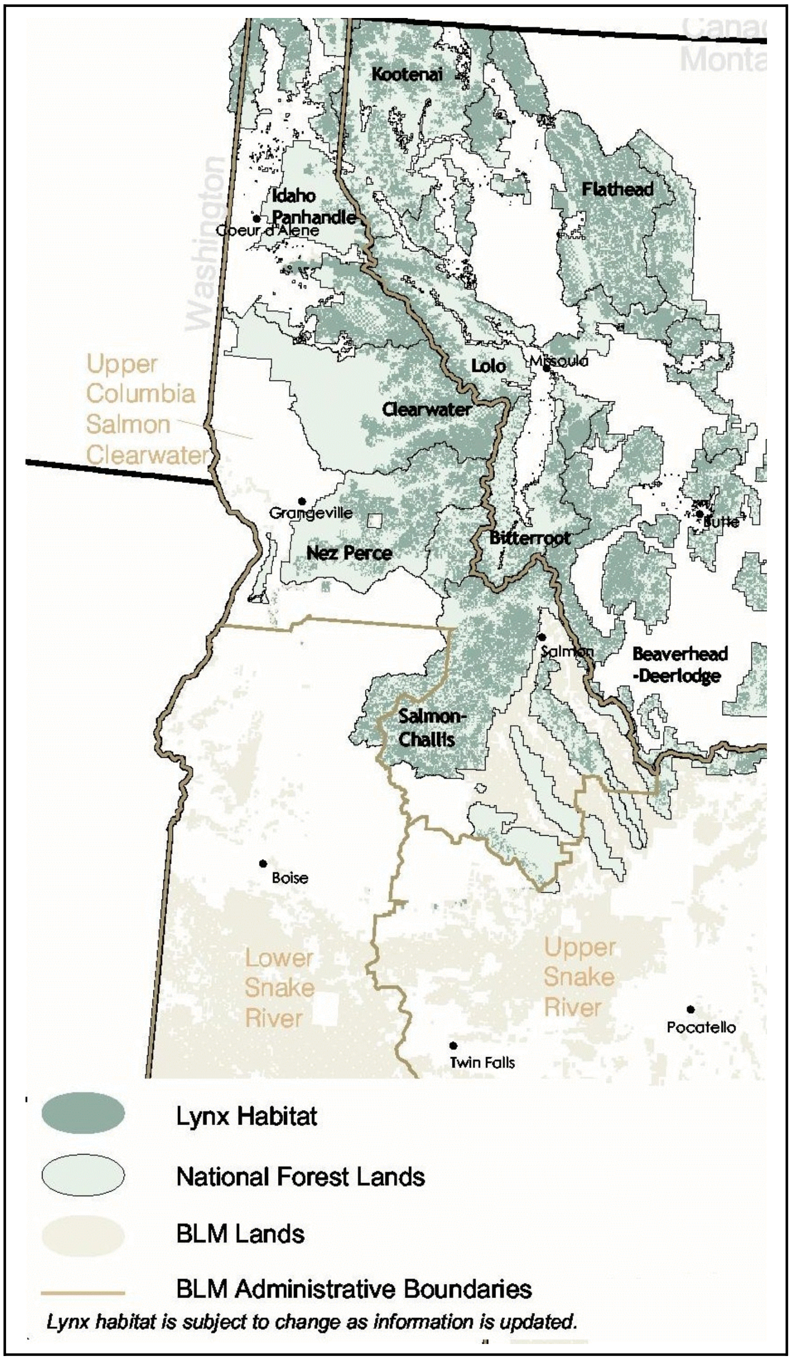


FIGURE E2-A. CURRENT CANADA LYNX HABITAT IN THE PACIFIC NORTHWEST (USFWS, 2003).

Canada lynx are solitary, reclusive, highly mobile animals requiring large territories in remote areas. Current Canada lynx habitat is displayed in Figure E2-A. Potential lynx habitat in the Payette National Forest as identified by USFS and USFWS is displayed in Figure E2-B. The main food source for the Canada lynx is the snowshoe hare, but they are also known to take rodents, birds and fish. Lynx avoid wide-open areas, preferring instead a mosaic of stand types to den and find prey, and unbroken forest to provide cover. Clear-cuts, ski resorts, mining operations and related activities reduce habitat and act as effective barriers to lynx in their travels.

The USFWS has identified the main threat to lynx to be habitat loss and lack of connectivity due to human activities (such as logging, road construction, recreational activities, fire suppression and urban development).

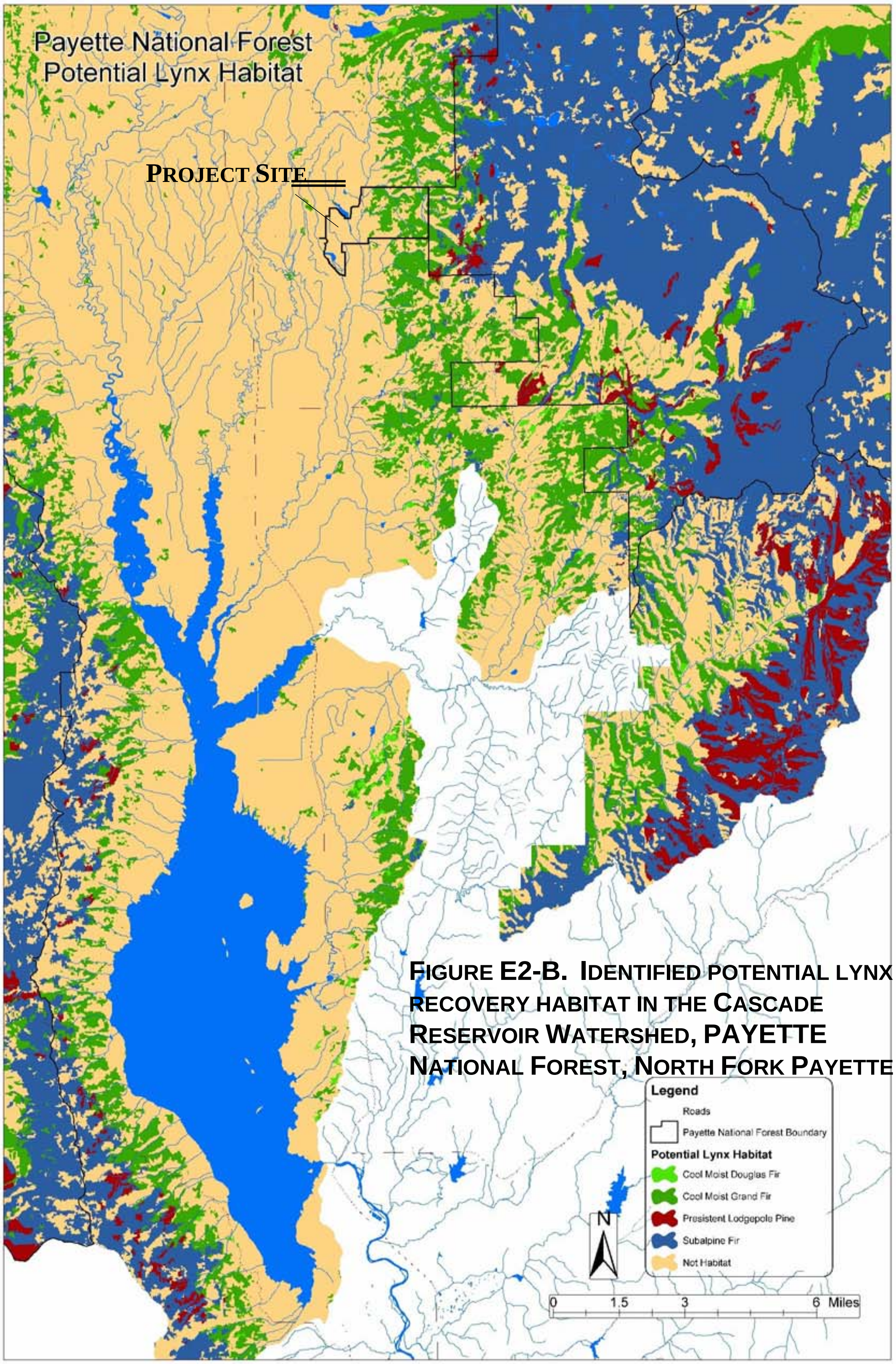


FIGURE E2-B. IDENTIFIED POTENTIAL LYNX RECOVERY HABITAT IN THE CASCADE RESERVOIR WATERSHED, PAYETTE NATIONAL FOREST, NORTH FORK PAYETTE

Trapping for fur pelts in the 1980's caused steep declines in lynx numbers. Packed snow trails resulting from winter recreation activities has given bobcats, cougars and coyotes access to traditional deep snow habitats that were once the lynx's domain. These animals now compete with lynx for food and habitat.

The location of proposed project properties is shown in Figure E2-B. Much of the property occupies that area of the valley floor identified as "not habitat" for lynx. The eastern-most portion of the property is identified as "cool moist grand fir" potential lynx habitat but existing vegetative cover is broken, interspersed with open space. The USFWS indicates that lynx "need unbroken forest to provide stalking and security cover. Even when hunting, lynx prefer some cover and typically won't cross openings more than 300 feet across". Given this characterization of habitat requirements, it is unlikely at best that lynx would be present in the project area.

Personal communication with USFS and IDFG staff (Jeff Rohlman, IDFG McCall; Joe Faust, USFS Boise National Forest, Cascade and Chris Hescock, USFS Payette National Forest, Krassel Ranger District) indicated that while portions of the watershed are identified as potential recovery habitat, there is no documented lynx population in the watershed. Further, there have been no recent sightings of lynx in the Cascade Reservoir Watershed. The only known identification of lynx presence are a track identified as potentially lynx in the area of Deadwood Summit in 1999 and two lynx sightings near Warm Lake in 1978. Neither of these occurrences is associated with the project area,

IDFG and USFS staff stated that the valley floor and foothills are not considered lynx habitat due to the topography, vegetation and human population density. Some portions of the headwaters drainage of Boulder Creek, near Boulder Lake is classified and managed by IDFG as potential lynx habitat but not the valley or foothill areas in the drainage. Additionally, USFS staff have completed in-depth surveys for lynx in the areas north of Jug Handle Mountain, where there is much better habitat opportunity and have observed no signs that there is a lynx population in these areas.

The location of the proposed wastewater treatment facility is within a relatively well populated and managed section of the valley floor, sited at elevations below those areas of the watershed supporting the type of unbroken forest vegetation that has been identified as a requirement of effective lynx habitat. It is highly unlikely that lynx would choose to inhabit the valley floor in the area of the proposed wastewater treatment facility due to the existing lack of cover resulting from legacy management practices and the existing high density of human presence.

As a large number of existing roads and structures are already in place in much of the immediate vicinity, activities specific to the construction or operation of the wastewater treatment facility are unrelated to the decline of the lynx population, and are not expected to exert any further negative effect. However, management practices within the common areas of the project are designed to minimize vegetation removal or reduction, and to improve native vegetative cover. Therefore, the project has the potential to improve habitat conditions in those areas designated as potential lynx recovery habitat.

NORTHERN IDAHO GROUND SQUIRREL

Northern Idaho ground squirrels inhabit open meadows and shrub/grasslands among coniferous forests of older Ponderosa pines and Douglas fir. Forage requirements consist of large quantities of grass seed, stems and other green leafy vegetation. According to the USFWS, the northern Idaho ground squirrel's population suffered a 92% decline between 1985 and 1999. Today the population consists of less than 500 individuals (estimated) living in 20 square miles of public and private lands near Council, Idaho (Figure E3).

FIGURE 3. ESTIMATED RANGE OF THE NORTHERN IDAHO GROUND SQUIRREL. (FROM MAGELLAN GEOGRAPHIC, 1994, SANTA BARBARA, CALIFORNIA).

The major threat to the northern Idaho ground squirrel as identified by USFWS is habitat loss due to conifer invasion and fire suppression. Other potential threats include "agricultural land conversion, urban development, recreational activities, and naturally occurring events such as severe droughts lasting longer than three years" (USFWS, 2003).

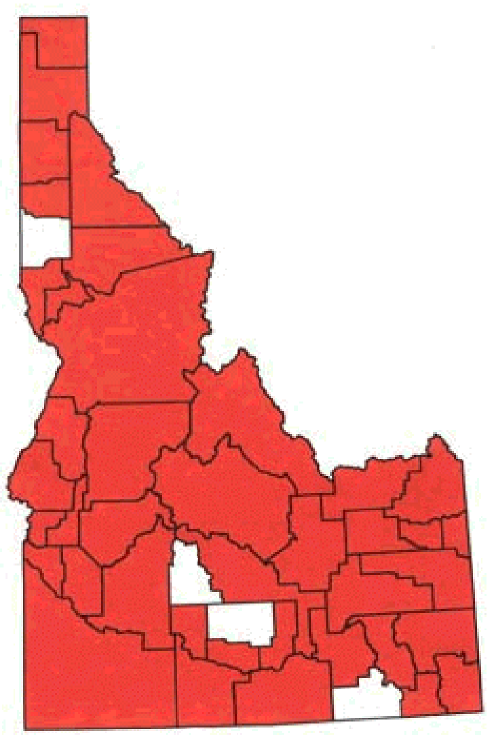
Dr. Eric Yensen (Albertson College, Boise, Idaho) visited the proposed project site in

November 2003 to assess the probability that northern Idaho ground squirrel were present. This assessment was made by spot-checking the best available habitat for burrow entrances (squirrels were in hibernation since early August). During the survey the ground surface was snow-free, and the burrows of several other species were located, but no burrows that clearly belonged to northern Idaho ground squirrels were found. Based upon this preliminary assessment, it is Dr. Yensen's professional opinion that the probability that the species occurs at the project site is very low (Yensen, 2003).

Information obtained from USFWS identifies human intervention (habitat loss due to conifer invasion and fire suppression) as the single greatest reason for the decline of the northern Idaho ground squirrel. These activities are unrelated to the operations or management of the proposed wastewater treatment facility. Additionally, the proposed project, if approved, would act to increase the area and quality of vegetation available in upland meadows within the project site, thus increasing potential habitat. Therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect the northern Idaho ground squirrel population.

BALD EAGLE

The bald eagle was reclassified from endangered to threatened status because of recovery progress in 1995, and a proposal to remove the bald eagle from the Endangered Species List was published in the Federal Register on July 6, 1999 (USFWS, 2003).



Bald eagles are large predators requiring high tree perches to obtain food and for nesting purposes. Bald eagles observed in the Valley County area rely on fish and other aquatic life as a primary food supply. Figure E4 identifies bald eagle habitat in the State of Idaho. The USFWS service identifies hunting and pesticide contamination (DDT), lead poisoning, agricultural development, hydroelectric dams and habitat loss as primary factors in population decline. While dramatic improvements have been realized in recent years, habitat loss continues to undermine population recovery.

FIGURE E4. IDENTIFIED BALD EAGLE HABITAT IN THE STATE OF IDAHO (USFWS, 2003).

Information obtained from USFWS identifies hunting, contamination of food supply, and habitat destruction as primary factors in the decline of bald eagle populations. None of which are related to the operations or management of the proposed wastewater treatment facility; therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect the bald eagle population.

STEELHEAD

Steelhead are a seagoing form of rainbow trout that migrate from fresh water to ocean waters early in their life cycle, and then return to fresh waters to spawn. Steelhead are common in the Snake, Salmon and Clearwater Rivers below the dams. Habitat in the State of Idaho as identified by NOAA is shown in Figure E5 below.

USFWS has identified dam construction on the Snake and Columbia Rivers as primary factors in the decline of steelhead populations as the dams act to obstruct passage to and from the sea. Additional factors include habitat loss and degradation due to human activity such as land development, logging, mining and agriculture.

Although the proposed designation of critical habitat for steelhead was withdrawn in February 2000, it is expected that it would mirror that of other anadromous species (i.e. chinook salmon), namely: "river reaches presently or historically accessible (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams) to Snake River fall and spring/summer chinook salmon in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) and including all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers; all Snake River reaches from the confluence of the Columbia River upstream to Hells Canyon Dam".

Information obtained from USFWS identifies dam construction on the Snake and Columbia Rivers as primary factors in the decline of steelhead populations. These activities are not related to the operations or management of the proposed wastewater treatment facility.

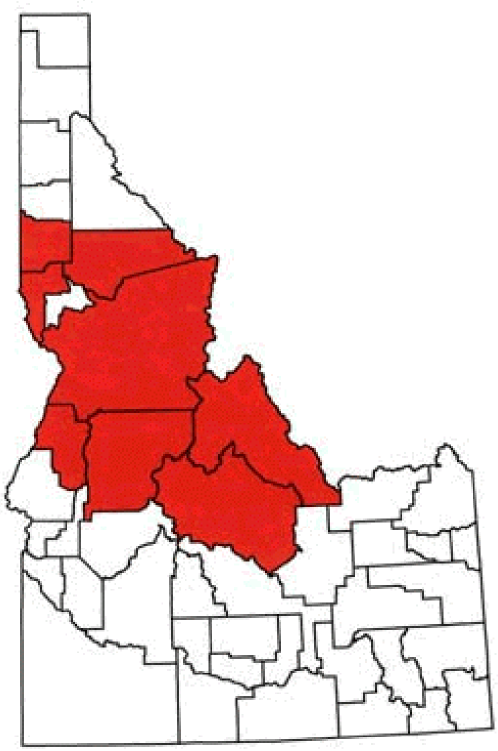


FIGURE E5. IDENTIFIED STEELHEAD HABITAT IN THE STATE OF IDAHO (USFWS, 2003).

Further, these activities have acted to restrict existing populations to those areas downstream of

Hells Canyon Dam, well below the proposed project site; therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect the steelhead population.

CHINOOK SALMON

Chinook salmon hatch and rear in fresh water. Young fish migrate to the ocean, and then return to spawn in fresh water. Within the State of Idaho the chinook population is divided into three separate groups or "runs" based on the time of arrival in Idaho waters: spring, summer or fall. NMFS has combined spring and summer chinook into one group called Snake River spring/summer chinook salmon. Fall chinook remain a separate group. According to the USFWS, spring chinook return to the Upper Salmon River in the Sawtooth Mountains, and the Middle Fork, East Fork and Yankee Fork of the Salmon River. Summer chinook return to the South Fork of the Salmon River and the Salmon River. Figure E6 below identifies chinook habitat in the State of Idaho.

Similar to steelhead, USFWS has identified hydropower facilities as a primary factor in the decline of the chinook populations in the Pacific Northwest. Impoundments created by hydropower facilities create "weak water currents, warm waters, blocked migratory routes and dangerous turbines that can negatively affect the species". According to USFWS biologists, "habitat loss and degradation; agricultural, urban and industrial pollution; mistaken angler harvest; clear-cutting, removal of streamside vegetation and livestock use; and some hatchery practices also pose threats to the chinook salmon" (USFWS, 2003).

Critical habitat for chinook has been designated to include "river reaches presently or historically accessible (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams) to Snake River fall and spring/summer chinook salmon in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) and including all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers; all Snake River reaches from the confluence of the Columbia River upstream to Hells Canyon Dam" (USFWS, 2003).

FIGURE E6. IDENTIFIED CHINOOK SALMON HABITAT IN THE STATE OF IDAHO (USFWS, 2003).

Information obtained from USFWS identifies dam construction on the Snake and Columbia Rivers as primary factors in the decline of chinook populations. These activities are not related to the operations or management of the proposed wastewater treatment facility and act to restrict existing populations to those areas downstream of Hells Canyon Dam, well below the proposed project site. Therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect either fall or spring/summer chinook populations

BULL TROUT

The bull trout was listed as threatened in the Columbia and Klamath Rivers on June 10, 1998. All bull trout in the lower 48 states are now protected, but none of the habitat needed for their conservation has been formally designated. In 2002, the USFWS released a draft plan proposing designation of critical habitat essential to the future of bull trout. This plan has yet to be finalized. In an out-of-court settlement with environmental stakeholders reached in October 2003, USFWS committed to make the designation of critical habitat for bull trout a priority in the coming year. According to the settlement, a final map identifying critical habitat in the Columbia and Klamath River basins will be completed by September 21, 2004. Until this map is finalized and publicly available, the original draft of proposed critical habitat (Figure E7) will be used as reference for the proposed project.

Bull trout are Idaho's only native species of char (a sub-group of the trout and salmon family distinguished by light-colored spots on a dark background and fall spawning). They are secretive fish, requiring extensive cover in the form of pools, streamside vegetation and logjams, and very cold, clear water (IDFG, 2003; American Fisheries Society, 2003).

The Idaho Department of Fish and Game and the American Fisheries Society have identified the primary threats to bull trout in Idaho to be habitat degradation and fragmentation. They also face competition for food and space from non-native species, such as brown trout, lake trout and brook trout. Hybridization between bull trout and brook trout is also a concern. In some areas, over-harvest and poaching have contributed to the decline of bull trout populations as well. Other reasons for population decline and decreases in range include dams, siltation from logging and farming (IDFG, 2003), blockage of migratory corridors, poor water quality, and past fisheries management (USFWS, 2003). While bull trout occur over a large area in Idaho, many of the populations are small and isolated from each other, making them more susceptible to local extinctions (USFWS, 2003).

As can be seen in Figure E7, the draft designation of critical habitat for bull trout in the North Fork Payette River drainage does not intersect with the proposed project site. Proposed critical habitat designations (draft) identify sections of the Gold Fork River drainage and the Lake Fork Creek drainage. No surface waters in the Boulder/Willow drainage are identified as proposed critical habitat for bull trout.

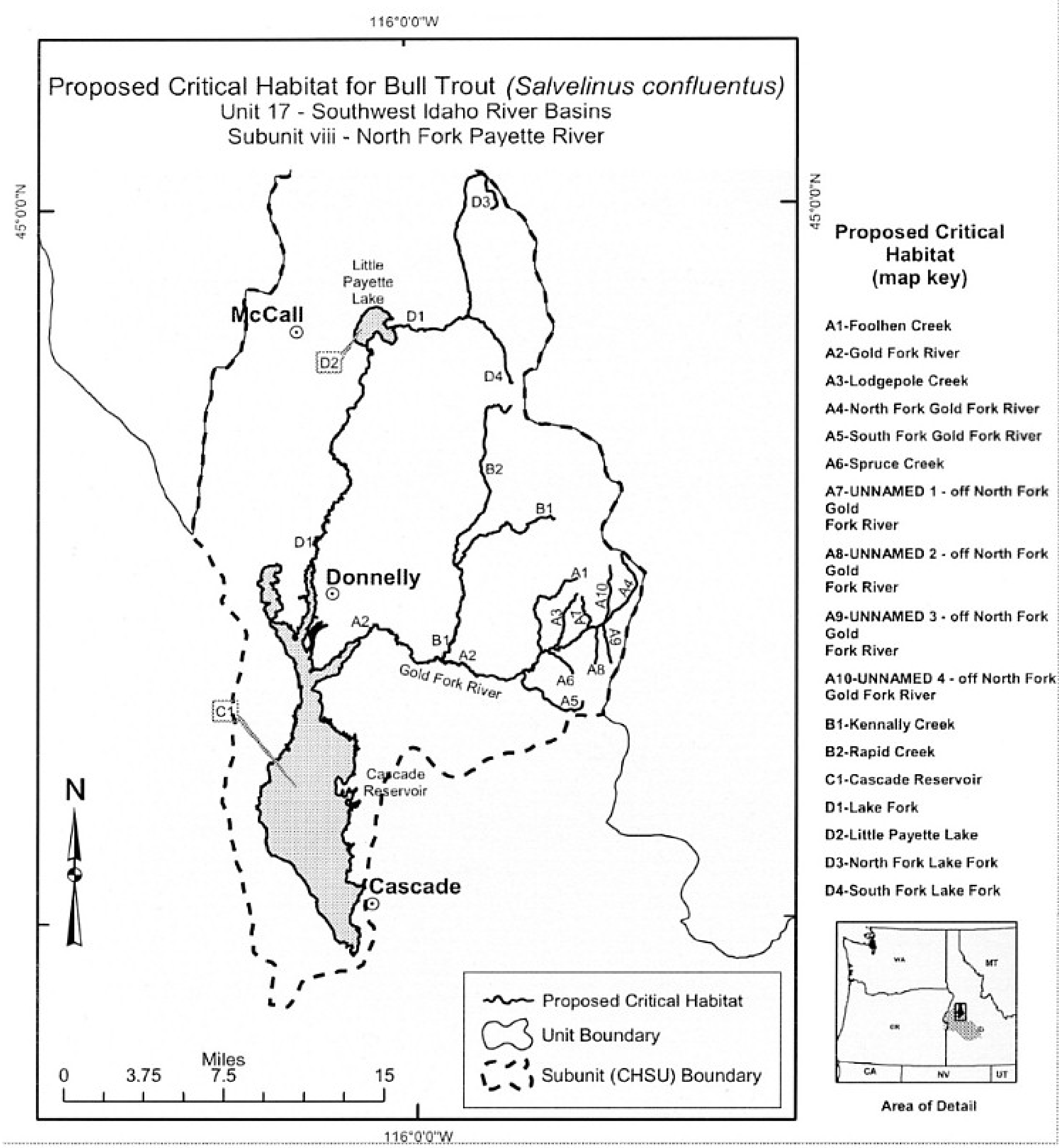


FIGURE E7. DRAFT CRITICAL BULL TROUT HABITAT DESIGNATIONS FOR THE NORTH FORK PAYETTE RIVER DRAINAGE, STATE OF IDAHO (USFWS, 2003).

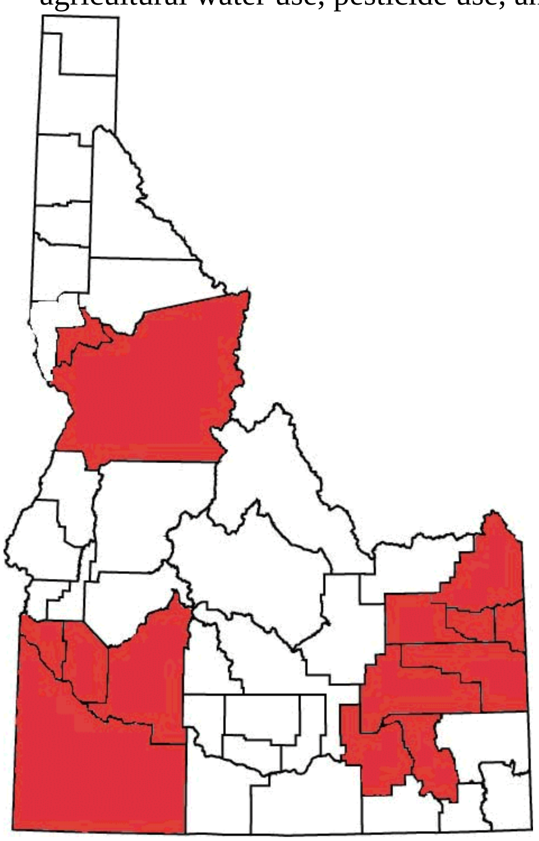
Additionally, the proposed project, if approved, would act to improve habitat and water quality within the project site, thus increasing potential habitat if surface waters in the project area are designated as critical habitat in the future. Activities identified by IDFG and USFWS as potential threats to this species are not related to the operations or management of the proposed wastewater treatment facility. Therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect bull trout populations.

YELLOW BILLED CUCKOO

The yellow-billed cuckoo is a candidate ESA species (66 FR 54807, October 30, 2001). Candidate species have no protection under the ESA, but have been included for planning consideration as candidate species could be proposed or listed during the project planning period, and would then be covered under Section 7 of the ESA.

Yellow billed cuckoo are generally absent from heavily forested areas and large urban areas, preferring riparian areas and willow and cottonwood forests along rivers and streams. In Idaho, the species is considered a rare visitor and breeder in the Snake River Valley. Figure E8 identifies the distribution of the yellow billed cuckoo in Idaho as determined by the USFWS.

USFWS has identified potential threats to this species as include conversion of riparian habitat to agriculture, dams and riverflow management, bank protection, livestock overgrazing, agricultural water use, pesticide use, and competition from exotic plants.



As can be seen in Figure E8, the identified habitat of the yellow billed cuckoo does not intersect with the proposed project site.

Additionally, the proposed project, if approved, would act to increase the area and quality of riparian corridor vegetation within the project site, thus increasing potential habitat. Activities identified by USFWS as potential threats to this species are not related to the operations or management of the proposed wastewater treatment facility. Therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect yellow billed cuckoo populations.

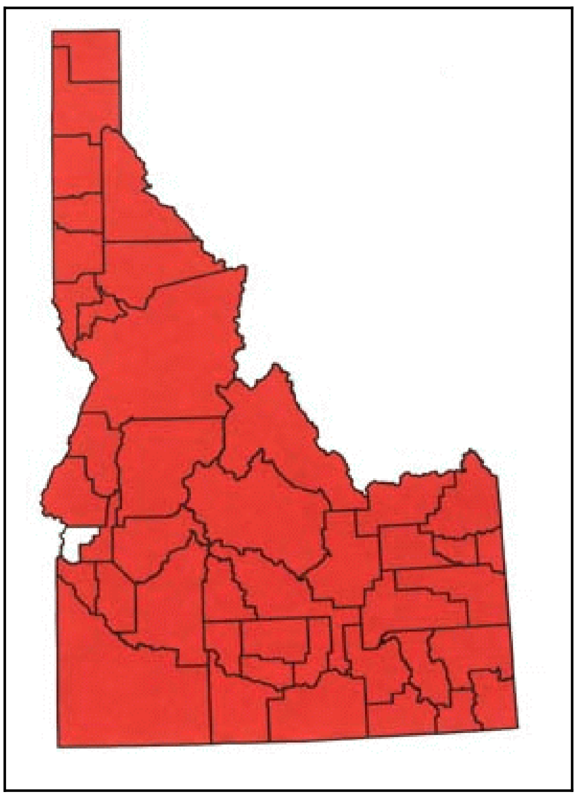
FIGURE E8. IDENTIFIED YELLOW BILLED CUCKOO HABITAT IN THE STATE OF IDAHO (USFWS, 2003).

UTE LADIES' TRESSES

Ute ladies' tresses (Spiranthes diluvialis) is a perennial, terrestrial orchid listed as a threatened species (57 FR 2053, January 17, 1992) under the ESA. Ute ladies' tresses is found in moist soils near springs, lakes or perennial streams at elevations of 1,800-7,000 feet. It may also occur in meadows or near riparian woodlands. The orchid is known to be present along the South Fork of the Snake River, downstream of Palisades Dam and small populations have been identified at approximately 20 other locations in that same area, most occurring on federal lands administered by the U.S. Forest Service and Bureau of Land Management (USFWS, 2003). Orchid species are generally rare. No positive identification of Ute ladies' tresses has occurred in the Cascade Reservoir Watershed (IDEQ, 2000).

Potential threats to the population and range of Ute ladies' tresses identified by the USFWS include agricultural modifications to natural flood-plains, habitat alteration due to increased demands for water by agriculture and municipal uses (dams, reservoirs, and water diversions), increased recreational use of riparian areas, changes in grazing patterns and invasion of exotic plant species (USFWS, 2003).

Figure E9 identifies the potential distribution of Ute ladies' tresses in Idaho as determined by the USFWS.



Due to the improved riparian conditions and reduced agricultural impacts identified as a primary goal of the proposed project, implementation would act to increase the area and quality of riparian corridor vegetation within the project site, thus increasing potential habitat. Activities identified by USFWS as potential threats to this species are not related to the operations or management of the proposed wastewater treatment facility. Therefore, the proposed wastewater treatment facility and related development are not expected to negatively affect Ute ladies' tresses populations.

Figure E 9. Identified potential Ute ladies' tresses habitat in the State of Idaho (USFWS, 2003)**.**

REFERENCES

American Fisheries Society, Idaho Chapter, Bull Trout information page, November 2003. http://www.fisheries.org/idaho/bull_trout.htm

Digital Atlas of Idaho, Idaho's Natural History Online, produced and maintained by the Idaho Geological Survey (IGS) and Idaho State University (ISU) College of Education, Boise State University (BSU), the Idaho Museum of Natural History (IMNH) http://imnh.isu.edu/digitalatlas/counties/counties.htm

Dr. Eric Yensen, Department Chair, Department of Biology, Albertson College, Boise, Idaho. Personal communication regarding distribution of northern Idaho ground squirrels, November 2003.

Idaho Department of Fish and Game (IDFG), informational website, November 2003. http://www.state.id.us/fishgame/fishgame.html

Idaho Division of Environmental Quality (IDEQ). 2000. Cascade Reservoir Phase II TMDL Implementation Plan. June, 2000. Idaho Department of Health and Welfare, Division of Environmental Quality, Boise, Idaho.

NOAA - NMFS website for information regarding chinook salmon, November 2003. http://www.nmfs.noaa.gov/prot_res/species/fish/Chinook_salmon.html

The National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) website for information regarding steelhead trout, November 2003. http://www.nmfs.noaa.gov/prot_res/species/fish/steelhead_trout.html

United States Fish and Wildlife Service (USFWS), Pacific Region, Snake River Fish and Wildlife Office, Endangered Species webpage, November 2003. http://idahoes.fws.gov/#

United States Forest Service (USFS), Payette National Forest, Krassel District, Endangered Species Information, Designated Potential Recovery Habitat for Lynx (map), November 2003.

USFWS – Bull Trout, Proposed Critical Habitat webpage, November 2003. http://pacific.fws.gov/bulltrout/default.htm

USFWS – Bull Trout, Proposed Critical Habitat, North Fork Payette River webpage, November 2003. http://pacific.fws.gov/bulltrout/crithab/unit_17.htm