# Fact Sheet

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**The United States Environmental Protection Agency (EPA)**
**Plans To Issue A National Pollutant Discharge Elimination System (NPDES) Permit to:**

**City of Kamiah**
**Water Treatment Plant**
**1755 S. Laguna Drive**
**Kamiah, Idaho 83536**

The United States Environmental Protection Agency (EPA) plans to issue a NPDES permit to the City of Kamiah Water Treatment Plant (WTP). The draft permit places conditions on the discharge of pollutants from the City of Kamiah Water 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 this facility.

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

## EPA Region 10 Proposes Certification.

EPA is certifying the NPDES permit for the City of Kamiah Water Treatment Plant, under Section 401 of the Clean Water Act. The physical location and discharge from this Water Treatment Plant is within the boundaries of the Nez Perce Reservation.

## Public Comment

Persons wishing to comment on or request a Public Hearing for the draft permit may do so in writing by the expiration date of the Public Notice. 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 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 comments are received, EPA will address the comments and issue the permit as appropriate.

**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 (See address below). The Draft Permit, Fact Sheet, and other information can also be found by visiting the Region 10 website at http://yosemite.epa.gov/r10/WATER.NSF/NPDES+Permits/Draft+NP787

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Region 10
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The Fact Sheet and draft permit are also available at:

United States Environmental Protection Agency
Idaho Operations Office
950 W Bannock, Suite 900
Boise, ID 83702
208-378-5746

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## Acronyms

| | |
|---|---|
| 1Q10 | 1 day, 10 year low flow |
| 7Q10 | 7 day, 10 year low flow |
| AML | Average Monthly Limit |
| APA | Administrative Procedures Act |
| AWL | Average Weekly Limit |
| BAT | Best Available Technology Economically Achievable |
| BCT | Best Conventional Pollutant Control Technology |
| BE | Biological Evaluation |
| BMP | Best Management Practices |
| BPJ | Best Professional Judgment |
| BPT | Best Practicable Technology Currently Available |
| °C | Degrees Celsius |
| CFR | Code of Federal Regulations |
| CFS | Cubic Feet per Second |
| COD | Chemical Oxygen Demand |
| 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 |
| ELGs | Effluent Limitations Guidelines |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FR | Federal Register |
| gpd | Gallons per day |
| gpm | Gallon per minute |
| HUC | Hydrologic Unit Code |
| 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 |
| NPDES | National Pollutant Discharge Elimination System |
| OWW | Office of Water and Watersheds |
| O&M | Operations and maintenance |
| PCS | Permit Compliance System |
| POTW | Publicly owned treatment works |
| QAP | Quality assurance plan |
| RP | Reasonable Potential |
| RPM | Reasonable Potential Multiplier |
| SDWIS | Safe Drinking Water Information System |
| SIC | Standard Industrial Classification |
| SS | Suspended Solids |
| s.u. | Standard Units |
| TMDL | Total Maximum Daily Load |
| TSD | Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) |
| TSS | Total suspended solids |
| THMs | Total Trihalomethanes |
| TTHMs | Total Trihalomethanes |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | United States Geological Survey |
| WLA | Wasteload allocation |
| WQBEL | Water quality-based effluent limit |
| WQS | Water Quality Standards |
| WTPs | Water Treatment Plants |

# I. APPLICANT

This fact sheet provides information on the draft NPDES permit for a conventional filtration water treatment plant in Idaho. The permit will provide CWA authorization for the discharge from this water treatment plant into the Clearwater River, within the Nez Perce Reservation. This discharge from the Water Treatment Plant is a new discharger into the river.

Facility Name: City of Kamiah Water Treatment Plant

NPDES Permit Number: ID-002846-1

Facility Location Address:
1755 S. Laguna Drive
Kamiah, Idaho 83536

Facility Mailing Address:
P.O. Box 338
Kamiah, Idaho 83536

Facility Contact: Mike Stanton, Public Works Director, (208) 935-2406
Applicant Contact: Dale Schneider, Mayor, (208) 935-2672

# II. Background Information

The City of Kamiah (City) is constructing a new Water Treatment Plant (WTP) which will replace the currently used, aging WTP. The new facility is designed to produce 800,000 gallons per day of potable water for the City. The City applied for an NPDES permit to discharge process water from the new facility to the Clearwater River. The current facility infiltrates the process water into the ground rather than directly discharging to the Clearwater River. The proposed WTP is expected to be operating in August 2013.

The WTP will be located at 1755 S. Laguna Drive, in Lewis County, City of Kamiah, Idaho. According to the permit application, the facility will discharge into the Clearwater River from one outfall located at approximately: 46° 13’ 44” N and 116° 01’ 04”W.

The City submitted a NPDES Permit Application dated September 14, 2011 for the proposed WTP. As of March 8, 2012, final design plans have already been completed.

The process flow diagram for the Kamiah WTP is provided in Appendix C. Both the raw water source and the receiving water are the Clearwater River. The processes include: pretreatment (gravity separator), coagulation/flocculation, clarification, filtration, and disinfection.

Pretreatment consists of liquid-solid gravity separators to remove sand and grit. Solids from the system are removed automatically. The solids are dewatered. Any water from the system is pumped to the process water settling basin.

Coagulation and flocculation are used to separate fine particles and colloidal materials from water. Colloids or fine particles in suspension either have or acquire electrical charges on their surfaces. In the process of coagulation, coagulants are added to destabilize the colloidal state of suspended particles through "charge neutralization" allowing the particles to adhere to each other. The facility plans to use aluminum chloride and a flocculation agent (such as PolyClear NF 5000) for its coagulation and flocculation process. The coagulants are added following the liquid-solid gravity separators. The floc builds up as it enters the clarifiers.

Clarification. In clarification the suspended material (including flocculated particles) settles out of the water stream by gravity. The Kamiah WTP will use up-flow clarifiers. The solids are removed from the clarifiers through a clarifier rinsing process. The clarifier rinse process will occur about four times per day.

Following clarification, the water passes through mixed media filters to remove suspended solids.

Chlorine is added after filtration for disinfection purposes, producing the finished water for distribution as drinking water. This chlorinated finish water may be used to backflush the filters.

The total discharge from this facility is expected to be up to 48,900 gallons per day from Kamiah WTP. The four principle wastestreams produced by the WTP are : clarifier rinses, filter backwash, filter drain down, and filter to waste. Filter backwash and filter-to-waste account for most of the volume of wastewater discharged. All four waste streams are routed back to the settling basins prior to discharge into the Clearwater River. These waste streams are discussed in more detail below:

- Clarifier Rinse. The solids are removed from the clarifiers through a clarifier rinsing process. The clarifier rinsing process will occur about two to four times per day. Approximately 3,600 gallons will be generated from each rinse. Daily discharge could be up to 14,400 gallons per day when rinses occur four times each day. Raw water is used for the clarifier rinse. The chemicals used for flocculation are not added to the raw water during the clarifier rinse cycle. The clarifier rinse will be discharged to the process water settling basin. Solids from the clarifiers are dewatered.
- Filter Backwash. Filter media is cleaned by flushing with water in the reverse direction to normal flow, with sufficient force to separate particles from the media. At a typical WTP, backwashing operation lasts for 10 to 25 minutes with maximum rates of 15 to 20 gallon per minute (gpm) per square foot. Because a high water flow is used, a large volume of filter backwash water is produced in a relatively short amount of time. The frequency of backwash will vary from daily to once every few days. Each backwash cycle will produce approximately 25,200 gallons. Approximately 50 percent of the water used to backwash the filters is chlorinated finished water, the rest is river water. Relative to raw river water, typically filter backwash concentrates impurities, such as total suspended solids (TSS), and may form total trihalomethanes (TTHMs) from residual chlorine and Total Organic Carbon (TOC) compounds. In addition, filter backwash may have higher concentrations of aluminum and iron (from aluminum and iron based coagulants). The average TSS concentrations of filter backwash typically fall within the range of 50 to 400 mg/L. Prior to discharge into the Clearwater River, filter backwash is routed to the settling basin.
- Filter Drain Down. The Filter Drain Down process is part of the process used to maintain the performance of the filter at the beginning of the backwash cycle. This process is expected to generate approximately 3,300 gallons of water each time the filter units back wash. The water generated from this process will be directed to the

process water settling basin through the filter to waste line. Each filter drain down process will generate approximately 3,300 gallons.

- Filter-to-Waste process. Filter-to-waste is generated by filters immediately after being placed back on-line following backwashing. The filter-to-waste is not considered to be of a quality that can be sent directly into the water distribution system, but is a fairly clean waste stream. Typically, it amounts to approximately 0.5 percent of the total amount of water filtered. At this WTP, each filter-to-waste process cycle will generate approximately 6,000 gallons. This water will be routed to the settling basin prior to discharge into the Clearwater River.

Wastestreams from the clarifier rinse, filter backwash, filter drain down and filter to waste processes will be discharged to a process water settling basin. After settling, the supernatant is discharged to the Clearwater River. The effluent discharged will contain relatively small amounts of TSS, residual chlorine and flocculants.

## III. Receiving Waters

The treated effluent from the City of Kamiah's WTP will discharge from Outfall 001 to the Clearwater River. The outfall is not equipped with a diffuser, and the point of discharge in the Clearwater River is located within the boundaries of the Nez Perce Indian Reservation. The Clearwater River, is a substantially sized waterbody, and is a tributary to the Snake River. On June 21, 2012, EPA initiated tribal consultation with the Nez Perce Tribe concerning the proposed permit; on August 24, 2012, EPA completed tribal consultation.

### 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 and the Idaho WQS state 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.

EPA used all daily flow data available from USGS station #13339000 (1912 to 1965) and the DFLOW computer program to calculate the critical low flows of Clearwater River at Kamiah, Idaho. USGS station #13339000 is located at latitude 46° 13'58" N, longitude 116° 01'21" W (Rev.) (NAD83), in SW1/4 NE1/4 sec.1, T.33 N., R.3 E., Lewis/Idaho County line, Kamiah quad., Hydrologic Unit 17060306, Nez Perce Indian Reservation, on left bank 0.25 mi downstream from highway bridge at Kamiah, 0.75 mi downstream from Lawyer Creek, 6 mi downstream from South Fork, and at river mile 67.0. Data were available from 1912 to 1965. These are the calculated low flows: 1Q10 is 481cfs, and the 7Q10 is 672cfs.

### B. Water Quality Standards

Section 301(b)(1)(C) of the Clean Water Act (Act) requires that NPDES permits contain effluent limits necessary to meet water quality standards. A State/Tribe'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 (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/Tribe 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.

Concerning the NPDES permitting program, 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, in the absence of EPA-approved tribal WQS, 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 Clearwater River to the Idaho state boundary downstream is approximately 58 miles.

According to IDAPA 58.01.02.120.08, HUC 17060306, Clearwater Subbasin, Unit C-22, "Clearwater River – confluence of South and Middle Fork Clearwater Rivers to Lolo Creek", this segment has the following use designations: cold water communities, salmonid spawning, primary contact recreation, and domestic water supply. Prior to recent IDEQ deletion, this segment was also listed as a Special Resource Water. Water quality criteria designed to protect these beneficial uses appear in Sections 210, 250 and 251 of the Idaho Water Quality Standards.

In addition, the Idaho Water Quality Standards state that all waters of the State of Idaho are protected for industrial and agricultural water supply (Section 100.03.b and c), wildlife habitats (100.04) and aesthetics (100.05). The WQS also state, in Section 252.02 that the criteria from *Water Quality Criteria 1972*, also referred to as the "Blue Book" (EPA-R3-73-033) can be used to determine numeric criteria for the protection of the agricultural water supply use.

The Idaho *Water Quality Standards* state that the following general water quality criteria apply to all surface waters of the state:
Hazardous Materials (Section 200.01);
Toxic Substances (Section 200.02);
Deleterious Materials (Section 200.03);
Radioactive Materials (Section 200.04);
Floating, Suspended or Submerged Matter (Section 200.05);
Excess Nutrients (Section 200.06);
Sediment (Section 200.07); and
Natural Background Conditions (Section 200.09)

The Clearwater River was designated as a Special Resource Water under former Idaho WQS. The Special Resource Water designation has since been removed in Idaho WQS and in accordance with the revised §39-3603(2)(b)(iv) of the Idaho Code, Tier II protection is sufficient to address Special Resource Waters. Further discussion on Antidegradation Policy and Tier II protection is found in Appendix F.

### C. Restrictions on Permitting New Dischargers

The Kamiah WTP is a new discharger as that term is defined in 40 CFR 122.2, and 40 CFR 122.4(i) places restrictions on the issuance of NPDES permits to new sources or new dischargers. Specifically, it states that:

> No permit may be issued … to a new source or a new discharger if the discharge from its … operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards … and for which the State … has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate … that (1) There are sufficient remaining pollutant load allocations to allow for the discharge; and (2) The existing dischargers into the segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards (40 CFR 122.4(i)).

The Kamiah WTP discharge will not cause or contribute to the violation of water quality standards. EPA determined that the proposed discharge does not have reasonable potential to cause or contribute to violations of water quality standards. The draft permit contains effluent limits for that are more stringent than would be allowed by water quality standards, which will ensure that the level of water quality to be achieved by these effluent limits is derived from and complies with applicable water quality standards (40 CFR 122.44(d)(1)). Therefore, the discharge of these pollutants, as authorized by the permit, will not cause or contribute to violations of water standards. EPA has determined that a discharge of residual chlorine and total suspended solids at the technology-based effluent limits will not cause or contribute to violations of water quality standards. Furthermore, as explained above and in Appendix F, the discharge will not cause or contribute to violations of Idaho's antidegradation policy.

Section 303(d) of the Clean Water Act requires listings of waters that are not attaining water quality standards. This is known as the list of impaired waters. There is no Section 303(d) listing for this segment of the Clearwater River where the facility discharges. There is also no Total Maximum Daily Load (TMDL) for the receiving water, therefore there is no need to demonstrate that there are sufficient remaining load allocations to allow for the discharge or that the existing dischargers into the segment that are subject to compliance schedules before issuing this permit.

## IV. Effluent Limitations

### A. General Approach to Determining Effluent Limitations

Sections 101, 301, 304, 308, 401, 402, and 403 of the CWA provide the basis for effluent limitations and other conditions in the permit. EPA has evaluated possible discharges from water treatment plants with respect to these sections of the CWA and relevant NPDES implementing regulations to determine what conditions and requirements to include in the permit.

In general, the CWA requires effluent limits that are the more stringent of either technology-based or water quality-based limitations. Technology-based effluent limits are based on a minimum level of treatment for point sources provided by currently available treatment technologies. Water quality-based effluent limits (WQBELs) are developed to ensure that applicable water quality standards for receiving waters are met. The derivation of technology and WQBELs of the draft permit are described in greater detail in the Appendices this Fact Sheet.

### B. Anti-Degradation Policy

In setting permit conditions, EPA must consider the State's/ 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/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 consistent with Idaho's water quality standards, EPA utilized IDEQ's antidegradation implementation methods as guidance to determine whether Idaho's antidegradation policy has been met. As discussed in Appendix F, EPA believes that the permitted discharge would comply with the state's anti-degradation policy.

### C. Evaluation of Technology-Based Limitations

To date, EPA has not established, pursuant to Section 301(b) of the CWA, technology-based Effluent Limitation Guidelines (ELGs) or standards of performance applicable to discharges from water treatment plants. In such circumstances, where ELGs have not been developed, EPA relies on best professional judgment (BPJ), pursuant to Section 402(a)(1) of the CWA, to establish technology-based effluent limits on a case-by-case basis. Such limits must be established based on best available technology economically achievable (BAT) for toxics and non-conventional pollutants and best conventional pollutant control technology (BCT) for conventional pollutants and take into consideration the factors presented at 40 CFR § 125.3(d)(2) for BCT and at 40 CFR § 125.3(d)(3) for BAT. Therefore, and as provided in Section 402(a)(1) of the Act, EPA is establishing technology-based effluent limits in the permit utilizing BPJ to meet the requirements of BCT/BAT. The draft permit includes technology-based effluent limitations for TSS.

Note that, EPA has selected the "drinking water treatment point source category" as a candidate for effluent guidelines rulemaking. At this time, EPA has made no decisions about whether any discharge controls are necessary for residuals produced by drinking water treatment facilities. Additional information on this rulemaking may be found at: http://www.epa.gov/waterscience/guide/dw/

## D. Evaluation of Water Quality-Based Effluent Limitations

Section 301(b)(1)(C) of the CWA and implementing regulations at 40 CFR § 122.44(d) require permits to include limits for all pollutants or parameters which are or may be discharged at a level which will cause, or contribute to an excursion above any State/Tribe water quality standard, including State/Tribe narrative criteria for water quality. If such WQBELs are necessary, they must be stringent enough to ensure that water quality standards are met, and they must be consistent with any available waste load allocation. For pollutants with technology-based limits, EPA must also determine whether the technology-based limits will be protective of the corresponding water quality criteria. The draft permit includes WQBELs for pH and total residual chlorine. Appendix B provides a discussion of the steps involved in developing WQBELs.

## E. Summary of Effluent Limitations and Requirements

The following summarizes the effluent limitations of the draft permit that are in the draft WTP permit.

1. pH. The pH must not be less than 6.5 or greater than 9.0 standard pH units.

2. Total Residual Chlorine. Each draft permit includes average monthly and maximum daily total residual chlorine concentration limits (in units of mg/L), and average monthly and maximum daily total residual chlorine loading limits (in units of lbs/day). Based on Best Professional Judgment, EPA has established the following technology-based effluent limits for Total Residual Chlorine: 0.5 mg/l (maximum daily limit) and 0.3 mg/l (average monthly limit).

The loading limits are calculated by the following formula:

Loading = concentration (in mg/l) x effluent design flow (in mgd) x 8.34

where, 8.34 is a conversion factor.

Based on an effluent design flow of 48,900 gallons per day (0.0489 mgd), the loading limits are calculated to be 0.20 lbs/day (maximum daily) and 0.12 lbs/day (average monthly).

3. TSS. Based on Best Professional Judgment, EPA has established the following technology-based effluent limits for TSS: 30 mg/l (maximum daily limit) and 45 mg/l (average monthly limit); the loading limits are 12.23 lbs/day and 18.35 lbs/day correspondingly.

**Table 1 Effluent Limitations for Total Residual Chlorine and TSS**

| Parameter | Concentration (mg/l) | | Mass-Based Loading[1] (lbs/day) | |
|---|---|---|---|---|
| | Average Monthly Limit | Maximum Daily Limit | Average Monthly Limit | Maximum Daily Limit |
| **Total Residual Chlorine** | 0.3 mg/l | 0.5 mg/l | 0.12 lbs/day | 0.20 lbs/day |
| **TSS** | 30 mg/l | 45 mg/l | 12.23 lbs/day | 18.35 lbs/day |

Footnote:

1. Loading is calculated by multiplying the concentration (mg/L) by the flow (mgd) on the day sampling occurred and a conversion factor of 8.34
2. The permittee must use methods that can achieve a minimum level (ML) less than the effluent limitation.

4. Narrative. The draft permit includes narrative effluent limitations for toxic substances; deleterious materials; and floating, suspended, and submerged matter; which reflect applicable State water quality criteria applied directly as end-of-pipe limitations.

## F. Monitoring and Reporting Requirements

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) or on the application for renewal, as appropriate, to the EPA.

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 Part 136) and if the Method Detection Limits are less than the effluent limits.

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 2 Effluent Monitoring**

| Parameter | Units | Monitoring Frequency | Type of Sample |
|---|---|---|---|
| Outfall Flow | gpd | Daily[1] | Estimate |
| pH | s.u. | Weekly | Grab |
| TSS | mg/L | Monthly | Grab |
| Total Residual Chlorine | mg/L | Weekly | Grab |
| Metals[3,4] | µg/L | Annually | Grab |
| TTHMs[4] | µg/L | Annually | Grab |

| | | | |
|---|---|---|---|
| Turbidity | NTUs | Monthly | Grab |
| Aluminum | µg/L | Annually | Grab |
| Temperature | °C | Weekly | Grab |
| Alkalinity as $CaCO_3$ | Mg/l | Monthly | Grab |

1. Report average monthly and maximum daily gallons per day (gpd).
2. Analyses for the thirteen metals (identified as Compound Nos. 1 – 13 by the National Toxics Rule at 40 CFR § 131.36). These include: antimony, arsenic, beryllium, cadmium, chromium (III and VI), copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
3. Sampling required during first three years of coverage only.
4. Analysis for chloroform, chlorodibromomethane, dichlorobromomethane, and bromoform.

# V. 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. The permittees are 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. The plan shall be retained on site and made available to EPA and Nez Perce Tribe as applicable upon request.

## B. Best Management Practices

Section 402 of the Clean Water Act and federal regulations at 40 CFR § 122.44(k)(2) and (3) authorize EPA to require best management practices (BMPs) in NPDES permits. BMPs are measures that are intended to prevent or minimize the generation and the potential for release of pollutants from industrial facilities to waters of the U.S. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the discharger to develop and implement a BMP Plan within 6 months of becoming authorized to discharge under its terms. The facility must identify and assess potential impacts of pollutant discharges and identify specific management practices and operating procedures to prevent or minimize the generation and discharge of pollutants. The BMP Plan must also address several specific objectives.

The BMP Plan must be amended whenever there is a change in the facility or its operation that materially increases the potential for an increased discharge of pollutants.

## C. Standard Permit Provisions

Section IV of the draft permit contains standard regulatory language that is required in all NPDES permits (40 CFR §122.41). Because it is based on regulations, the standard regulatory language cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and general requirements.

# VI. Other Legal Requirements

## A. Endangered Species Act of 1973 and Essential Fish Habitat

Section 7 of the Endangered Species Act requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U. S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has determined that the issuance of this permit will have no effect on any of the threatened or endangered species in the vicinity of the discharge. See Appendix D for further details.

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 the National Marine Fisheries Service (NMFS) when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EPA has tentatively determined that the issuance of this permit will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action

## B. Certification Requirement

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

## C. Permit Expiration

This permit will expire five years from the effective date. If a permit is not reissued before its expiration date, the conditions of the expired permit will continue in force until the effective date of a new or reissued permit. (40 CFR § 122.6)

# Appendix A Basis for Effluent Limitations

## A. Statutory and Regulatory Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the CWA provide the basis for effluent limitations and other conditions in the draft permit. EPA evaluates the discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, EPA first determines which technology-based limits must be incorporated into the permit. EPA then evaluates the technology-based limits to determine whether they are adequate to ensure that water quality standards are met in the receiving water. If the limits are not adequate, EPA must develop additional water quality-based limits. These limits are designed to prevent exceedances of Idaho's water quality standards in the receiving water. The draft permit will include whichever limits (technology-based or water quality-based) are more stringent.

## B. Technology-Based Evaluation

Where EPA has not yet developed effluent limitation guidelines, pursuant to Section 301(b) of the CWA, for a particular industry or a particular pollutant, technology-based limitations must be established using BPJ (40 CFR § 122.43, 12.44, and 125.3). Because there are no ELGs developed by EPA for discharges from the water treatment industry, technology-based effluent limitations must be based on BPJ.

## C. Water Quality-Based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the potential discharges to determine compliance with Section 301(b)(1)(C) of the CWA and implementing regulations at 40 CFR § 122.44(d), which require permits to include limits for all pollutants or parameters which are or may be discharged at a level which will cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality. The limits must be stringent enough to ensure that water quality standards are met and must be consistent with any available waste load allocation (WLA).

EPA must also consider the State/Tribe's antidegradation policy. At IDAPA 58.01.02.051, IDEQ requires that existing in stream water uses and the level of water quality necessary to protect those existing uses be maintained and protected. Where the quality of waters exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water, that quality must also be maintained and protected.

The sections below provide a discussion of the steps involved in developing water WQBELs. Appendix B shows the derivation of specific WQBELs for the draft permit.

1. Water Quality Criteria

   Uses of receiving water are defined by IDEQ at IDAPA 58.01.02.100 through IDAPA 58.01.02.200 and can include aquatic life uses, recreational uses, water supply uses, wildlife habitat, and aesthetics. Applicable water quality criteria are presented at IDAPA 58.01.02.200 through 299. To protect all beneficial uses, limitations of the permit are based on the most stringent of the water quality criteria applicable to all possible beneficial uses.

2. Mixing Zones

Mixing zones are defined as a limited area or volume of water where the discharge plume is progressively diluted by the receiving water. Water quality criteria may be exceeded in the mixing zone as long as acutely toxic conditions are prevented from occurring and the applicable existing designated uses of the water body are not impaired as a result of the mixing zone. Mixing zones are allowed at the discretion of the State/Tribe, based on the State/Tribe water quality standards regulations.

The Idaho water quality standards at IDAPA 58.01.02.060 allow for the use of mixing zones after a biological, chemical, and physical appraisal of the receiving water and the discharge. The standards allow water quality within a mixing zone to exceed chronic water quality criteria so long as chronic water quality criteria are met at the boundary of the mixing zone. Acute water quality criteria may be exceeded within a zone of initial dilution inside the chronic mixing zone. In accordance with state water quality standards, mixing zones may be authorized.

3. Wasteload Allocation (WLA) Development

A WLA must be developed to establish the allowable loading of each pollutant that may be discharged without causing or contributing to exceedances of water quality standards in the receiving waters. WLAs can be established in three ways: mixing zone-based WLAs, TMDL-based WLAs, and end-of-pipe WLAs.

a. Mixing Zone-Based WLA

When a mixing zone for a discharge is authorized, the WLA is calculated based on the available dilution, background concentrations of pollutants, and the water quality criteria.

b. TMDL-Based WLA

Where the receiving water quality does not meet water quality standards, the wasteload allocation (WLA) 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, including a margin of safety that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this determined capacity risks violating water quality standards.

Section 303(d) of the CWA requires states to develop TMDLs for water bodies that will not meet water quality standards after the imposition of technology-based effluent limitations to ensure that these waters will come into compliance with water quality standards. The first step in establishing a TMDL is to determine the assimilative capacity of the waterbody (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.

c. End-of-Pipe WLA

In these circumstances, where WLAs cannot be determined based on TMDLs or based on a mixing zone, the applicable water quality criteria are applied as end-of-pipe WLAs.

4. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical methodology described in Chapter 5 of the Technical Support Document for Water Quality-Based Toxics Control (TSD), EPA Office of Water (1991) (EPA/505/2-90-001) to establish maximum daily and average monthly permit limitations (MDL and AML, respectively). This approach takes into account effluent variability, sampling frequency, water quality standards, and the difference in time frames between the monthly average and the daily maximum limits.
The daily maximum limit is based on a coefficient of variation (CV) and a probability basis, while the monthly average limitation is dependent on these two variables and the monitoring frequency. As recommended by the TSD, EPA uses a probability basis of 95 percent for the monthly average limit calculation and 99 percent for the daily maximum limit calculation. EPA normally uses a CV of 0.6 for both monthly average and daily maximum calculations when there are fewer than 10 samples.

## D. Pollutant-Specific Analysis

This discussion describes the basis for each of the technology-based or water quality-based effluent limitations in the draft permit.

<u>Total Chlorine Residual</u>

There are no applicable technology-based effluent guidelines for chlorine residuals in discharges from water treatment plants. Based on Best Professional Judgment, the EPA is technology-based effluent limits for total residual chlorine in the draft permit of 0.5 mg/l (maximum daily limit) and 0.3 mg/l (average monthly limit).

The State of Idaho, has established applicable water quality criteria of 19 µg/L and 11 µg/L total chlorine residual for acute and chronic concentrations, respectively, for the protection of aquatic life. EPA conducted a Reasonable Potential analysis to determine if the technology-based effluent limit would violate Idaho Water Quality Standards.

The results of the analysis show that the proposed technology based limits would not cause a violation of Idaho Water Quality Standards (see Appendix B). This indicates that the technology-based effluent limits are more stringent than would be required by the Idaho Water Quality Standards.

Therefore, the draft permit includes the technology-based effluent limits for total residual chlorine of 0.5 mg/l (maximum daily limit) and 0.3 mg/l (average monthly limit).

pH

There are no applicable technology-based effluent guidelines for pH in discharges from water treatment plants; however, at IDAPA 58.01.02.250, the State has established applicable water quality criteria for pH in receiving waters of 6.5 to 9.0. To assure protection of the applicable water quality criteria, the pH range of 6.5 to 9.0 is being established as an end of pipe discharge limitation by the draft permit.

Trihalomethanes

There are no applicable technology-based effluent guidelines for trihalomethanes in discharges from water treatment plants. The State of Idaho, however, has established the following applicable water quality criteria for protection of human health for each of the four common trihalomethanes.

**Table A- 1 Trihalomethanes Human Health Criteria**

| | Human Health Criteria (IDAPA 58.01.02.210) | |
|---|---|---|
| **Trihalomethane** | **Consumption of Water and Organisms (µg/l)** | **Consumption of Organisms Only (µg/l)** |
| Chloroform | 5.7 | 470 |
| Chlorodibromomethane | 0.40 | 13 |
| Dichlorobromomethane | 0.55 | 17 |
| Bromoform | 4.3 | 140 |

Although chlorine is commonly used for disinfection in water treatment plants, and literature suggests that trihalomethanes (THMs) can be elevated in water treatment plant residuals, reported levels are widely variable, and there is no actual data available for a determination of reasonable potential for plants in Idaho. Therefore, the permit does not include effluent limitations for THMs, but do require monitoring. This information will be used to conduct reasonable potential analysis for THMs during development of the next permit.

Turbidity

There are no applicable technology-based effluent guidelines for turbidity in discharges from water treatment plants. At IDAPA 58.01.02.252, however, IDEQ has established water quality criteria for turbidity for waters designated for domestic water supply, that prohibits increases of 5 NTUs or more in receiving waters that have background turbidity of 50 NTUs or less, and increases of 10 percent above background (not to exceed 25 NTUs) are prohibited, when background turbidity is greater than 50 NTUs.

EPA has determined that limitations applied to TSS in discharges from WTPs will also control, to a great extent, the levels of turbidity in these discharges. In addition, because no data is available describing turbidity levels in discharges from the WTPs for a determination of reasonable potential, the draft permit do not include effluent limitations for turbidity, but does require monitoring. This information will be used to conduct reasonable potential analysis for turbidity during development of the next permit.

Total Suspended Solids

There are no applicable technology-based effluent guidelines for suspended solids in discharges from water treatment plants. For the discharge authorized by the permit, EPA is establishing TSS effluent limits of 30 mg/L (average monthly limit) and 45 mg/L (maximum daily limit). EPA is establishing these technology-based effluent limits in the permit utilizing BPJ to meet the requirements of BCT/BAT. (see Part IV.C).

Existing individual permits for water treatment plants in Idaho have limits of 30 mg/ and 45 mg/L (monthly average and daily maximum). The facilities have been in compliance with these limits. In establishing the TSS limitations for this permit, EPA is also relying on research performed for the EPA in 1987. (SAIC, Model Permit Package for the Water Supply Industry, EPA Contract No. 68-01-7043) This study considered sedimentation lagoons as the model treatment for BCT based on a finding that 76 percent of WTPs surveyed had used this technology for wastewater treatment. Analysis of 76 individual NPDES permits for WTPs determined that limitations of 30 mg/L and 45 mg/L were representative of current permitting practice for average monthly and daily maximum TSS limits, respectively. And, analysis of monitoring data for sedimentation lagoons within the industry resulted in calculation of 95th percent occurrence (monthly average) and 99th percent occurrence (daily maximum) levels of treatment of 28.1 mg/L and 44.4 mg/L, respectively. These levels of treatment performance were considered Best Practicable Technology Currently Available (BPT), and subsequent analysis determined that BPT was equal to BCT. The study identified 30 mg/l and 45 mg/L to be the monthly average and daily maximum TSS limits for a model NPDES permit.

Aluminum

There are no applicable technology-based guidelines or State water quality criteria for aluminum. To evaluate the need for effluent limitations for aluminum, EPA has considered the EPA National Recommended Water Quality Criteria, 2002 (EPA-822-R-02-047), which recommends maximum concentrations of 87 μg/L and 750 μg/L as acute and chronic concentrations for the protection of freshwater aquatic life. IDEQ has also established a narrative water quality criterion for toxic substances, which states that surface waters of the State must be free of toxic substances in concentrations that impair designated beneficial uses.

A review of the literature regarding water treatment plant residuals suggests that aluminum concentrations in water treatment plant residuals can be elevated, particularly when aluminum salts are used to enhance coagulation. The draft permit does not include effluent limitations for aluminum, but does require monitoring to determine if aluminum effluent limits would be justified during the next permit cycle. This information will be used to conduct reasonable potential analysis for aluminum during development of the next permit.

Metals

There are no applicable technology-based limits for metals. IDEQ, however, has established applicable water quality criteria. In addition, IDEQ has established a narrative water quality criterion for toxic substances, which states that surface waters of the State must be free of toxic substances in concentrations that impair designated beneficial uses.

A review of the literature regarding water treatment plant residuals suggests that metals may be present in discharges from water treatment plants. In developing limitations and conditions for the permit, however, EPA did not have specific data available to determine if these pollutants may cause or contribute to a water quality standard violation. Therefore, the draft permit requires effluent sampling for metals during the first three years of the permit cycle. The metal analysis will be for compounds 1 to 13 of the National Toxics Rule at 40 CFR § 131.36. These include: antimony, arsenic, beryllium, cadmium, chromium (III and VI), copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. These data will be used to determine if additional limits are needed for the effluent discharge for the next permit.

# Appendix B Water Quality-Based Effluent Limits Calculations

The proposed Kamiah WTP has not yet been in operation, therefore there is no historical data of its residual chlorine concentrations of its effluent. However, to determine if there is reasonable potential to exceed the WQS, it is necessary to have the maximum effluent concentration measured and the number of samples measured. Therefore, EPA proposes effluent limits that are based on Best Professional Judgment (BPJ) for Total Residual Chlorine:
Maximum Daily Limit = 0.5 mg/l; and
Average Monthly Limit = 0.3 mg/l.

This appendix describes the process EPA uses to conduct reasonable potential analysis and calculate WQBELs. EPA conducted Reasonable Potential calculation for Total Residual Chlorine as shown in Table B-1, and determined that the proposed limits would not violate Idaho Water Quality Standards. .

**Step 1**. Conduct Reasonable Potential

To determine if there is "reasonable potential" to cause or contribute to an exceedence of the water quality criteria for a given pollutant, EPA compares applicable water quality criteria to the maximum projected downstream concentrations for a particular pollutant, $C_d$. If the projected downstream concentration exceeds the criteria, there is "reasonable potential" and a WQBEL must be included in the permit.

The maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_dQ_d = C_eQ_e + C_uQ_u \qquad \text{(Equation B-1)}$$

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 design flow rate
$Q_u$ = Receiving water low flow rate upstream of the discharge (1Q10, 7Q10)

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

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_e + Q_u} \qquad \text{(Equation B-2)}$$

The above form of the equation is based on the assumption that 100% of the receiving water is available for mixing. If only a fraction of the receiving water is available, the equation becomes:

$$C_d = \frac{C_eQ_e + C_u(Q_u \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation B-3)}$$

where MZ is the fraction of the receiving water flow available for dilution.

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

$$C_d = C_e \qquad \text{(Equation B-4)}$$

Equation B-2 can be simplified by introducing a "dilution factor,"

$$D = \frac{Q_e + (Q_u \times MZ)}{Q_e} \qquad \text{(Equation B-5)}$$

After the dilution factor simplification, Equation B-2 becomes:

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

Equation B-6 is the form of the mass balance equation used to determine reasonable potential and calculate wasteload allocations.

Because of the common use of chlorine for disinfection in water treatment plants, EPA has determined that there is reasonable potential for wastewater discharges from water treatment plants to cause an exceedance of the numeric State water quality criteria for chlorine.

**Step 2**. Calculate Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equations B-6). To calculate the wasteload allocation, the receiving water concentration downstream of the effluent discharge ($C_d$) is set equal to the acute or chronic criterion and the equation is solved for $C_e$. The calculated value of $C_e$, becomes the acute or chronic WLA (i.e. $WLA_a$ or $WLA_c$). Equation B-6 is rearranged to solve for the WLA:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{(Equation B-7)}$$

**Step 3.** Determine long-term average concentrations.

WLAs are converted to long term average concentrations (LTAs). For each WLA based on an aquatic life criterion, the acute and chronic LTAs are calculated using the following equations from the *TSD*.

$$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\sigma) \qquad \text{(Equation B-8)}$$
$$LTA_c = WLA_c \times \exp(0.5\sigma_4^2 - z\sigma_4) \qquad \text{(Equation B-9)}$$

where,

$\sigma^2 = \ln [CV^2 + 1]$

$\sigma_4^2 = \ln [CV^2/4 + 1]$

$z = 2.326$ for the 99th percentile occurrence probability

CV = coefficient of variation (here, because there are less than 10 data points, the CV is set equal to 0.6, the recommended default value)

$\sigma^2 = \ln [CV^2 + 1]$

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

**Step 4**. Derive the maximum daily (MDL) and average monthly (AML) permit limits.

Using equations from the *TSD*, the MDL and the AML are calculated as follows.

$MDL = LTA \times e^{[z\sigma - 0.5\sigma 2]}$ (Equation B-10)

where,

$\sigma^2 = \ln [CV^2 + 1]$

$z = 2.326$ for the 99th percentile probability basis

CV = coefficient of variation (here, because there are less than 10 data points, the CV is set equal to 0.6, *i.e.* the recommended default value of the *TSD*)

and,

$AML = LTA \times e^{[z\sigma_n - 0.5\sigma_n 2]}$ (Equation B-11)

where,

$\sigma_n{}^2 = \ln [CV^2 / n +1]$

$z = 1.645$ for the 95th percentile probability basis

CV = coefficient of variation = 0.6

n = number of sampling events required per month (here, n is set equal to 4, as recommended by the *TSD* whenever less than 4 samples per month are collected)

**Dilution Factor Calculation**

The Idaho *Water Quality Standards* 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:

- The 1 day, 10 year low flow (1Q10). This flow is used to protect aquatic life from acute effects. It represents the lowest daily flow that is expected to occur once in 10 years. For example, the 1Q10 flow in the Clearwater River at Kamiah is 481cfs; this is the flow rate to be used for evaluating aquatic life for the acute criteria pursuant to Idaho's WQS.

- The 7 day, 10 year low flow (7Q10). This flow is used to protect aquatic life from chronic effects. It the lowest 7 day average flow expected to occur once in 10 years. For example, the 7Q10 flow in the Clearwater River at Kamiah is 672cfs; this is the flow rate to be used for evaluating the aquatic life for the chronic criteria pursuant to Idaho's WQS.

Using 25% of critical low flows (consistent with Idaho Water Quality Standards) results in the following dilution factors:
Acute Dilution Factor = 128
Chronic Dilution Factor = 178

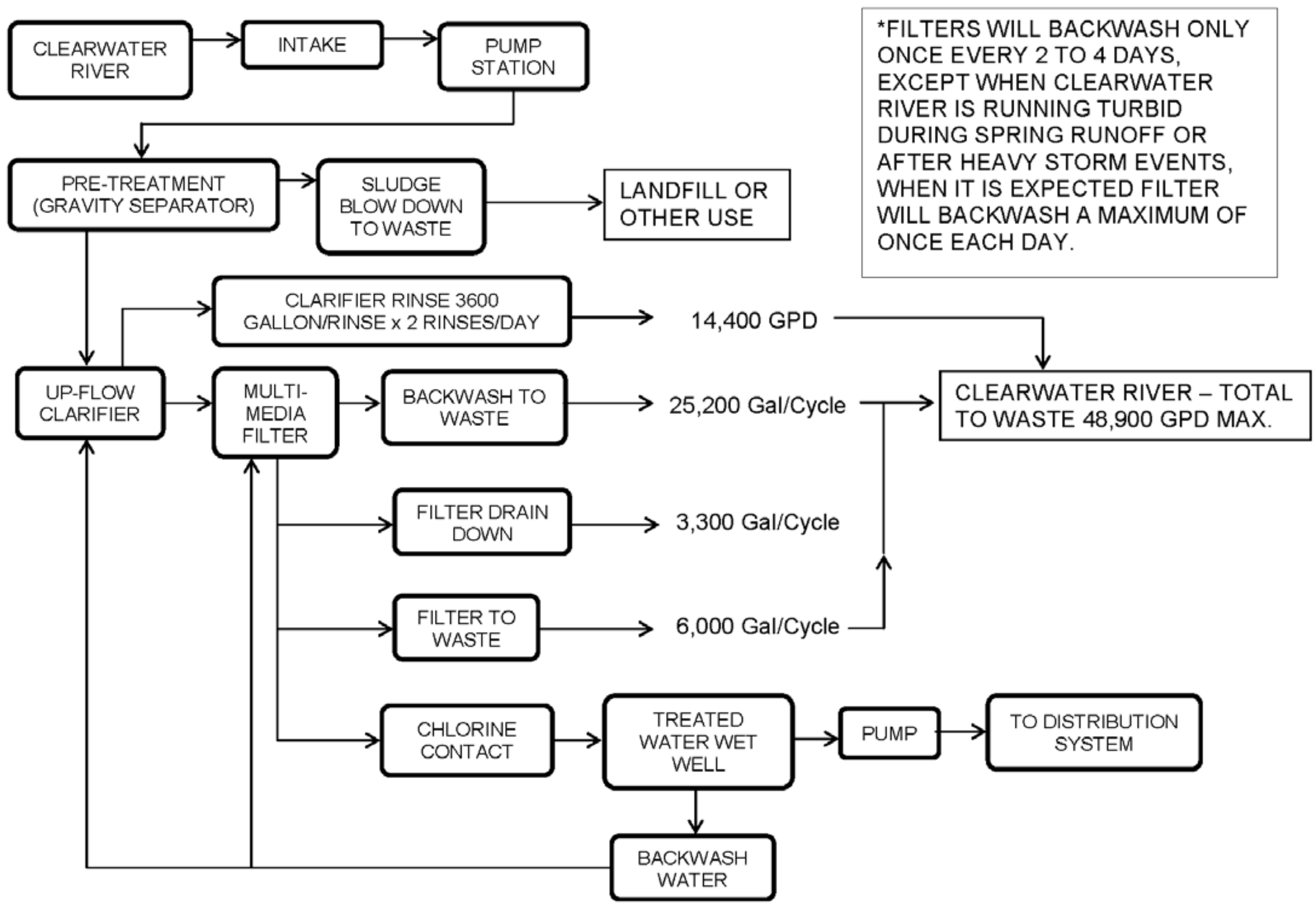
## Table B-1. Reasonable Potential Calculation for Total Residual Chlorine

| Parameter | | Idaho Water Quality Standards | | Maximum conc. at edge of mixing zone | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ambient Concentration | Acute | Chronic | Acute | Chronic | **LIMIT REQUIRED?** | Effluent percentile value | | Computed Max effluent conc. measured (metals as total recoverable) | Coeff of Variation | | # of samples | Reasonable Potential Multiplier | Acute Dilution Factor | Chronic Dilution Factor |
| | Ug/l | *ug/L* | *ug/L* | *ug/L* | *ug/L* | | | *Pn* | *ug/L* | *CV* | *S* | *n* | | | |
| Total Residual Chlorine (Maximum Daily Limit = 0.5 mg/l) | 0 | 19.00 | 11.00 | 3.91 | 2.81 | **NO** | NA | NA | 500 | NA | NA | NA | 1.00 | 128 | 178 |

Footnotes:

1. Based on State of Idaho water quality standards.
2. For Total Residual Chlorine Reasonable Potential calculation is based on a technology-based limit, with the Maximum Daily Limit of 0.5 mg/l (i.e., 500ug/l)

**APPENDIX C**
**PROCESS FLOW DIAGRAM – KAMIAH WATER TREATMENT FACILITY**

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City of Kamiah
Water Treatment Facility

# Appendix D

# Summary of Biological Evaluation

**APPENDIX D**

**ENDANGERED SPECIES ACT**

As discussed in this fact sheet, Section 7 of the Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if there are potential affects a federal action may have on threatened and endangered species. In the analysis below, EPA has determined that there is NO EFFECT to threatened or endangered species from the proposed Kamiah Water Treatment Plant, therefore, it is not necessary to consult with NMFS and USFWS concerning this proposed discharge.

## I. Threatened and Endangered Species

According to the USFWS species list, the following federally-listed species are in the vicinity of the discharge (for Idaho County and Lewis County). The species denoted by a * are under the jurisdiction of NMFS:

<u>Endangered Species:</u>
Sockeye salmon (*Oncorhynchus nerka)*

<u>Threatened Species:</u>
Bull Trout (*Salvelinus confluentus*)
MacFarlane's Four-O'clock (*Mirabilis macfarlanei)*
Chinook Salmon (*Oncorhynchus tshawytscha*)*
Steelhead (*Oncorhynchus mykiss*)*
Spalding's catchfly *(Silene spaldingii)*
Canada Lynx (*Lynx canadensis*)

<u>Proposed Threatened Species:</u>
None

## II. Potential Effects for Species

### A. Sockeye Salmon (*Oncorhynchus nerka)* - Endangered

The sockeye salmon is the third most abundant of the seven species of Pacific salmon, after pink salmon (*O. gorbuscha*) and chum salmon. Sockeye contributed about 17 percent by weight and 14 percent in numbers to the total salmon catch in the North Pacific Ocean and adjacent waters during the period 1952 to 1976 (Burgner 2003).

Sockeye salmon exhibit a greater variety of life history patterns than other member of the genus *Oncorhynchus* and characteristically make more use of lake rearing habitat in juvenile stages. Although sockeye are primarily anadromous, there are distinct populations called kokanee that mature, spawn, and die in fresh water without a period of sea life. Typically, but not universally, juvenile anadromous sockeye utilize lake rearing areas for one to three years after emergence from the gravel; however, some populations utilize stream areas for rearing and may migrate to sea soon after emergence. Anadromous sockeye may spend from one to four years in the ocean before returning to freshwater to spawn and die in late summer and autumn. The sockeye also shows a wide variety of racial adaptations to specialized spawning and rearing habitat combinations (Burgner 2003).

The primary spawning grounds of sockeye salmon in North America extend from tributaries of the Columbia River to the Kuskokwim River in western Alaska, and, on the Asian side, the spawning areas are found mainly on the Kamchatka Peninsula of Russia. During their feeding and maturation phase in the ocean, sockeye range throughout the North Pacific Ocean, Bering Sea, and eastern Sea of Okhotsk. There is considerable intermingling of Asian and North American populations from Bering Sea and Gulf of Alaska streams. Maturing sockeye return to their respective spawning rivers at different times varying from late spring to midsummer. Spawning time range from late July through January, but are primarily from midsummer until late autumn (Burgner 2003).

**Analysis of Potential Impacts to Sockeye Salmon**

In consideration of all factors pertaining to the Sockeye Salmon and the discharge from the WTP, it is predicted that there will be no impact to the Sockeye Salmon. The discharge does not contribute to the factors responsible for the Sockeye Salmon's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Sockeye Salmon. The Sockeye Salmon is a highly mobile species, discharge is not from a major facility, and as well as meeting State Water Quality Standards; therefore, no measurable impacts are predicted. **No effect** is predicted on the Sockeye Salmon from the discharge.

### B. Bull Trout (*Salvelinus confluentus*) - Threatened

The bull trout is a member of the char family (*Salvelinus*) and is represented by different life history forms, including river-resident populations, lacustrine populations, and sea-run populations. The latter appear to be relatively rare (Behnke 2002).

The stream-resident form is subdivided into two basic types: one lives its entire life in small headwater streams, often isolated above waterfalls; the other typically spawns in smaller tributary streams but spends most of its time foraging in larger rivers. This second form, often called "fluvial," occurs only in relatively larger river basins that contain a network of headwater spawning tributaries connected to larger riverine habitat, allowing bull trout to undertake movements of more than 100 miles (Behnke 2002).

The northernmost distribution of bull trout occurs in the headwaters of the Yukon and Mackenzie River basins of Alaska and Canada. In Pacific Coast drainages, they occur in rivers of British Columbia southward to around Puget Sound. Bull trout are not native to Vancouver Island or other islands off the Pacific Coast of and Canada and southern Alaska. Native distribution includes the upper parts of the North and South Saskatchewan River drainages of Alberta, Canada (Behnke 2002).

To the south, a few bull trout populations persist in cold headwater tributary streams in the Upper Klamath Lake basin of Oregon. The southernmost population of bull trout once occurred in the McCloud River of California. However, those bull trout declined rapidly in the 1940s after construction of Shasta Dam (Behnke 2002).

### *Columbia Basin Bull Trout*

#### Status

The CR bull trout distinct population segment (DPS) was listed as threatened on June 10, 1998 (62 FR 32268). The following information on bull trout was taken from 63 FR 31647-31674 and USFWS 2002a).

#### Geographic Range and Spatial Distribution

The Columbia River population segment is from the northwestern United States and British Columbia, Canada. This population segment is comprised of 386 bull trout populations in Idaho, Montana, Oregon, and Washington with additional populations in British Columbia. The Columbia River population segment includes the entire Columbia River basin and all its tributaries, excluding the isolated bull trout populations found in the Jarbridge River in Nevada. Bull trout populations within the Columbia River population segment have declined from historic levels and are generally considered to be isolated and remnant.

#### Critical Habitat

Critical habitat has been designated for Columbia River Basin bull trout on September 26, 2005 (70 FR 56213). The critical habitat proposal for bull trout in the Columbia River basin calls for a total of 3,828 miles of streams in Oregon, Washington, Idaho, and Montana to be designated as critical bull trout habitat, along with 143,218 acres of lakes and reservoirs in those four states.

#### Life History

Bull trout are seldom found in waters where temperatures are warmer than 15EC to 17.8EC. Besides very cold water, bull trout require stable stream channels, clean spawning gravel, complex and diverse cover, and unblocked migration routes (USFWS 2002a). Because bull trout life history patterns include migratory and resident forms, both adults and juveniles are present in the streams throughout the year. Bull trout adults may begin to migrate from feeding to spawning grounds in the spring and migrate slowly throughout the summer (Pratt 1992).

Bull trout eggs incubate from 100 to 145 days, usually in winter, after which the alevins require 65 to 90 days to absorb their yolk sacs (Pratt 1992). They remain within the interstices of the streambed as fry for up to three weeks before filling their air bladder, reaching lengths of 25-28 mm, and emerging from the streambed in late April (McPhail and Murry 1979, Pratt 1992).

**Population Trends and Risks**

The Columbia River population segment includes bull trout residing in portions of Oregon, Washington, Idaho and Montana. Bull trout are estimated to have once occupied about 60 percent of the Columbia River basin; they presently are known or predicted to occur in less than half of watersheds in the historical range (Quigley and Arbelbide 1997), which amounts to approximately 27 percent of the basin (67 FR 71239). Another evaluation of the distribution and status of bull trout within the Columbia River and Klamath River basins indicates that bull trout are present in about 36 percent of the watersheds in their potential range and are estimated to have strong populations in only 6-12 percent of the potential range (Rieman et al. 1997). Among the many factors that contributed to the decline of the bull trout in the Columbia River and Klamath River basins, the following three factors seem to be particularly significant. First, fragmentation and isolation of local populations due to the proliferation of dams and water diversions which have eliminated habitat, altered water flow and temperature regimes and impeded migratory movements (Rieman and McIntyre 1993, Dunham and Rieman 1999). Second, degradation of spawning and rearing habitat in upper watershed areas, particularly alterations in sedimentation rates and water termperature resulting from past forest and rangeland management practices and intensive development of roads (Fraley and Shepard 1989). Thirdly, the introduction and spread of nonnative species particularly brook trout, and lake trout, which compete with bull trout for limited resources (Ratliff and Howell 1992, Leary et al. 1993).

**Analysis of Potential Impacts to Bull Trout**

In consideration of all factors pertaining to the Bull Trout and the discharge from the WTP, it is predicted that there will be no impact to the Bull Trout. The discharge does not contribute to the factors responsible for the bull trout's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Bull Trout. The bull trout is a highly mobile species, discharge is not from a major facility, and the effluent meets State Water Quality Standards; therefore, no measurable impacts are predicted. **No effect** is predicted on the bull trout from the discharge.

### C. MacFarlane's Four-O'clock (*Mirabilis macfarlanei)* - Threatened

On October 26, 1979, the MacFarlane's Four-o'clock was designated as endangered in its entire range (USFWS 1979). Since that time, additional populations were discovered, and populations on Federal lands were being actively managed and monitored. As a result of these ongoing recovery efforts, the MacFarlane's Four-o'clock was downlisted to threatened status in March 1996 (USFWS 1996).

Range of Species

Within the area covered by this listing, this species is endemic to portions of the Snake, Salmon and Imnaha River canyons in Wallowa County in northeast Oregon, and adjacent Idaho county in Idaho (Moseley 1993).

Critical Habitat

Critical habitat has not been designated for this species.

Life History

MacFarlane's four-o'clock is a member of the four-o'clock family (Nyctaginaceae). It is a perennial plant with a stout, deep-seated taproot. Flowering is from early May to early June, with mid-May usually being the peak flowering period. Known MacFarlane's four-o'clock locations include Cottonwood Landing, Island Gulch, Kurry Creek, Kurry Creek-West Creek divide, Mine Gulch, Tyron Bar, and West Creek. *Mirabilis macfarlanei* is found on talus slopes in canyon land corridors where the climate is regionally warm and dry, with precipitation occurring mostly in a winter-to-spring period. If *M. macfarlanei* originated in northern areas during a warmer period and its path of retreat with cooling climate was cut off by less favorable conditions, the warmer climate would explain the restricted distribution of the species.

Population Trends and Risks

Twelve years of recovery efforts for the MacFarlane's Four-o'clock, have removed this species from the brink of extinction. As a result, on March 15, 1996, USFWS reclassified the plant from endangered to the less critical category of threatened in 1996 (USFWS 1996). Improved livestock grazing management, research, the discovery of additional plant locations on public lands, and the stable condition of existing populations led the USFWS to conclude that the status of MacFarlane's Four-o'clock has substantially improved. MacFarlane's Four-o'clock is currently found in eleven populations in Idaho and Oregon. The amount of occupied habitat located in Idaho and Oregon since the species' listing represents a three-fold increase due to new discoveries.

Habitat destruction due to vehicular travel along with surface disturbance associated with mining could contribute to degradation of MacFarlane's four-o'clock habitat. Livestock damage may also minimally impact the species, and weedy invasion in areas of previous grazing activity may be a threat (Mancuso and Moseley 1991). Increased collecting pressure is a foreseeable problem if the specie's location becomes known. Mule deer prefer forbs and some utilization of *Mirabilis macfarlanei* has also been observed.

Insect depredation has been shown to be detrimental to MacFarlane's four-o'clock. Past indiscriminate herbicide spraying has also had adverse effects on the small number of *Mirabilis macfarlanei* plants. In addition, using insecticides for insect control is detrimental to many of the known pollinators of this species, including several genera of bees.

### Analysis of Potential Impacts to MacFarlane's Four-O'clock

In consideration of all factors pertaining to the plant MacFarlane's Four O'clock and the discharge from the WTP, it is predicted that there will be no impact to the MacFarlane's Four O'clock. The discharge does not contribute to the factors responsible for this plant's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to this plant because the MacFarlane's Four O'clock is found on talus slopes in canyon land corridors where the climate is regionally warm and dry. The discharge is into the Clearwater River, not where this plant is found. Therefore, no measurable impacts are predicted. **No effect** is predicted on the MacFarlane's Four O'clock from the discharge.

**D. Chinook Salmon (*Oncorhynchus tshawytscha)* - Threatened**

(The following summary is taken from 63 FR 11481, 3/9/98).

Chinook salmon are easily distinguished from other *Oncorhynchus* species by their large size. Adults weighing over 120 pounds have been caught in North American waters. Chinook salmon are very similar to coho salmon in appearance while at sea (blue-green back with silver flanks), except for their large size, small black spots on both lobes of the tail, and black pigment along the base of the teeth. Chinook salmon are anadromous and semelparous. This means that as adults, they migrate from a marine environment into the freshwater streams and rivers of their birth (anadromous) where they spawn and die (semelparous). Adult female Chinook will prepare a spawning bed, called a redd, in a stream area with suitable gravel composition, water depth and velocity. Redds will vary widely in size and in location within the stream or river. The adult female Chinook may deposit eggs in four to five "nesting pockets" within a single redd. After laying eggs in a redd, adult Chinook will guard the redd from four to 25 days before dying. Chinook salmon eggs will hatch, depending upon water temperatures, between 90 to 150 days after deposition. Stream flow, gravel quality, and silt load all significantly influence the survival of developing Chinook salmon eggs. Juvenile Chinook may spend from three months to two years in freshwater after emergence and before migrating to estuarine areas as smolts, and then into the ocean to feed and mature.

Among Chinook salmon two distinct races have evolved. One race, described as a "stream-type" Chinook, is found most commonly in headwater streams. Stream-type Chinook salmon have a longer freshwater residency and perform extensive offshore migrations before returning to their natal streams in the spring or summer months. The second race is called the "ocean-type" Chinook, which is commonly found in coastal steams in North America. Ocean-type Chinook typically migrate to sea within the first three months after emergence, but they may spend up to a year in freshwater prior to emigration. They also spend their ocean life in coastal waters. Ocean-type Chinook salmon return to their natal streams or rivers as spring, winter, fall, summer, and late-fall runs, but summer and fall runs predominate. The difference between these life history types is also physical, with both genetic and morphological foundations.

Juvenile stream- and ocean-type Chinook salmon have adapted to different ecological niches. Ocean-type Chinook salmon tend to utilize estuaries and coastal areas more extensively for juvenile rearing. The brackish water areas in estuaries also moderate physiological stress during parr-smolt transition. The development of the ocean-type life history strategy may have been a response to the limited carrying capacity of smaller stream systems and glacially scoured, unproductive, watersheds, or a means of avoiding the impact of seasonal floods in the lower portion of many watersheds.

Stream-type juveniles are much more dependent on freshwater stream ecosystems because of their extended residence in these areas. A stream-type life history may be adapted to those watersheds, or parts of watersheds, that are more consistently productive and less susceptible to dramatic changes in water flow or which have environmental conditions that would severely limit the success of sub-yearling smolts. At the time of saltwater entry, stream-type (yearling) smolts are much larger, averaging 73-134 mm depending on the river system, than their ocean-type (sub-yearling) counterparts and are, therefore, able to move offshore relatively quickly.

Coast wide, Chinook salmon remain at sea for one to six years (more common, two to four years), with the exception of a small proportion of yearling males, called jack salmon, which mature in freshwater or return after two or three months in salt water. Ocean- and steam-type Chinook salmon are recovered differentially in coastal and mid-ocean fisheries, indicating divergent migratory routes. Ocean-type Chinook salmon tend to migrate along the coast, while stream-type Chinook salmon are found far from the coast in the central North Pacific. Differences in the ocean distribution of specific stocks may be indicative of resource partitioning and may be important to the success of the species as a whole.

There is a significant genetic influence to the freshwater component of the returning adult migratory process. A number of studies show that Chinook salmon return to their natal streams with a high degree of fidelity. Salmon may have evolved this trait as a method of ensuring an adequate incubation and rearing habitat. It also provides a mechanism for reproductive isolation and local adaptation. Conversely, returning to a stream other than that of one's origin is important in colonizing new areas and responding to unfavorable or perturbed conditions at the natal stream.

Chinook salmon stocks exhibit considerable variability in size and age of maturation, and at least some portion of this variation is genetically determined. The relationship between size and length of migration may also reflect the earlier timing of river entry and the cessation of feeding for Chinook salmon stocks that migrate to the upper reaches of river systems. Body size, which is correlated with age, may be an important factor in migration and redd construction success. Under high density conditions on the spawning ground, natural selection may produce stocks with exceptionally large-sized returning adults.

Early researchers recorded the existence of different temporal "runs" or modes in the migration of Chinook salmon from the ocean to freshwater. Freshwater entry and spawning timing are believed to be related to local temperature and water flow regimes. Seasonal "runs" (i.e., spring, summer, fall, or winter) have been identified on the basis of when adult Chinook salmon enter freshwater to begin their spawning migration. However, distinct runs also differ in the degree of maturation at the time of river entry, the thermal regime and flow characteristics of their spawning site, and their actual time of spawning. Egg deposition must occur at a time to ensure that fry emerge during the following spring when the river or estuary productivity is sufficient for juvenile survival and growth.

Pathogen resistance is another locally adapted trait. Chinook salmon from the Columbia River drainage were less susceptible to *Ceratomyxa shasta*, an endemic pathogen, than stocks from coastal rivers where the disease is not known to occur. Alaskan and Columbia River stocks of Chinook salmon exhibit different levels of susceptibility to the infectious hematopoietic necrosis virus (IHNV).

The preferred temperature range for Chinook salmon has been variously described as 12.2-13.9 degrees C (Brett 1952), 10-15.6 degrees C (Burrows 1963), or 13-18 degrees C (Theurer et al. 1985). Temperatures for optimal egg incubation are 5.0-14.4 degrees C (Bell 1986). The upper lethal temperature limit is 25.1 degrees C (Brett 1952) but may be lower depending on other water quality factors (Ebel et al. 1971). Variability in temperature tolerance between populations is likely due to selection for local conditions; however, there is little information on the genetic basis of this trait.

Dissolved oxygen concentrations of 5.0 mg/L or greater are needed for successful egg development in redds for water temperatures between 4-14 degrees C (Reiser and Bjornn 1979, as cited in NMFS 1996). Freshwater juveniles avoid water with dissolved oxygen concentrations below 4.5 mg/L at 20 degrees C (Whitmore et al. 1960). Migrating adults will pass through water with dissolved oxygen levels as low as 3.5-4.0 mg/L (Fujioka 1970; Alabaster 1988, 1989).

### *Snake River Fall Chinook Salmon*

#### Status

This ESU was listed as threatened on April 22, 1992. The 11/2/94 Emergency Rule (59 FR 54840), reclassifying Snake River Chinook from threatened to endangered, expired on May 26, 1995.

#### Geographic Range and Spatial Distribution

The Snake River Basin includes an area of approximately 280,000 km$^2$ and incorporates a range of vegetative life zones, climatic regions, and geological formations. The Snake River ESU includes the mainstem of the river and all tributaries, from their confluence with the Columbia River to the Hells Canyon Dam complex. Because genetic analyses indicate that fall-run chinook salmon in the Snake River are distinct from the spring-summer-run in the Snake River Basin (Waples and Johnson 1991a, as cited in Meyers et al. 1998), Snake River fall-run Chinook salmon are considered separately from the other two forms. They are also considered separately from those assigned to the Upper Columbia River summer- and fall-run ESU because of considerable differences in habitat characteristics and adult ocean distribution and less definitive, but still significant, genetic differences. There is, however, some concern that recent introgression from Columbia River hatchery strays is causing the Snake River population to lose the qualities that made it distinct for ESA purposes.

#### Critical Habitat

The critical habitat for the Snake River fall Chinook salmon was listed on December 28, 1993 (58 FR 68543) and modified on March 9, 1998 (63 FR 11515) to include the Deschutes River. A 1995 status review found that the Deschutes River fall-run Chinook salmon population should be considered part of the Snake River fall-run ESU. Populations from Deschutes River and the Marion Drain (tributary of the Yakima River) show a greater genetic affinity to Snake River ESU fall Chinook than to the Upper Columbia River summer-fall-run Chinook (March 9, 1998, 63 FR 11490). The designated critical habitat (63 FR 11515, March 9, 1998) for the Snake River fall Chinook salmon includes all river reaches accessible to Chinook salmon in the Columbia River from The Dalles Dam upstream to the confluence with the Snake River in Washington (inclusive). Critical habitat in the Snake River includes its tributaries in Idaho, Oregon, and Washington (exclusive of the upper Grande Ronde River and the Wallowa River in Oregon, the Clearwater River above its confluence with Lolo Creek in Idaho, and the Salmon River upstream of its confluence with French Creek in Idaho). Also included are river reaches and estuarine areas 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) upstream to The Dalles Dam. Excluded are areas above specific dams identified in Table 17 (see March 9, 1998, 63 FR 11519) or above longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for at least several hundred years).

**Historical Information**

Snake River fall-run Chinook salmon remained stable at high levels of abundance through the first part of the 20th century, but then declined substantially. Although the historical abundance of fall-run Chinook salmon in the Snake River is difficult to estimate, adult returns appear to have declined by three orders of magnitude since the 1940s and perhaps by another order of magnitude from pristine levels. Irving and Bjornn (1981) estimated that the mean number of fall-run Chinook salmon returning to the Snake River declined from 72,000 during the period 1938 to 1949, to 29,000 during the 1950s. Further declines occurred upon completion of the Hells Canyon Dam complex, which blocked access to primary production areas in the late 1950s. Estimated returns of naturally produced adults from 1985 through 1993 range from 114 to 742 fish (USEPA 1998).

**Life History**

Fall-run Chinook salmon in this ESU are ocean-type. Ocean-type Chinook typically migrate to sea within 3 months of emergence but may spend up to a year in freshwater prior to emigration. Adults return to the Snake River at ages 2 through 5, with age 4 most common at spawning (Chapman et al. 1991, as cited in Meyers et al. 1998). Spawning, which takes place in late fall, occurs in the mainstem and in the lower parts of major tributaries (NWPPC 1989, Bugert et al. 1990). Juvenile fall-run Chinook salmon move seaward slowly as subyearlings, typically within several weeks of emergence (Chapman et al. 1991, as cited in Meyers et al. 1998). Based on modeling by the Chinook Technical Committee, the Pacific Salmon Commission estimates that a significant proportion of the Snake River fall-run Chinook (about 36 percent) are taken in Alaska and Canada, indicating a far-ranging ocean distribution. In recent years, only 19 percent were caught off Washington, Oregon, and California, with the balance (45 percent) taken in the Columbia River (Simmons 2000).

**Habitat and Hydrology**

With hydrosystem development, the most productive areas of the Snake River Basin are now inaccessible or inundated. The upper reaches of the mainstem Snake River were the primary areas used by fall-run Chinook salmon, with only limited spawning activity reported downstream from river kilometer (Rkm) 439. The construction of Brownlee Dam (1958; Rkm 459), Oxbow Dam (1961; Rkm 439), and Hells Canyon Dam (1967; Rkm 397) eliminated the primary production areas of Snake River fall-run Chinook salmon. There are now 12 dams on the mainstem Snake River, and they have substantially reduced the distribution and abundance of fall-run Chinook salmon (Irving and Bjornn 1981).

**Hatchery Influence**

The Snake River has contained hatchery-reared fall-run Chinook salmon since 1981 (Busack 1991). The hatchery contribution to Snake River escapement has been estimated at greater than 47 percent (Meyers et al. 1998). Artificial propagation is recent, so cumulative genetic changes associated with it may be limited. Wild fish are incorporated into the brood stock each year, which should reduce divergence from the wild population. Release of sub-yearling fish may also help minimize the differences in mortality patterns between hatchery and wild populations that can lead to genetic change (Waples 1999).

**Population Trends and Risks**

Almost all historical Snake River fall-run Chinook salmon spawning habitat in the Snake River Basin was blocked by the Hells Canyon Dam complex; other habitat blockages have also occurred in Columbia River tributaries. The ESU's range has also been affected by agricultural water withdrawals, grazing, and vegetation management. The continued straying by nonnative hatchery fish into natural production areas is an additional source of risk. Assessing extinction risk to the newly configured ESU is difficult because of the geographic discontinuity and the disparity in the status of the two remaining populations. The relatively recent extirpation of fall-run Chinook in the John Day, Umatilla, and Walla Walla Rivers is also a factor in assessing the risk to the overall ESU. Long-term trends in abundance for specific tributary systems are mixed. For the Snake River fall-run Chinook salmon ESU, NOAA Fisheries estimates that the median population growth rate (lambda) over a base period from 1980 through 1998 ranges from 0.94 to 0.86, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure et al. 2000). The Snake River component of the fall Chinook run has been increasing during the past few years as a result of hatchery and supplementation efforts in the Snake and Clearwater River Basins. In 2002, more than 15,200 Fall Chinook were counted past the two lower dams on the Snake River, with about 12,400 counted above Lower Granite Dam. These adult returns are about triple the 10-year average at these Snake River projects (FPC 2003).

**Analysis of Potential Impacts to the Chinook Salmon**

In consideration of all factors pertaining to the Chinook Salmon and the discharge from the WTP, it is predicted that there will be no impact to the Chinook Salmon. The discharge does not contribute to the factors responsible for the Chinook Salmon's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Chinook Salmon. The Chinook Salmon is a highly mobile species, discharge is not from a major facility, and the effluent meets State Water Quality Standards; therefore, no measurable impacts are predicted. **No effect** is predicted on the Chinook Salmon from the discharge.

**E. Steelhead (*Oncorhynchus mykiss*) - Threatened**

The steelhead is the anadromous form of the rainbow trout (*O. mykiss*), which occurs in two subspecies, *O. mykiss irideus* and *O. mykiss gaidneri*. Whereas stream-resident rainbow trout may complete their life cycle in a limited area of a small stream and attain a length of only 8 inches or so, steelhead may spend half their lives at sea, roaming for thousands of miles in the North Pacific Ocean. Steelhead return to spawn at sizes ranging from about 24 inches and 5 pounds to about 36 to 40 inches or more and 20 pounds or more (Behnke 2002).

Biologically, steelhead can be divided into two reproductive ecotypes, based on their state of sexual maturity at the time of river entry. These two ecotypes are termed "stream-maturing" and "ocean-maturing". Stream-maturing steelhead enter fresh water in a sexually immature condition and require from several months to a year to mature and spawn. These fish are often referred to as "summer run" steelhead. Ocean-maturing steelhead enter fresh water with well-developed gonads and spawn shortly after river entry. These fish are commonly referred to as "winter-run" steelhead. In the Columbia River basin, essentially all steelhead that return to streams east of the Cascade Mountains are stream-maturing. Ocean-maturing fish are the predominate ecotype in coastal streams and lower Columbia River tributaries (ACOE 2000b).

All but one of the *O. m. gairdneri* steelhead populations migrating east of the Cascade Range are characterized as summer-run steelhead (entering the Columbia River from May into the early fall in October); the one exception is a winter-run steelhead spawning in Fifteenmile Creek, which drains the eastern side of the Cascades in Oregon. The genetic traits of Fifteenmile Creek steelhead make it intermediate between the subspecies *irideus* and *gairdneri*. Steelhead of the subspecies *irideus* are mainly winter-run fish, but *irideus* also has summer runs. Considering the entire range of *irideus* from California to Alaska, steelhead can be found entering one river or another in every month of the year (Behnke 2002).
Native steelhead in California generally spawn earlier than those to the north with spawning beginning in December. Washington populations begin spawning in February or March. Native steelhead spawning in Oregon and Idaho is not well documented. In the Clackamas River in Oregon, winter-run steelhead spawning begins in April and continues into June. In the Washougal River, Washington, summer-run steelhead spawn from March into June whereas summer-run fish in the Kalama River, Washington, spawn from January through April. Among inland steelhead, Columbia River populations from tributaries upstream of the Yakima River spawn later than most downstream populations.

Depending on water temperature, fertilized steelhead eggs may incubate in redds for 1.5 to 4 months before hatching as "alevins". Following yolk sac absorption, young juveniles or "fry" emerge from the gravel and begin active feeding. Juveniles rear in fresh water for 1 to 4 years, then migrate to the ocean as smolts. Downstream migration of wild steelhead smolts in the lower Columbia River begins in April, peaks in mid-May, and is essentially complete by the end of June (ACOE 2000b). Previous studies of the timing and duration of steelhead downstream migration indicate that they typically move quickly through the lower Columbia River estuary with an average daily movement of about 21 kilometers (ACOE 2000b).

Juvenile steelhead generally spend two years in freshwater before smolting and migrating to the ocean at lengths of about 6 to 8 inches. After about 15 to 30 months of ocean life, most steelhead return to their natal rivers to spawn. Unlike Pacific salmon, steelhead do not all die soon after spawning, but the rate of survival to repeat spawning is generally low - about 10 percent (Behnke 2002).

***Snake River Steelhead***

**Status**

The SR steelhead ESU was listed as threatened on August 18, 1997 (62FR43937).

**Geographic Range and Spatial Distribution**

This inland steelhead ESU occupies the Snake River Basin of southeast Washington, northeast Oregon and Idaho. The Snake River flows through terrain that is warmer and drier on an annual basis than the upper Columbia Basin or other drainages to the north. Geologically, the land forms are older and much more eroded than most other steelhead habitat. Collectively, the environmental factors of the Snake River Basin result in a river that is warmer and more turbid, with higher pH and alkalinity than is found elsewhere in the range of inland steelhead. In many Snake River tributaries, spawning occurs at a higher elevation (up to 2,000 m) than for steelhead in any other geographic region.

**Critical Habitat**

The critical habitat for SR steelhead was initially designated on February 16, 2000 (65FR7764), but was withdrawn in April 2002 and is currently under development.. The initial designated habitat consisted of all river reaches accessible to listed steelhead in the Snake River and its tributaries in Idaho, Oregon, and Washington. Also included were river reaches and estuarine areas 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) upstream to the confluence with the Snake River. Excluded were areas above the Hells Canyon and Dworshak Dams and areas above longstanding, naturally impassable barriers (i.e., Napias Creek Falls and other natural waterfalls in existence for at least several hundred years). The revised habitat designation included numerous watersheds throughout the Clearwater and South Fork Clearwater basins as well as other watersheds throughout Washington, Idaho and Oregon. Habitat was also excluded for four watersheds including Agency Creek, Flat Creek, Lower Palouse River and Upper Orofino Creek.

**Historical Information**

The longest consistent indicator of steelhead abundance in the Snake River basin is derived from counts of natural-origin steelhead at the uppermost dam on the lower Snake River. According to these estimates, the abundance of summer steelhead has declined from a 4-year average of 58,300 in 1964 to a 4-year average of 8,300 ending in 1998 (NMFS 2000). In general, steelhead abundance declined sharply in the early 1970's, rebounded moderately from the mid 1970's through the 1980's, and declined again during the 1990's.

**Life History**

Fish in this ESU are summer steelhead. They enter freshwater from June to October and spawn during the following March to May. Two groups are identified, based on migration timing, ocean-age, and adult size. A-run steelhead, thought to be predominately age-1-ocean, enter freshwater during June through August. B-run steelhead, thought to be age-2-ocean, enter freshwater during August through October. B-run steelhead are typically 75 to 100 mm longer at the same age. Both groups usually smolt as 2- or 3-year-olds (Whitt 1954, BPA 1992, Hassemer 1992). All steelhead are iteroparous, capable of spawning more than once before death.

**Habitat and Hydrology**

Hydrosystem projects create substantial habitat blockages in this ESU; the major ones are the Hells Canyon Dam complex (mainstem Snake River) and Dworshak Dam (North Fork Clearwater River). Minor blockages are common throughout the region. Steelhead spawning areas have been degraded by overgrazing, as well as by historical gold dredging and sedimentation due to poor land management. Habitat in the Snake River basin is warmer and drier and often more eroded than elsewhere in the Columbia River basin or in coastal areas.

**Hatchery Influence**

Hatchery fish are widespread and stray to spawn naturally throughout the region. In the 1990s, on average, 86 percent of adult steelhead passing Lower Granite Dam were of hatchery origin. Hatchery contribution to naturally spawning populations varies, however, across the region. Hatchery fish dominate some stocks, but do not contribute to others.

**Population Trends and Risks**

For the SR steelhead ESU as a whole, NMFS (2000) estimates that the median population growth rate (lambda) over a base period from 1990 through 1998 ranges from 0.91 to 0.70, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000). The main contributor of steelhead in the Columbia River basin is the Snake River. In 2002, the tributary into the Snake River was about 210,000, 71 percent of the total counted at McNary Dam (286,805). The 2002 Snake River steelhead count was about twice the 10-year average. The numbers of wild steelhead (non-clipped adipose fin) increased to about an average of 55,000 in the Snake River in 2002 (FPC 2003).

**Analysis of Potential Impacts to the Steelhead**

In consideration of all factors pertaining to the Steelhead and the discharge from the WTP, it is predicted that there will be no impact to the Steelhead. The discharge does not contribute to the factors responsible for the Steelhead's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Steelhead.

The Steelhead is a highly mobile species, discharge is not from a major facility, and the effluent meets State Water Quality Standards; therefore, no measurable impacts are predicted. **No effect** is predicted on the Steelhead from the discharge.

### F. Spalding's catchfly *(Silene spaldingii)* - Threatened

On October 10, 2001, the Spalding's catchfly was designated as threatened in its entire range (USFWS 2001).

**Range of Species**

When Spalding's catchfly was listed in 2001 there were a total of 58 populations. Since it's listing in 2001, increased survey efforts have resulted in the discovery of an additional 39 populations. Currently there are 22 populations in Idaho, 10.33 in Montana, 17 in Oregon, 49 in Washington, and 0.66 in British Columbia, Canada (USFWS 2007).

**Critical Habitat**

Critical habitat was proposed for Spalding's catchfly on April 24, 2000 (USFWS 2000d).

**Life History**

Spalding's catchfly is a long-lived perennial herb in the carnation family. It has four to seven pairs of lance-shaped leaves and small greenish-white flowers. The plant is distinguished by it very sticky foliage and petals that are shallowly lobed. Spalding's catchfly may range from 8 to 24 inches in height, and it flowers from July through early August. Fruit and seed maturation occurs in August, with seed dispersal taking place in late August to early September (Lorain 1991). Rosettes are formed the first year and flowering may occur during or after the second season. The bumblebee, *Bombus fervidus*, appears to be the only significant pollination vector for Spalding's catchfly throughout its range (Lesica 1991). At least in some populations, Spalding's catchfly appears to be subject to pollinator limitations, inbreeding depression, and a large genetic load (Lesica 1991 and 1993).

**Population Trends and Risks**

Spalding's catchfly is presently known from a total of 99 populations, 22 populations in Idaho, 10.33 in Montana, 17 in Oregon, 49 in Washington, and 0.66 in British Columbia, Canada (USFWS 2007). Spalding's catchfly is a serious conservation concern in all four states where it occurs. Just over half of the known populations of this plant occur on private land, much of which is slated for development, including areas near Redbird Ridge in Idaho, and Wallowa Lake in Oregon.

Throughout its range, much of the Paillasse Prairie grassland habitat of Spalding's catchfly has been converted to crop agriculture or pastureland. Although probably once widespread in the Paillasse region, Spalding's catchfly is now found mainly in small, fragmented sites on the periphery of its former range. Threats to this species may include livestock grazing, herbicide spraying, noxious weed infestation, recreation, road construction and maintenance, conversion of prairie into farmland, fire suppression and urban development (Gamon 1991, Lorain 1991, Heidel 1995, Schassberger 1988 and USFWS 2007).

**Analysis of Potential Impacts to the Spalding's Catchfly**

In consideration of all factors pertaining to the plant Spalding's Catchfly and the discharge from the WTP, it is predicted that there will be no impact to the Spalding's Catchfly. The discharge does not contribute to the factors responsible for this plant's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to this plant because the Spalding's Catchfly's habitat is on land, such as grasslands. The discharge is into the Clearwater River, not where this plant is found. Therefore, no measurable impacts are predicted. **No effect** is predicted on the Spalding's Catchfly from the discharge.

### G. Canada Lynx *(Lynx canadensis)* - Threatened

**Status**

The U.S. lower 48 lynx population segment was designated as threatened under the Endangered Species Act on in 1998 (USFWS 1998a). This listing was extended in 1999 (for not more than six months) to include the contiguous United States lynx population segment. This extension allowed time to resolve a dispute over the status of the U.S. lower 48 lynx population (USFWS 1998b). In 2000, USFWS determined threatened status for the contiguous U.S. distinct population segment of the Canada lynx (USFWS 2000a).

**Geographical Range and Spatial Distribution**

Within the area covered by this listing, the Canada lynx is known to currently occur in Alaska, Arizona, Colorado, Idaho, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New York, North Dakota, Ohio, Oregon, Pennsylvania, Washington and Wyoming.

The Canada lynx is currently found throughout Alaska and Canada (except arctic islands), south through the Rocky Mountains, northern Great Lakes region, and northern New England. The Canada Lynx was considered historically resident in 16 states represented by five ecologically distinct regions: Cascade Range (Washington, Oregon); northern Rocky Mountains (northeastern Washington, southeastern Oregon, Idaho, Montana, western Wyoming, northern Utah); southern Rocky Mountains (southeastern Wyoming, Colorado); northern Great Lakes (Minnesota, Wisconsin, Michigan); and northern New England (Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts). Resident populations currently exist only in Maine, Montana, Washington, and possibly Minnesota. The lynx is considered extant but no longer sustaining self-support populations in Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado, and assumed to be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts (USFWS 1998a).

**Critical Habitat**

Critical habitat has been proposed but not designated for Idaho, Maine, Minnesota, Montana and Washington.

**Life History**

The Canada lynx, a medium-sized cat, breeds in late winter or early spring in North America. Gestation lasts 62-74 days, with litter size averaging 3-4 and adult females producing one litter every 1-2 years. Young lynx stay with their mother until the next mating season or longer. Some females give birth as yearlings, but their pregnancy rate is lower than that of older females (Brainerd 1985). Prey scarcity suppresses breeding and may result in mortality of nearly all young (Brand and Keith 1979). Lynx are mainly nocturnal, being most active from 2 hours after sunset to one hour after sunrise (Banfield 1974). Canada lynx primarily feed on small mammals and birds, particularly snowshoe hare, (*Lepus americanus*). Occasionally lynx may feed on squirrels, small mammals, beaver, deer, moose, muskrat, and birds, some of which are taken as carrion. Lynx have been known to cache food for later use. When prey is scarce, lynx home range increases, and individuals may become nomadic (Ward and Krebs 1985, Saunders 1963, Mech 1980). Male home range (average often about 15-30 sq km, but up to hundreds of sq km in Alaska and Minnesota) is larger than that of females. Long distance dispersal movements of up to several hundred kilometers have been recorded. Population density usually is less than 10 (locally up to 20) per 100 sq km, depending on prey availability. Mean densities range between 2 and 9 per 100 sq km (McCord and Cardoza 1982).

Canada lynx generally occur in boreal and montane regions dominated by coniferous or mixed forest with thick undergrowth, but they may also enter open forest, rocky areas, and tundra to forage for abundant prey. When inactive or birthing, lynx occupy dens typically located in hollow trees, under stumps, or in thick brush. Den sites tend to be in mature or old growth stands with a high density of logs (Koehler 1990).

**Population Trends and Risks**

In the contiguous U.S., overall numbers and range of the Canada lynx are substantially reduced from historical levels. At present, lynx numbers have not recovered from overexploitation by both regulated and unregulated harvest that occurred in the 1970s and 1980s. Forest management practices that result in the loss of diverse age structure, fragmentation, increased roads, urbanization, agriculture, recreational developments, and unnatural fire frequencies have altered suitable habitat in many areas. As a result, many states may have insufficient habitat quality and/or quantity to sustain lynx or their prey (USFWS 1998a). Human access into habitat has increased dramatically over the last few decades contributing to direct and indirect mortality and displacement from suitable habitat. Although legal take is highly restricted, existing regulatory mechanisms may be inadequate to protect small, remnant populations or to conserve habitat. Competition with bobcats and coyotes may also be a concern in some areas.

Current population size of the Canada lynx in the contiguous U.S. is unknown, but probably numbers less than 2,000 individuals. The Washington lynx population probably numbers fewer than 100 individuals (Stinson 2001). It has been suggested that since lynx occurrence throughout much of the contiguous U.S. is on the southern periphery of the species' range, the presence of lynx is solely a consequence of dispersal from Canada, and that most of the U.S. may never have supported self-sustaining, resident populations over time (USFWS 1998a)

For the Pacific Northwest, U.S. Forest Service et al. (1993) recommended the following actions within known lynx range: (1) minimizing road construction, closing unused roads, and maintaining roads to the minimum standard possible; (2) using prescribed fire to maintain forage for snowshoe hare in juxtaposition with hunting cover for lynx; (3) designating areas to be closed to kill trapping of any furbearer to avoid incidental lynx mortality to maintain population refugia for lynx in key areas; (4) planning for kill-trapping closure on a wider basis if data indicate a declining lynx population as a result of incidental trapping mortality; and (5) developing and implementing a credible survey and monitoring strategy to determine the distribution of lynx throughout its potential range. U.S. Forest Service et al. (1993) listed three primary habitat components for lynx in the Pacific Northwest: (1) foraging habitat (15-35 year-old lodgepole pine) to support snowshoe hare and provide hunting cover; (2) den sites (patches of >200-year-old spruce and fir, generally less than 5 acres; and (3) dispersal/travel cover (variable in vegetation composition and structure).

The major limiting factor is abundance of snowshoe hare, which in turn is limited by availability of winter habitat (in the Pacific Northwest, primarily early successional lodgepole pine with trees at least 6 feet tall) (U.S. Forest Service et al. 1993). In general, the future of the lynx looks more promising than for many other felids. Quinn and Parker (1987) do not believe that habitat alteration has had significant impact on lynx populations, although in the southern portions of its range optimal habitat for snowshoe hares is more patchily distributed (Wolff 1980). Modified logging, leaving interspersing areas of good tree cover, can actually benefit both lynx and their prey. However, suppression of forest fires limits early successional growth favored by hares and may ultimately reduce hare abundance.

**Analysis of Potential Impacts to the Canada Lynx**

In consideration of all factors pertaining to the Canada Lynx and the discharge from the WTP, it is predicted that there will be no impact to the Canada Lynx. The discharge does not contribute to the factors responsible for this plant's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to this animal because the Canada Lynx is a terrestrial species. Therefore, no measurable impacts are predicted. **No effect** is predicted on the Canada Lynx from the discharge.

## III. Summary of Potential Imacts Pursuant to ESA

After analyzing potential impacts to each species above, EPA has determined that the requirements contained in the draft permit will have **no effect** on the threatened or endangered species in the vicinity of the discharge. The issuance of an NPDES permit to the City of Kamiah Water Treatment Plant is not expected to result in habitat destruction, nor will it be expected to result in changes in population that could result in increased habitat destruction.

## APPENDIX E

## ESSENTIAL FISH HABITAT

### Essential Fish Habitat

Essential fish habitat (EFH) includes 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. 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. It is predicted that the Kamiah WTP would not cause any of the above adverse effects to fish habitat.

Due to the nature of this relatively small water treatment plant (maximum daily discharge of 0.076 cfs (based on 48,900 gallons per day)) in comparison with the large volume of water at the Clearwater River (7Q10 low flow of 627cfs). In addition to many factors such as having effluent limits for Total Residual Chlorine and for TSS, and being in compliance with Idaho's WQS, including its antidegradation regulations, the circumstances discussed does not indicate any measurable impact to fish habitat. Therefore EPA has determined that the issuance of this permit has **no effect** on EFH in the vicinity of the discharge.

# APPENDIX F
# ANTIDEGRADATION ANALYSIS

EPA is required by Section 301(b)(1)(C) of the Clean Water Act and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State water quality standards, including those of downstream States that are affected by the discharge, and including antidegradation requirements. Since EPA evaluated the discharge consistent with Idaho's water quality standards, EPA utilized IDEQ's antidegradation implementation methods as guidance to determine whether the permit meets Idaho's antidegradation policy.

Idaho WQS (IDAPA 58.01.02.051.01) provide that existing uses and the water quality necessary to protect the existing uses shall be maintained and protected (Tier 1 protection). In addition, where water quality exceeds levels necessary to support uses, that quality shall be maintained and protected unless the Department finds, after intergovemmental coordination and public participation, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located (Tier II protection).

**Identification of the Specific Level of Protection**

DEQ has established a water body by water body approach for identifying waters that will receive Tier 2 antidegradation protection. Tier 2 determination is based on the following three factors:

- The water body's category of use support according to the most recent federally approved Integrated Report
- The beneficial uses of the receiving water body
- Whether data indicate the water body as a whole is of high quality

The Kamiah WTP will discharge to assessment unit ID 17060306CL022_02 (Clearwater River - confluence of South and Middle Fork Clear). This segment of the Clearwater River is not assessed in Idaho's 2010 303(d)/305(b) integrated report (which is the most recent federally approved integrated report). According to Section 39-3603(2)(b) of the Idaho Code, "water bodies identified in the Integrated Report as not assessed will be provided an appropriate level of protection on a case-by-case basis using information available at the time of a proposal for a new or reissued permit or license." To be conservative, EPA considered the Clearwater River assessment unit a high quality water related to aquatic life and recreational uses for the purposes of this antidegradation review. Therefore, EPA will provide Tier 2 protection, in addition to Tier 1, for both aquatic life and recreational beneficial use.

**Tier 1 Protection**

The discharge is to the Clearwater River, at Kamiah. Per Idaho WQS, this segment (HUC 17060306, Clearwater Subbasin, Unit C-22, "Clearwater River – confluence of South and Middle Fork Clearwater Rivers to Lolo Creek) has the following use designations: Cold Water Communities, Salmonid Spawning, Primary Contact Recreation, Domestic Water Supply, and was also designated as a Special Resource Water prior to the recent deletion of the SRW designation.

The effluent limits in the draft permit ensure compliance with IDEQ numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses.

As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and ensures that the level of water quality necessary to protect existing uses is maintained and protected.

**Tier II Protection**
In order to determine whether degradation will occur, EPA evaluated the effect on water quality of the issuance of the permit for each pollutant that is relevant to aquatic life use and the recreation use. The parameters include TSS and total residual chlorine. Based on the evaluation, EPA concluded that none of the pollutants discharged will cause significant change in water quality and therefore further Tier II analysis is not needed.

The State's statue describing Tier II analysis at Title 39, Chapter 36, states:

*(c) Tier II analysis for insignificant activity or discharge. The department shall consider the size and character of an activity or discharge or the magnitude of its effect on the receiving stream and shall determine whether it is insignificant. If an activity or discharge is determined to be insignificant, then no further Tier II analysis for other source controls, alternatives analysis or socioeconomic justification is required.*
*(i) The department shall determine insignificance when the proposed change in an activity or discharge, from conditions as of July 1, 2011, will not cumulatively decrease assimilative capacity by more than ten percent (10%).*
*(ii) The department may request additional information from the applicant in making a determination whether a proposed change in an activity or discharge is insignificant.*

The following summarizes the evaluation for chorine and TSS.

**Total Suspended Solids (TSS)**

1. Determination of Background Concentration

To begin the determination of assimilative capacity of TSS of the Clearwater River at Kamiah, it is necessary to determine the background concentration. Because no background water quality data were available for TSS of the Clearwater River at Kamiah, EPA approximated the TSS background concentration based on the concentrations of TSS of tributaries upstream of Kamiah where data are available. To estimate critical conditions, EPA considered durations when excessive load occurs at the South Fork Clearwater River in addition to the average TSS of the tributaries of the Clearwater River. TSS background data is available for the South Fork Clearwater River at Stites, for the Selway River and at the Lochsa River from DEQ reports.

Page 28 of the Lower Selway River Subbasin Assessment (dated December 2000) states that the average TSS concentration at Selway and Lochsa rivers are 8.6 mg/l and 7.3 mg/l, respectively.

At Table 51 of the South Fork Clearwater River Subbasin Assessment and TMDLs (dated October 2003) states that the average TSS on the South Fork Clearwater River at Stites is 9.7 mg/l. The Selway River has annual mean flow of 3,749 cfs (page 14 of Lower Selway River Subbasin Assessment, December 2000). The Lochsa River has annual mean flow of 2,855 cfs (page13, Lochsa River Subbasin Assessment, September 1999) and the South Fork Clearwater River has an average daily flow of 1,099 cfs (Table 51, page 195 South Fork Clearwater River Subbasin Assessment and TMDLs, October 2003). The average background concentration of TSS at Kamiah can be approximated by performing a weighted average of the data from its tributaries. The estimated weighted average TSS concentration in the Clearwater River is 8.28 mg/l.

| **Contributing Streams to the Clearwater River** | **Mean Flow (cfs)** | **Average TSS Concentration (mg/l)** | **Flow x Ave. TSS Concentration** |
|---|---|---|---|
| S.F. Clearwater River | 1,099 | 9.7 | 10,660 |
| Lochsa River | 2,855 | 7.3 | 20,842 |
| Selway River | 3,749 | 8.6 | 32,241 |
| Totals | 7,703 | | 63,743 |
| Ave. weighted TSS concentration in the Clearwater River = (63,743)/(7,703) = 8.28 mg/l | | | |

However, it is also necessary to account for the worst case scenario when the South Fork Clearwater River experiences excessive sediment loads during the month of May. According to Table 59 on page 224 of the South Fork Clearwater River Subbasin Assessment and TMDLs report, there is an excess load of 7,754 tons/year in the lower South Fork Clearwater River. This excess load occurs almost exclusively during the month of May when peak annual flow occurs at near 10,000 cfs in the South Fork Clearwater River at Stites (see Figure 65, page 199, South Fork Clearwater River Subbasin Assessment and TMDL report). On Table 18, page 56, the average flow in May is roughly double the flow rates of April, and June, which supports the position that much of the excessive load occurs during May.

Because the excessive TSS load in the South Fork Clearwater River occurs in one month during the year, EPA determines that at the conservative worst case scenario at Kamiah, the excess load during May should be added to average annual loading conditions. Thus, this excessive load of 7,754 tons/year should be divided by 30 for each day during May when peak flow occurs. To estimate the worst case scenario, this excessive load from the South Fork Clearwater River of 258.47 tons/day during May that must be added to the average background TSS concentrations from tributaries of the Clearwater River. This excessive load when expressed in concentration is 9.61 mg/l of TSS.

Therefore at the conservative worst case scenario when TSS is highest in the Clearwater River, the background concentration is the addition of the average concentration of TSS at its tributaries (i.e., 8.28 mg/l TSS) plus the additional concentration from the excessive loading period (i.e., 9.61 mg/l TSS). Using this model assuming the conservative worst case scenario, EPA determines that background TSS concentration of the Clearwater River at Kamiah is approximately 18 mg/l (i.e., 8.28 mg/l + 9.61 mg/l = 17.89 mg/l = 18 mg/L).

2. Target In-Stream Concentration

Based on the above analysis of the background concentration of TSS in the Clearwater River at the conservative worst case scenario, the remaining assimilative capacity can be calculated from the target in-stream concentration. According to "Guide to Selection of Sediment Targets for Use in Idaho TMDLs" (June 2003), on Table 5, page 16, the "Suggested levels of TSS (mg/L) for categorizing fish habitat conditions" is 25 mg/l for the least effects, high protection and at the best conditions. Based on this information a 25 mg/l TSS target averaged over 30-day period, not to exceed 50 mg/l daily has been used to develop the sediment TMDLs in Idaho. This target is also intended to maintain a high level of protection for salmonid spawning populations. This in-stream water quality target has also been applied in the South Fork Palouse River Watershed Assessment and TMDLs (February 2007, page 54), therefore, EPA believes that the appropriate target concentration in the Clearwater River is 25 mg/l TSS averaged over 30-day period, and not to exceed 50 mg/l for each day.

3. Remaining Assimilative Capacity and Antidegradation Policy

Based on the target in-stream concentration of 25 mg/l TSS, and the estimated worst case scenario when there is excessive load of TSS in the South Fork Clearwater River, EPA is able to calculate the remaining assimilative capacity of the Clearwater River.

Concentration of remaining assimilative capacity = target conc.– worst case conc.

= 25 mg/l – 18 mg/l = 7 mg/l

According to Idaho Code (Statue), 39-3603(2)(c)(i), if the decrease in assimilative capacity is less than 10%, then the activity is considered insignificant. Therefore, the threshold for consideration of insignificance for this case is 10 percent of the remaining assimilative capacity as calculated above, which is 0.7 mg/l TSS (i.e., 7 mg/l x 0.1 = 0.7 mg/l).

To determine if the proposed discharge from the Kamiah WTP would be considered insignificant, it is necessary to calculate the TSS loading of the Clearwater River, and compare it to the loading of the effluent from the WTP.

As described in Part III.A above, the 7Q10 low flows of the Clearwater River at Kamiah is 672 cfs, which is 433.55 mgd. Using this 7Q10 flow rate, the calculation is as follows:

Loading of the remaining assimilative capacity = 433.55 mgd x 0.7 mg/l x 8.34

= 2,531 lbs/day

The proposed average monthly limit of TSS from the WTP is 30 mg/l. Therefore, the loading from the WTP (at 30 mg/l) = 0.0489 mgd x 30 mg/l x 8.34 =12.23 lbs/day.

The used assimilative capacity is 12.23 lbs/day divided by 2,531 lbs/day X 0.7 mg/l = 0.003 mg/l

4. Conclusion

Based on the above analyses as summarized below, EPA concludes the proposed Kamiah WTP's discharge of TSS is considered insignificant.

Summary of Significance Determination for TSS

| | |
|---|---|
| Baseline Ambient Water Quality | 18 mg/L |
| Water Quality Target Concentration | 25 mg/L |
| Assimilative Capacity | 7 mg/L |
| Threshold Water Quality Change for Significance | 0.7 mg/L |
| Used Assimilative Capacity (mg/L) | 0.003 mg/l |
| Water Quality Change Significant | No<br>≤ 10% of assimilative capacity |

**Residual Chlorine**

1. Determination of Background Concentration

There is no data of the background concentration for chlorine in the Clearwater River at Kamiah. However, there are no significant discharges of chlorine upstream of Kamiah. Also, considering that the main stem of the Clearwater River has abundant flow (based on the 7Q10 low flow rate of 433 million gallons per day) which would significantly dilute small sources, EPA estimates that the background concentration of chlorine in the river is assumed to be zero.

2. Target In-Stream Concentration

The Idaho Water Quality Standard for residual chlorine is 11µg/l or 0.011 mg/l for the chronic aquatic life criteria. Based on the state's WQS, the target in-stream concentration is 0.011 mg/l.

3. Remaining Assimilative Capacity and Antidegradation Policy

Based on the target in-stream concentration of residual chlorine of 0.011 mg/l, with practically zero background level, the remaining assimilative capacity is 40 lbs/day (i.e., 433.55 mgd x 0.011 mg/l x 8.34 = 39.77 lbs/day).

EPA has proposed an Average Monthly Limit of 0.3 mg/l for chlorine. The loading discharge limit is 0.1 lbs/day (i.e., 0.0489 mgd x 0.3 mg/l x 8.34 = 0.1223 lbs/day).

The used assimilative capacity = 0.1 lb/day divided by 40 lbs/day x 0.011 mg/l

= 0.0000275 mg/l (i.e., 0.00003 mg/l)

4. Conclusion

Based on the analyses, as summarized below, EPA concludes that the proposed WTP's residual chlorine discharge is considered insignificant.

Summary of Significance Determination for Total Residual Chlorine

| | |
|---|---|
| Baseline Ambient Water Quality | 0 mg/L |
| Water Quality Standard | 0.011 mg/L |
| Assimilative Capacity | 0.011 mg/L |
| Threshold Water Quality Change for Significance | 0.0011 mg/L |
| Used Assimilative Capacity (mg/L) | 0.00003 mg/l |
| Water Quality Change Significant | No<br>≤ 10% of assimilative capacity |