



Region 10, NPDES Permits Unit
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Seattle, WA 98101

Fact Sheet

Public Comment Start Date: June 13, 2007

Public Comment Expiration Date: July 13, 2007

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Proposed Issuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

City of Kuna Wastewater Treatment Plant

EPA Proposes To Issue NPDES Permit

EPA proposes to issue an NPDES permit to the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:

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

401 Certification

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

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

Public Comment

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

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review

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

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-6251 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

Idaho Department of Environmental Quality
Boise Regional Office
1445 North Orchard
Boise, ID 83706
(208) 373-0287

Kuna Library
457 North Locust
Kuna, ID 83634
(208) 922-1025

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of once every three years, for a 30-day average flow rate.
AML	Average Monthly Limit
BOD ₅	Biochemical oxygen demand, five-day
°C	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan

RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
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
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. Applicant

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

City of Kuna
NPDES Permit # ID-002835-5

Physical Location:
On Ten Mile Road between Lake Hazel Road and Columbia Road near Kuna,
Idaho

Mailing Address:
City of Kuna
P.O. Box 13
Kuna, ID 83634

Contact: Leola Vega, City of Kuna Wastewater Department Manager

II. Facility Information

The City of Kuna is located in southwest Idaho, in Ada County. The City plans to construct a new wastewater treatment plant (WWTP) utilizing membrane bioreactors (MBR) for treatment. This type of wastewater treatment plant, when properly operated and maintained, produces a high-quality effluent, with low concentrations of biochemical oxygen demand (BOD) and total suspended solids (TSS). The maximum monthly design flow of the planned facility will be 3.5 million gallons per day (mgd).

Details about the wastewater treatment processes and waste streams are included in Appendix A. See Appendix B for a map of the location of the proposed discharge location. This will be the facility's first NPDES permit.

III. Receiving Water

The City of Kuna intends to discharge to Indian Creek in Canyon County, Idaho. The treatment plant will be located in Ada County, Idaho. Indian Creek is a tributary to the Boise River, which flows through Idaho and is tributary to the Snake River, which forms part of the border between the States of Idaho and Oregon, and further downstream, part of the border between the States of Idaho and Washington.

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. However, because the chronic criterion for ammonia is a 30-day average

concentration not to be exceeded more than once every three years, EPA has used the 30B3 for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based design flow intended to ensure an excursion frequency of less than once every three years for a 30-day average flow rate.

EPA used daily flow data from USGS station #13211309 (Indian Creek above wastewater plant near Nampa, Idaho) and the DFLOW computer program to calculate the critical low flows of Indian Creek. The 1Q10 is 15.8 CFS, the 7Q10 is 16 CFS and the 30B3 is 16.7 CFS.

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'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 to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The City of Kuna intends to discharge to Indian Creek between the New York Canal split and Sugar Avenue. This segment of Indian Creek is designated for the beneficial uses of cold water aquatic life habitat, salmonid spawning, and secondary contact recreation. 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).

Secondary contact recreation is defined in the Idaho water quality standards as "water quality appropriate for recreational uses on or about the water and which are not included in the primary contact category. These activities may include fishing, boating, wading, infrequent swimming, and other activities where ingestion of raw water is not likely to occur."

C. Water Quality Limited Waters

A water quality limited segment is any waterbody, or definable portion of a waterbody, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. In accordance with section 303(d) of the Act, States must identify waters not achieving water quality standards in spite of the application of technology-based controls in National Pollutant Discharge Elimination System (NPDES) permits for point sources. Such waterbodies are known as water quality limited segments (WQLSs), and the list of such waterbodies is called the "303(d) list." Once a water body is identified as a WQLS, the States are required under the Act to develop a total maximum daily load (TMDL). A TMDL is a determination of the amount of a pollutant from point, nonpoint, 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 water quality criterion for that pollutant.

The proposed receiving water is a water quality limited segment, and is tributary to a water quality-limited segment of the Boise River.

Sediment

In January of 2000, EPA approved the *Lower Boise River TMDL* (IDEQ, 1998, 1999), which included load (for nonpoint sources) and wasteload (for point sources) allocations for sediment and bacteria. Total suspended solids (TSS) was used as a surrogate for sediment in point source wasteload allocations (WLA) for point sources.

The Kuna facility was not given a wasteload allocation for sediment; however, there was a 3.62 ton per day reserve capacity set aside for point sources in the TMDL. IDEQ has indicated that this reserve may be allocated to both new and existing dischargers. The *Lower Boise River TMDL* states that dischargers may use the reserve “as needed” by requesting the incorporation of some portion of the reserve into their permit. The technology-based average monthly limit for TSS from the Kuna facility is 30 mg/L, which, at the 3.5 mgd maximum month design flow rate, is 876 lb/day or 0.44 tons per day. However, the application states that the average concentration of suspended solids in the discharge will be less than 10 mg/L. Therefore, the full loading allowed by the technology-based limit is not “needed” by the Kuna facility at this time. Therefore, EPA has set the average monthly mass effluent limit for TSS equal to 292 lb/day, which is the mass of TSS that would be discharged by the facility if the concentration were 10 mg/L (as reported on the application) and the flow were equal to the maximum monthly design flow of 3.5 mgd. Consistent with the ratio between the average monthly and average weekly technology-based limits, the average weekly limit is equal to 1.5 times this amount, or 438 lb/day. The average monthly mass limit represents 4% of the reserve wasteload allocation. The permit requires the permittee to meet the technology-based limits for TSS concentration (30 mg/L monthly average and 45 mg/L weekly average) and removal rate (85% minimum monthly average); only the mass TSS limit is a water quality-based effluent limit based on using no more of the sediment reserve capacity than necessary.

The in-stream sediment concentrations that the *Lower Boise River TMDL* is intended to achieve are 50 mg/L as a 60-day average and 80 mg/L as a 14-day average. The TMDL analysis concluded that Idaho’s narrative criteria for sediment would be attained if these concentrations and averaging periods were achieved in the Boise River. The concentration limits in the draft permit will limit the Kuna facility to significantly lower TSS concentrations than these (30 mg/L monthly average and 45 mg/L weekly average) at the end-of-pipe. Further, typical suspended solids from domestic wastewater treatment plants contain organic matter that will decompose or settle out in the environment, which will further decrease this facility’s impact on sediment concentration in the Boise River. Therefore, the TSS effluent limits in the draft permit are derived from and comply with water quality standards for sediment in the Boise River, and are consistent with the wasteload allocations in the *Lower Boise River TMDL*. See Appendix C for additional information about TSS effluent limits.

Bacteria

The existing *Lower Boise River TMDL* also included load and wasteload allocations for bacteria. At the time the TMDL was written, Idaho's contact recreation criteria were based on fecal coliform concentrations, but the switch to the current Escherichia Coli (E. Coli) criteria was under consideration. The TMDL states that, if the E. Coli criteria were to be approved, as they now have been, that "compliance with the load allocations in this TMDL could be demonstrated using E. Coli samples, rather than fecal coliform," and that "If E. Coli are used as the new Idaho criteria for contact recreation when the permits are re-issued, the new E. Coli criteria should be incorporated into the permits in place of fecal coliform requirements." (Page 75).

Therefore, EPA has included effluent limitations for E. Coli in the permit for the City of Kuna. EPA believes that the effluent limits are consistent with the *Lower Boise River TMDL* because they apply approved bacteria criteria at the "end-of-pipe," just as the TMDL load and wasteload allocations did. The fact that water quality criteria are applied at the end-of-pipe ensures that the effluent limits in the final permit are derived from and comply with water quality standards.

Temperature

The *Lower Boise River TMDL* does not recommend assigning wasteload allocations for temperature. Because this discharge is to a tributary of the Boise River, it is unlikely that it will have a measurable impact on the temperature of the Boise River. The permittee is required to monitor effluent and receiving water temperature. These data will be used to determine if a water quality-based temperature effluent limit may be necessary in the future.

Phosphorus

Indian Creek is listed in the 2002/2004 303(d)/305(b) integrated report as being impaired for nutrients. The segment of the Boise River between Indian Creek and the mouth is listed on the 2002/2004 303(d)/305(b) integrated report as being impaired for nutrients. According to the *Lower Boise River TMDL*, the Lower Boise River is highly enriched with phosphorous, with concentrations as high as 0.5 mg/L (500 µg/L) at Parma and as high as 0.8 mg/L (800 µg/L) at Middleton. Ambient data from USGS Station #13213000 (Boise River near Parma, Idaho) show a 95th percentile total phosphorus concentration of 0.55 mg/L (550 µg/L) and an average of 0.36 mg/L (360 µg/L). Ambient data compiled from several USGS monitoring locations on Indian Creek show a 95th percentile phosphorus concentration of 0.77 mg/L (770 µg/L) and an average phosphorus concentration of 0.514 mg/L (514 µg/L).

The elevated phosphorous concentration in the Boise River is contributing to the impairment of the Snake River, and the *Snake River Hells Canyon TMDL* (Idaho DEQ and Oregon DEQ 2003, 2004) calls for a reduction in phosphorous loading to the Snake River from the Boise River and other tributaries during a critical season (May 1st through September 30th). The Snake River Hells Canyon TMDL requires the Boise River to achieve a load allocation of less than or equal to 70 µg/L, under all flow conditions.

EPA has used this 70 µg/L load allocation to interpret Idaho's narrative criterion for nutrients. The narrative criterion for nutrients, which is Section 200.06 of the Idaho WQS, reads as follows: "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses." While the 70 ppb interpretation of the narrative criterion applies to the Boise River at the mouth as opposed to Indian Creek at the point of discharge, the current concentrations of total phosphorus in the Boise River and Indian Creek are greater than 70 µg/L. Therefore, neither Indian Creek nor the Boise River can provide dilution of the effluent phosphorus and any discharge of phosphorus from the City of Kuna wastewater treatment plant at a concentration greater than 70 µg/L will contribute to an excursion above the 70 µg/L total phosphorus load allocation at the mouth of the Boise River. Therefore, the proposed permit requires the Kuna facility to meet the 70 µg/L target total phosphorus concentration from the Snake River Hells Canyon TMDL at the end-of-pipe. Based on the Snake River Hells Canyon TMDL and the draft certification from Idaho DEQ, the phosphorus limit applies seasonally, from May through September. See Appendix E for more information about the phosphorus limits.

There is a phosphorus TMDL under development for the Boise River that is likely to include a wasteload allocation for the City of Kuna's proposed wastewater treatment plant. The wasteload allocation may be different than the effluent limits proposed in the draft permit. If the Boise River phosphorus TMDL is finalized and approved before the City of Kuna's permit is issued, the final permit will include phosphorus effluent limits that are consistent with the wasteload allocation. If the phosphorus TMDL is finalized after the permit is issued, EPA will consider modifying the Kuna permit to include phosphorus effluent limits that are consistent with the wasteload allocation, should the wasteload allocation be different than the proposed effluent limits.

Phosphorus No Net Increase Policy

The State regulation IDAPA 58.01.02.054.04 requires that, prior to the completion of a TMDL for total phosphorus in the Lower Boise watershed, the total load of phosphorus within the watershed must remain the same or decrease. Therefore, the draft Clean Water Act Section 401 certification provided to EPA by IDEQ states that, prior to discharging phosphorus, the City of Kuna shall develop and obtain IDEQ approval of a plan that describes how the City will comply with this regulation. After the plan has been approved, the draft certification requires that the City implement the plan. EPA is required by 40 CFR 122.44(d)(3) to include permit requirements necessary to conform to the conditions of a State certification of an NPDES permit under Section 401 of the Clean Water Act. Therefore, this requirement has been included in the draft permit.

In this case, this regulation applies only to loading of phosphorus; however, because it is not technically feasible to remove 100% of the phosphorus from domestic wastewater, the permit requires that there be no discharge of pollutants until the requirements of IDAPA 58.01.02.054.04 are satisfied. The City need only comply with this regulation until a phosphorus TMDL for the Lower Boise River is approved by EPA. The City must begin to submit discharge monitoring reports (DMRs) as soon as the permit becomes effective, however, while the City is not discharging to surface water, the DMRs should

be marked “No Discharge.” These requirements have been included in the permit as Parts I.A.1, and 1.A.2, which read as follows:

I.A.1. The permittee must comply with Part I.A.2 of this permit prior to EPA approval of a phosphorus TMDL that includes a phosphorus wasteload allocation for this discharge. Following EPA approval of a phosphorus TMDL that includes a phosphorus wasteload allocation for this discharge, Part I.A.2 of this permit does not apply. Part I.A.2 does not relieve the permittee of the general monitoring and reporting requirements of Part III of this permit.

I.A.2. Prior to discharging pollutants, the permittee must submit written notice to EPA that it has developed and obtained IDEQ approval of a plan that describes how the City will comply with IDAPA 58.01.02.054.04.

- a) The written notice to EPA must include a copy of IDEQ’s notice to the permittee that the plan has been approved by IDEQ.
- b) The plan must describe the measures the City will implement to ensure the City’s discharge does not increase the total load of phosphorus within the Indian Creek and Lower Boise watersheds.
- c) The plan must include a schedule for implementation of the measures.
- d) Once the plan is approved by IDEQ, the plan must be implemented according to the schedule in the approved plan.

IV. Effluent Limitations

A. Basis for Effluent Limitations

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

B. Proposed Effluent Limitations

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

1. Removal Requirements for BOD₅ and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration. Percent removal of BOD₅ must be reported on the Discharge Monitoring Reports (DMRs). For each parameter, the monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month. Influent and effluent samples must be taken over approximately the same time period.

2. The permittee must not discharge floating, suspended or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.
3. Table 1 (below) presents the proposed average monthly, average weekly, maximum daily, and instantaneous maximum effluent limits.

Table 1: Proposed Effluent Limits				
Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day Biochemical Oxygen Demand	mg/L	30	45	—
	lb/day	876	1314	—
	% removal	85% (min.)	—	—
Total Suspended Solids	mg/L	30	45	—
	lb/day	292	438	—
	% removal	85% (min.)	—	—
pH	s.u	6.3 to 9.0 at all times		
Total Phosphorus as P (May-September)	µg/L	70	105	—
	lb/day	2.0	3.1	—
E. Coli Bacteria	#/100 ml	126 ¹	—	576 ²
Total Residual Chlorine³	µg/L	16	—	31
	lb/day	0.46	—	0.92
Total Ammonia as N	mg/L	1.7	—	3.9
	lb/day	50	—	115

Notes:

1. Geometric mean.
2. No single sample may exceed 576 organisms per 100 ml (instantaneous maximum limit).
3. The total residual chlorine effluent limits are not quantifiable using EPA-approved analytical methods. Therefore, EPA will use the minimum level of the most sensitive EPA-approved analytical method (100 µg/L) as the compliance evaluation level. The permittee will be considered compliant with the total residual chlorine limits as long as the average monthly and maximum daily effluent chlorine concentrations are less than 100 µg/L and the average monthly and maximum daily chlorine loadings are less than 2.9 lb/day.

C. Schedules of Compliance

The Federal regulation 40 CFR 122.47(a)(2) prohibits schedules of compliance for new dischargers in most cases. The only exception is when new requirements are issued after commencement of construction but less than three years before commencement of the relevant discharge. Because the City of Kuna has not yet begun construction of the new treatment plant, no compliance schedule may be authorized. The City must comply with all effluent limitations starting on the effective date of the final permit.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

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

limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

B. Effluent Monitoring

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

Table 2, below, presents the effluent monitoring requirements for the City of Kuna in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

The draft permit requires three times per week monitoring for total phosphorus, in order to determine compliance with the effluent limits for total phosphorus. Monitoring for alkalinity, hardness, oil and grease, total dissolved solids, total Kjeldahl nitrogen, and nitrate plus nitrite nitrogen is required because all POTWs with a design flow greater than 100,000 gallons per day are required to submit these data with their application for renewal of their NPDES permit. The draft permit also requires the permittee to perform all of the effluent monitoring required by the NPDES Form 2A application for POTWs with design flows greater than or equal to 1 mgd, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Effluent	Continuous	Recording
BOD₅	mg/L	Influent and Effluent	2/week	24-hour composite
	lb/day			calculation ¹
	% Removal	% Removal	1/month	calculation ²
TSS	mg/L	Influent and Effluent	2/week	24-hour composite
	lb/day			calculation ¹
	% Removal	% Removal	1/month	calculation ²
E. Coli Bacteria	#/100 ml	Effluent	5/month	grab
Total Residual Chlorine	mg/L	Effluent	1/month	grab
	lb/day			calculation
Total Ammonia as N	mg/L	Effluent	2/week	24-hour composite
	lb/day			calculation
Total Phosphorus as P (May – September)	µg/L	Influent and Effluent	3/week	24-hour composite
	lb/day			Calculation ¹
	% Removal	% Removal	1/month	calculation ²
Total Phosphorus as P (October – April)	µg/L	Effluent	1/month	24-hour composite
	lb/day			calculation ¹
pH	standard units	Effluent	5/week	grab
Temperature	°C	Effluent	5/week	grab

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Alkalinity ³	mg/L	Effluent	1/quarter	24-hour composite
Hardness ³	mg/L as CaCO ₃	Effluent	1/quarter	24-hour composite
Oil and Grease ³	mg/L	Effluent	1/quarter	grab
Total Dissolved Solids ³	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen ³	mg/L	Effluent	1/quarter	24-hour composite
Nitrate plus Nitrite Nitrogen ³	mg/L	Effluent	1/quarter	24-hour composite
Dissolved Oxygen	mg/L	Effluent	2/month	grab
Whole Effluent Toxicity	TU _c	Effluent	Annual	24-hour composite
NPDES Application Form 2A Expanded Effluent Testing	---	Effluent	3x/5 years	---

Notes:

- Maximum daily loading is calculated by multiplying the concentration in mg/L by the average daily flow in mgd and a conversion factor of 8.34.
- Percent removal is calculated using the following equation:
(average monthly influent - effluent) ÷ average monthly influent.
- Quarters are defined as January through March, April through June, July through September, and October through December. Monitoring results for pollutants with a sample frequency of quarterly must be reported on the March, June, September and December DMRs.

C. Surface Water Monitoring

Table 3 presents the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted with the application for renewal of this NPDES permit.

Parameter (units)	Sample Locations	Sample Frequency	Sample Type
Total Ammonia as N (mg/L)	Upstream	monthly	Grab
pH (s.u)	Upstream	monthly	Grab
Temperature ¹ (°C)	Upstream	monthly ¹	Grab

Notes:

- Receiving water monitoring for temperature must be performed at least once during the calendar months of April, May, June, July, August, September and October.

VI. Sludge (Biosolids) Requirements

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

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

VII. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The City of Kuna is required to develop and implement a Quality Assurance Plan by 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 IDEQ upon request.

B. Operation and Maintenance Plan

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

C. Phosphorus Management Plan

Federal regulations at 40 CFR 122.44(k) require the permittee to use Best Management Practices (BMPs) in order to control or abate the discharge of pollutants whenever they are reasonably necessary to carry out the purposes and intent of the CWA. Given the elevated phosphorus concentrations in the Boise River and Indian Creek, EPA believes that best management practices targeted toward phosphorus reduction are reasonably necessary to carry out the purposes and intent of the CWA. The draft permit requires the permittee to develop a phosphorus management plan within one year of the effective date of the final permit and implement the plan within one year and six months of the effective date of the final permit. The intent of the phosphorus management plan is to identify and implement measures that will reduce discharges of total phosphorus from the facility. The draft permit specifies certain elements which must be included in the phosphorus management plan. The plan shall be retained on site and made available to EPA and IDEQ upon request. The phosphorus management plan is not the same as the plan required in Section I.A.2.

D. Oversight of Industrial Users

The draft permit requires the City to enforce applicable sections of the industrial pretreatment requirements of 40 CFR Part 403, including the prohibited discharges of Part 403.5.

E. Additional Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language

covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Restrictions on Permitting New Dischargers

The City of Kuna is a new discharger. The regulation 40 CFR 122.4(i) states that no NPDES permit may be issued to a new source or a new discharger if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. EPA has determined that the proposed discharge has the reasonable potential to cause or contribute to violations of water quality standards for ammonia, chlorine, phosphorus, and pH. However, the draft permit proposes water quality-based effluent limits for all of these pollutants, 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. Therefore, this permit complies with 40 CFR 122.4(i).

B. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has determined that the issuance of this NPDES permit will have no effect on threatened or endangered species, therefore, consultation is not required for this action. See appendix G of this fact sheet for more information.

C. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has determined that the discharge from the City of Kuna WWTP will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action.

D. State/Tribal Certification

Section 401 of the CWA requires EPA to seek State or Tribal certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

E. Permit Expiration

The permit will expire five years from the effective date.

IX. References

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

IDEQ. 1998, 1999. *Lower Boise River TMDL: Subbasin Assessment, Total Maximum Daily Loads*. December 18, 1998. Revised September 29, 1999. Idaho Department of Environmental Quality.

Appendix A: Facility Information

General Information

NPDES ID Number:	ID-002835-5
Physical Location of Treatment Plant:	On Ten Mile Road between Lake Hazel Road and Columbia Road near Kuna, Idaho
Physical Location of Discharge:	Indian Creek at Lake Hazel Road
Mailing Address:	P.O. Box 13 Kuna, ID 83634

Facility Information

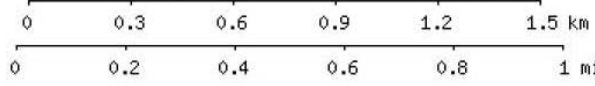
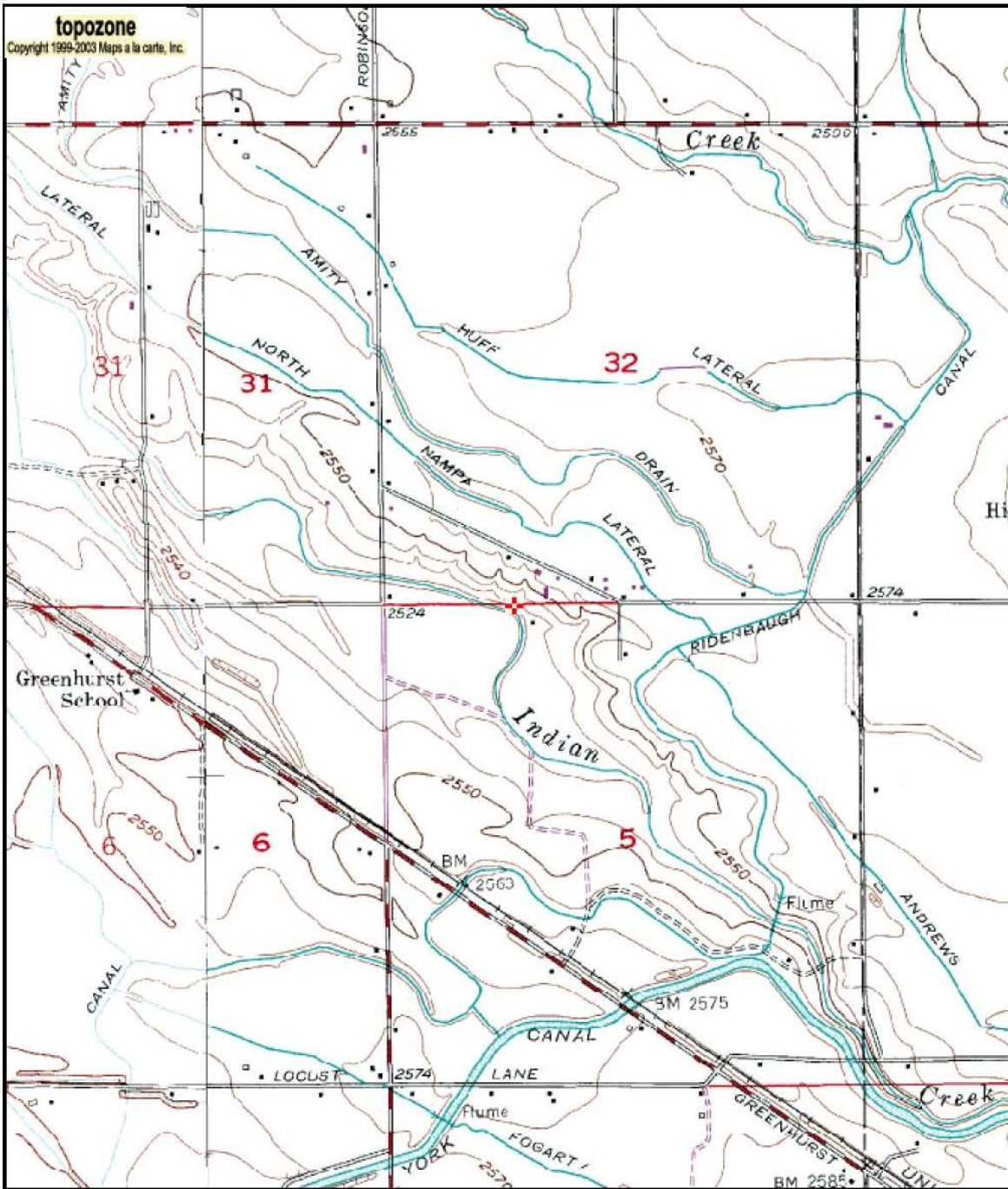
Type of Facility:	Publicly Owned Treatment Works (POTW)
Treatment Train	Grit removal, fine screen, membrane bioreactors, ultraviolet disinfection.
Biosolids (Sludge) Handling:	Thickening, anaerobic or aerobic digestion, dewatering, landfill or land application.
Flow:	Maximum month design flow is 3.5 mgd.
Outfall Location:	Outfall 001: latitude 43° 32' 49" N; longitude 116° 29' 17" W

Receiving Water Information

Receiving Water:	Indian Creek
Watershed:	Lower Boise (HUC 17050114)
Beneficial Uses:	Cold water aquatic life Salmonid Spawning Secondary contact recreation Water supply for: <ul style="list-style-type: none">• Agricultural• Industrial

Appendix B: Facility Map

Figure A-1: Topographical Outfall Location Map



Map center is 43° 32' 48"N, 116° 29' 18"W (WGS84/NAD83)
Meridian quadrangle
Projection is UTM Zone 11 NAD83 Datum

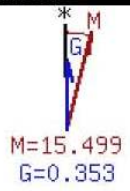


Figure A-2: Satellite Photo and Outfall Location Map



Map source: Google Maps. © 2007 Google. Imagery © 2007 DigitalGlobe. Map Data © 2007 NAVTEQ.

Figure A-3: Photograph of approximate outfall location (from Robinson Road facing East)



Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

In sections 301(b)(1)(B) and 304(d)(1), the Act established a performance level, referred to as “secondary treatment,” which all POTWs are required to meet. EPA developed and promulgated “secondary treatment” regulations that are found in 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants, and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD₅, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Table C-1: Secondary Treatment Effluent Limits (40 CFR 133.102)			
Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD ₅ and TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD ₅ and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

Chlorine

The Kuna Wastewater Treatment Plant will use ultraviolet disinfection. Therefore, no technology-based chlorine limits are applicable to this discharge.

Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

$$\text{Mass based limit (lb/day)} = \text{concentration limit (mg/L)} \times \text{design flow (mgd)} \times 8.34^1$$

In this case, for the monthly average technology-based BOD₅ and TSS effluent limits:

$$876 \text{ lb/day} = 30 \text{ mg/L} \times 3.5 \text{ mgd} \times 8.34$$

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Discharges to State or Tribal waters must also comply with

¹ 8.34 is a conversion factor with units (lb × L)/(mg × gallon × 10⁶)

limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality.

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

Reasonable Potential Analysis

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

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Idaho Department of Environmental Quality. Based on the draft certification, the water quality-based effluent limits in this permit, except for phosphorus and E. coli, have been calculated using a mixing zone. If IDEQ does not grant a mixing zone in its final certification of this permit, the water quality-based effluent limits will be recalculated such that the criteria are met before the effluent is discharged to the receiving water.

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an excursion above water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permitted discharge will not cause an excursion above the criterion.

The following discussion details the specific water quality-based effluent limits in the draft permit.

Once a WLA is developed, EPA calculates effluent limits which are protective of the WLA using procedures described in Appendix E for total phosphorus and Appendix F for other pollutants.

C. Facility-Specific Water Quality-based Effluent Limits

pH

The most stringent water quality criteria for pH are for the protection of aquatic life uses. The pH criteria for these uses state that the pH must be no less than 6.5 and no greater than 9.0 standard units. The upper bound of the water quality criteria is equal to the upper bound of the technology-based pH limits (9.0 standard units). Therefore, the pH of the effluent could not be greater than 9.0 standard units regardless of the discharges' effects on the receiving water and whether a mixing zone were authorized. EPA has determined that the effluent pH must be at least 6.3 standard units in order to ensure that water quality standards for pH are met in the receiving water. Therefore, the proposed pH effluent limits are a range of 6.3 to 9.0 standard units at all times.

Total Residual Chlorine

EPA has determined the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for chlorine. Therefore, EPA has established water quality-based effluent limits for chlorine that are derived from and comply with water quality standards (see Appendix F).

Total Phosphorus

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for total phosphorus at the mouth of the Boise River. Therefore, EPA has calculated water quality-based effluent limits for total phosphorus that are derived from and comply with water quality standards (see Appendix E).

Ammonia

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for ammonia. Therefore, EPA has calculated water quality-based effluent limits for ammonia (see Appendix F).

E. Coli

A mixing zone cannot be granted to the City of Kuna for E. coli because the permit must be consistent with the *Lower Boise River TMDL*. Load and wasteload allocations for bacteria in the *Lower Boise River TMDL* are concentration-based allocations equal to the State water quality criteria for bacteria. Effluent limits that apply current bacteria water quality criteria at the end of pipe ensure that the effluent limits are derived from and comply with criteria for bacteria in Indian Creek and the Boise River, and will allow Indian Creek to maintain compliance with its load allocation for bacteria. Bacteria effluent limits that apply current water quality criteria at the end of pipe are therefore consistent with the *Lower Boise River TMDL*.

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

The Idaho water quality standards also state that a water sample that exceeds certain “single sample maximum” values indicates a likely exceedance of the geometric mean criterion, although it is not, in and of itself, a violation of water quality standards. For waters designated for secondary contact recreation, the “single sample maximum” value is 576 organisms per 100 ml (IDAPA 58.01.02.251.01.b.i.).

The goal of a water quality-based effluent limit is to ensure a low probability that water quality standards will be exceeded in the receiving water as a result of a discharge, while considering the variability of the pollutant in the effluent (EPA, 1991). Because a single sample value exceeding 576 organisms per 100 ml indicates a likely exceedance of the geometric mean criterion, EPA has imposed an instantaneous (single grab sample) maximum effluent limit for E. coli of 576 organisms per 100 ml, in addition to a monthly geometric mean limit of 126 organisms per 100 ml, which directly implements the water quality criterion for E. coli. This will ensure that the discharge will have a low probability of exceeding water quality standards for E. coli.

Regulations at 40 CFR 122.45(d)(2) require that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable. The terms “average monthly limit” and “average weekly limit” are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are “derived from and comply with” the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

Segments of Indian Creek and the Boise River downstream of the discharge are designated for primary contact recreation. The geometric mean water quality criterion is identical for waters designated for primary and secondary contact recreation. Because the geometric mean criterion is being applied to the discharge as a “criteria end of pipe” effluent limitation, the effluent limits are also derived from and comply with water quality standards for E. coli in downstream waters designated for primary contact recreation.

Total Suspended Solids

The Kuna facility was not given a wasteload allocation for sediment, however there was a 3.62 ton per day reserve capacity set aside for point sources in the TMDL. IDEQ has indicated that this reserve may be allocated to both new and existing dischargers. The Lower Boise River TMDL states that dischargers may use the reserve “as needed” by requesting the incorporation of some portion of the reserve into their permit. The technology-based average monthly limit for TSS from the Kuna facility is 30 mg/L, which, at the 3.5 mgd maximum month design flow rate,

is 876 lb/day or 0.44 tons per day. However, the application states that the average concentration of suspended solids in the discharge will be less than 10 mg/L. Therefore, the full loading allowed by the technology-based limit is not “needed” by the Kuna facility at this time.

Therefore, EPA has set the average monthly mass effluent limit for TSS equal to 292 lb/day, which is the mass of TSS that would be discharged by the facility if the concentration were 10 mg/L (as reported on the application) and the flow were equal to the maximum month design flow of 3.5 mgd. Consistent with the ratio between the average monthly and average weekly technology-based limits, the average weekly limit is equal to 1.5 times this amount, or 438 lb/day. The average monthly mass limit represents 4% of the reserve wasteload allocation. The permit requires the permittee to meet the technology-based limits for TSS concentration (30 mg/L) and removal rate (85%); only the mass TSS limit is a water quality-based effluent limit based on using no more of the sediment reserve capacity than necessary.

Appendix D: Reasonable Potential Calculations

The following describes the process EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to excursions above Idaho's federally approved water quality standards. EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential.

To determine if there is reasonable potential for the discharge to cause or contribute to an excursion above water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This section discusses how the maximum projected receiving water concentration is determined.

A. Mass Balance

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

$$C_d Q_d = C_e Q_e + C_u Q_u \quad (\text{Equation D-1})$$

where,

C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)

C_e = Maximum projected effluent concentration

C_u = 95th percentile measured receiving water upstream concentration

Q_d = Receiving water flow rate downstream of the effluent discharge = $Q_e + Q_u$

Q_e = Effluent flow rate (set equal to the design flow of the WWTP)

Q_u = Receiving water low flow rate upstream of the discharge

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

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \quad (\text{Equation D-2})$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving stream and that 100% of the upstream flow may be used to dilute the effluent. EPA believes it is appropriate to assume rapid and complete mixing in this case, however, the Idaho water quality standards (Section 060.01.e.iv) generally do not allow more than 25% of the receiving stream flow to be used for mixing. When only a fraction of the receiving stream flow is used for mixing, the equation becomes the following:

$$C_d = \frac{C_e Q_e + C_u (Q_u \times MZ)}{Q_e + (Q_u \times MZ)} \quad (\text{Equation D-3})$$

where MZ is the fraction of the receiving water flow available for dilution. In this case, pursuant to of the Idaho WQS, MZ is equal to 25% (.25).

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

$$C_d = C_e \quad \text{(Equation D-4)}$$

Equation D-3 can be simplified by introducing a “dilution factor,”

$$D = \frac{Q_e + 0.25Q_u}{Q_e} \quad \text{(Equation D-5)}$$

There are three values for the dilution factor: one based on the 1Q10 flow rate in the receiving stream and used to determine reasonable potential and wasteload allocations for acute aquatic life criteria, one based on the 7Q10 flow rate to determine reasonable potential and wasteload allocations chronic aquatic life criteria (except for ammonia) and conventional pollutants, and one based on the 30B3 flow rate to determine reasonable potential and wasteload allocations for the chronic ammonia criterion. EPA used the DFLOW computer program and daily flow data from USGS Station #13211309 (Indian Creek above wastewater plant near Nampa, Idaho)

Table D-1: Dilution Factors		
Acute Dilution Factor	Chronic Dilution Factor	Chronic Ammonia Criterion Dilution Factor
1.73	1.74	1.77

After the dilution factor simplification, Equation D-3 becomes:

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

Equations D-4 and D-6 are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

B. Maximum Projected Effluent Concentration

To determine the maximum projected effluent concentration for pollutants not subject to technology-based effluent limits, EPA has used the information provided by the permittee in the application.

The planned wastewater treatment plant will use ultraviolet disinfection. EPA used 100 µg/L, which is the minimum level (ML) of the most sensitive EPA-approved analytical method for total residual chlorine, as the maximum projected effluent concentration for chlorine.

C. Maximum Projected Receiving Water Concentration

The discharge has reasonable potential to cause or contribute to an excursion above water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant. The maximum projected receiving water concentration is calculated from Equation D-6:

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

For ammonia, the maximum projected receiving water concentration is, for the acute condition:

$$C_d = \frac{5 - 0.16}{1.73} + 0.16 = 2.96 \text{ mg/L}$$

And, for the chronic condition:

$$C_d = \frac{5 - 0.16}{1.77} + 0.16 = 2.89 \text{ mg/L}$$

The water quality criteria for ammonia are based on the pH and temperature of the receiving water. The acute and chronic water quality criteria for this season are 2.59 and 0.99 mg/L, respectively. The projected receiving water concentrations are greater than the criteria, therefore a water quality-based effluent limit is necessary for ammonia.

Table D-2, below, summarizes the reasonable potential calculations for ammonia and chlorine.

Table D-2: Reasonable Potential Calculations - City of Kuna			
Dilution Factors	Acute	Chronic	Ammonia
Year - Round	1.73	1.74	1.77
All Concentrations in ug/L unless otherwise noted			
Parameter	Total Phosphorus as P	Total Ammonia as N (mg/L)	Total Residual Chlorine
Data Source	Application	Application	Minimum Level
Maximum Projected Effluent Concentration	2000	5	100
Year - Round			
Ambient Concentration	550	0.16	0
Acute Conversion Factor	1	1	1
Chronic Conversion Factor	1	1	1
Maximum Acute RWC	N/A	2.96	57.8
Maximum Chronic/Single Value RWC	2000	2.89	57.5
Acute Aquatic Life Criterion	N/A	2.59	19
Chronic Aquatic Life Criterion	N/A	0.99	11
Most Stringent Single-Value Criterion	70	N/A	N/A
Reasonable Potential?	YES	YES	YES

Appendix E: Reasonable Potential and Effluent Limit Calculations for Total Phosphorus

The Boise River and Indian Creek are listed in Idaho's 2002/2004 303(d)/305(b) integrated report as being impaired for nutrients. The Snake River Hells Canyon TMDL calls for a reduction in phosphorus loading to the Snake River from the Boise River. The load allocation for the Boise River in the Snake River Hells Canyon TMDL is a maximum of 70 µg/L total phosphorus. The following discussion details how EPA has determined if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to excursions above water quality standards for total phosphorus and calculate water quality-based effluent limits for total phosphorus.

A. Reasonable Potential Analysis

EPA is required by Section 301(b)(1)(C) of the Clean Water Act to include water quality-based effluent limits in NPDES permits. The regulation 40 CFR 122.44(d)(1)(i) states that NPDES permits must contain water quality-based effluent limits for all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including narrative criteria for water quality. The regulation 40 CFR 122.44(d)(1)(ii) requires that, when determining whether a discharge causes, has the reasonable potential to cause, or contribute to an excursion above water quality standards, the permitting authority shall use procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, and, where appropriate, the dilution of the effluent in the receiving water. The general procedure for reasonable potential analyses is shown in Appendix D.

The State of Idaho does not have numeric criteria for nutrients, including total phosphorus. When the State water quality standards do not contain numeric criteria for a given pollutant, EPA may calculate a numeric water quality criterion for the pollutant which will attain and maintain the narrative water quality criteria and fully protect designated uses (40 CFR 122.44(d)(1)(vi)). In this case, EPA has used the total phosphorus load allocation of 70 µg/L from the *Snake River Hells Canyon TMDL* to interpret Idaho's narrative criteria for nutrients for the purposes of determining reasonable potential and calculating effluent limits for total phosphorus. EPA believes this approach is reasonable because the analysis performed for that TMDL demonstrated that attainment of beneficial uses in the Snake River could be restored if the concentration of phosphorus at the mouth of the Boise River was reduced to 70 µg/L.

This interpretation of Idaho's narrative nutrient criterion does not apply to the receiving water at the point of discharge; rather, it applies at the mouth of the Boise River. Therefore, the question is not whether the discharge has the reasonable potential to cause or contribute to in-stream excursions above 70 µg/L total phosphorus at the point of discharge or at the edge of a mixing zone, but rather whether it has the reasonable potential to cause or contribute to excursions above 70 µg/L at the mouth of the Boise River.

This requires a slight modification of EPA's usual reasonable potential calculation procedures. Normally, in order to account for existing controls on point and nonpoint sources of pollution, EPA uses the *upstream* concentration of pollutants as an input to the reasonable potential

calculations. In this instance, EPA has considered the total phosphorus concentrations observed at Parma, Idaho (USGS Station # 12313000), which is near the mouth of the Boise River. The 95th percentile phosphorus concentration at Parma is 0.55 mg/L (550 µg/L) and the average concentration is 0.36 mg/L (360 µg/L).

It is not appropriate to consider dilution of the effluent in the receiving water in every case. The fact that the point where the water quality criterion applies is several miles away from the discharge suggests that it would be appropriate to consider the dilution of the effluent in the receiving water. However, because the existing concentrations of total phosphorus, whether measured as a 95th percentile or an average, in Indian Creek or at the mouth of the Boise River, far exceed the 70 µg/L criterion, dilution cannot be considered when performing a reasonable potential analysis, because the receiving waters currently have no assimilative capacity for the City of Kuna's proposed discharge of phosphorus.

In cases where dilution cannot be considered when performing a reasonable potential analysis, the discharge has the reasonable potential to cause or contribute to excursions above water quality standards if the maximum projected effluent concentration is greater than the criterion. For phosphorus, the "maximum projected effluent concentration" of total phosphorus is 2 mg/L (2,000 µg/L), as reported on the application for this NPDES permit. Because the maximum projected effluent concentration of total phosphorus exceeds the criterion, the discharge has the reasonable potential to cause or contribute to excursions above 70 µg/L total phosphorus at the mouth of the Boise River.

B. Effluent Limitations

When calculating effluent limits that "derive from and comply with" water quality standards as required by 40 CFR 122.44(d)(1)(vii)(A), it is not possible for a mixing zone to be authorized in this case. The concentrations of total phosphorus in the receiving waters far exceed the criterion, therefore, the receiving waters have no assimilative capacity to dilute the effluent phosphorus. Therefore, as with the reasonable potential analysis, the 70 µg/L interpretation of Idaho's narrative nutrient criteria must be applied at the end-of-pipe when establishing water quality-based effluent limits. The 70 µg/L interpretation of Idaho's narrative nutrient criterion therefore becomes the wasteload allocation for calculating final effluent limits for this discharger.

NPDES regulations at 40 CFR 122.45(d)(2) require that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits unless impracticable. EPA has set the average monthly limit equal to the 70 µg/L wasteload allocation. This means the effluent concentration of total phosphorus could be greater than 70 µg/L for short periods of time within a calendar month, but such excursions will be of such a short duration and small magnitude that they will be negligible in terms of their effect on phosphorus concentrations in the main stem Boise River.

The purpose of a water quality-based effluent limit is to require the permittee to achieve a long term average level of performance that will ensure a low probability of exceeding the wasteload allocation. Since effluents are not constant, the average weekly discharge limitation is numerically greater than the average monthly discharge limitation. EPA has calculated an average weekly limit of 105 µg/L by using the same ratio of the average weekly limit to the average monthly limit as used in the "secondary treatment" technology-based limits for BOD and TSS (1.5:1). The average weekly limit was calculated in this manner because facility-

specific effluent data are not available, and EPA determined in the analysis supporting the secondary treatment effluent limits that the 1.5:1 ratio is representative of typical effluent variability for POTWs.

While EPA believes a concentration limit for phosphorus is necessary in this case to prevent the discharge from contributing to an excursion above water quality standards, the federal regulation 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, and allows limits to be expressed in terms of other units of measurements in addition to mass. Therefore the permit contains both mass and concentration limits, and the permittee is required to comply with both the mass and concentration limits. Mass limits were calculated from the concentration limits based on the maximum month design flow of the WWTP, consistent with 40 CFR 122.45(b)(1).

C. Boise River Phosphorus TMDL

There is a TMDL under development for the Boise River that is likely to include a phosphorus wasteload allocation for the City of Kuna's proposed wastewater treatment plant. The wasteload allocation may be different than the effluent limits proposed in the draft permit. If the Boise River phosphorus TMDL is finalized and approved before the City of Kuna's permit is issued, the final permit will include phosphorus effluent limits that are consistent with the wasteload allocation. If the phosphorus TMDL is finalized after the permit is issued, EPA will consider modifying the Kuna permit to include phosphorus effluent limits that are consistent with the wasteload allocation, if the wasteload allocation is, in fact, different than the proposed effluent limits.

Appendix F: WQBEL Calculations - Aquatic Life Criteria

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The WQBELs for ammonia and chlorine are intended to protect aquatic life criteria. The following discussion presents the general equations used to calculate the water quality-based effluent limits, then works through the calculations for the May through October ammonia WQBEL as an example. The calculations for all WQBELs based on aquatic life criteria are summarized in Table F-1.

D. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equations D-6 and D-7). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e . The calculated C_e is the acute or chronic WLA. Equation D-6 is rearranged to solve for the WLA, becoming:

$$C_e = \text{WLA} = D \times (C_d - C_u) + C_u \quad (\text{Equation F-1})$$

In the case of ammonia, for the acute criterion,

$$\begin{aligned} \text{WLA}_a &= 1.73 \times (2.59 - 0.16) + 0.16 \\ \text{WLA}_a &= \mathbf{4.37 \text{ mg/L}} \end{aligned}$$

For the chronic criterion,

$$\begin{aligned} \text{WLA}_c &= 1.77 \times (0.99 - 0.16) + 0.16 \\ \text{WLA}_c &= \mathbf{1.62 \text{ mg/L}} \end{aligned}$$

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

$$\text{LTA}_a = \text{WLA}_a \times \exp(0.5\sigma^2 - z\sigma) \quad (\text{Equation F-3})$$

$$\text{LTA}_c = \text{WLA}_c \times \exp(0.5\sigma_{30}^2 - z\sigma_{30}) \quad (\text{Equation F-4})$$

where,

$$\sigma^2 = \ln(\text{CV}^2 + 1)$$

$$\sigma = \sqrt{\sigma^2}$$

$$\sigma_4^2 = \ln(\text{CV}^2/30 + 1)$$

$$\sigma = \sqrt{\sigma_4^2}$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

In the case of ammonia, for the season of May through October:

$$\text{CV} = 0.600$$

$$\sigma^2 = \ln(0.6^2 + 1) = 0.307$$

$$\sigma = \sqrt{\sigma^2} = 0.555$$

$$\sigma_{30}^2 = \ln(0.6^2/30 + 1) = 0.0119$$

$$\sigma_{30} = \sqrt{\sigma_{30}^2} = 0.109$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

Therefore,

$$LTA_a = 4.37 \text{ mg/L} \times \exp(0.5 \times 0.307 - 2.326 \times 0.555)$$

$$LTA_a = \mathbf{1.40 \text{ mg/L}}$$

$$LTA_c = 1.62 \text{ mg/L} \times \exp(0.5 \times 0.0119 - 2.326 \times 0.109)$$

$$LTA_c = \mathbf{1.27 \text{ mg/L}}$$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below. For ammonia, the chronic LTA of 1.27 mg/L is more stringent.

E. Derive the maximum daily and average monthly effluent limits

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

$$MDL = LTA \times \exp(z_m \sigma - 0.5 \sigma^2) \quad (\text{Equation F-5})$$

$$AML = LTA \times \exp(z_a \sigma_n - 0.5 \sigma_n^2) \quad (\text{Equation F-6})$$

where σ , and σ^2 are defined as they are for the LTA equations (F-2 and F-3) and,

$$\sigma_n^2 = \ln(CV^2/n + 1)$$

$$\sigma = \sqrt{\sigma_n^2}$$

$$z_a = 1.645 \text{ for } 95^{\text{th}} \text{ percentile probability basis}$$

$$z_m = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

$$n = \text{number of sampling events required per month} = 9$$

In the case of ammonia,

$$MDL = 1.27 \text{ mg/L} \times \exp(2.326 \times 0.555 - 0.5 \times 0.307)$$

$$MDL = \mathbf{3.9 \text{ mg/L}}$$

$$AML = 1.27 \text{ mg/L} \times \exp(1.645 \times 0.198 - 0.5 \times 0.039)$$

$$AML = \mathbf{1.7 \text{ mg/L}}$$

Table F-1, below, details the calculations for water quality-based effluent limits based on two-value aquatic life criteria.

Table F-1: Limits Based on 2-Value Aquatic Life Criteria								
Statistical variables for permit limit calculation								
	AML Prob'y Basis	MDL Prob'y Basis	LTA Prob'y Basis	Acute Dil'n Factor	Chronic Dil'n Factor	Chronic Ammonia Dil'n Factor		
PARAMETER	<i>decimal</i>	<i>decimal</i>	<i>decimal</i>	<i>dimensionless</i>	<i>dimensionless</i>	<i>dimensionless</i>		
All	0.95	0.99	0.99	1.73	1.74	1.77		
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations								
	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	Limiting LTA	# of Samples per Month	# of Samples per Week
PARAMETER	<i>ug/L</i>	<i>ug/L</i>	<i>ug/L</i>	<i>ug/L</i>	<i>decimal</i>	<i>ug/L</i>	<i>n</i>	
Chlorine	32.86	19.13	10.6	10.1	0.600	10.1	4	1
Ammonia (mg/L)	4.37	1.62	1.40	1.27	0.600	1.27	9	2
Effluent Limit Calculation Summary								
	Ambient Conc	Water Quality Criterion Acute	Water Quality Criterion Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	
PARAMETER	<i>ug/L</i>	<i>ug/L</i>	<i>ug/L</i>	<i>ug/L</i>	<i>ug/L</i>	<i>lb/day</i>	<i>lb/day</i>	
Chlorine	0.00	19.0	11.0	16	31	0.46	0.92	
Ammonia (mg/L)	0.16	2.59	0.99	1.7	3.9	50	115	

Appendix G: Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA) Fisheries and the U.S. Fish and Wildlife Service regarding potential effects an action may have on listed endangered species.

A. Endangered and Threatened Species in the Vicinity of the Discharge

EPA requested a species list from USFWS for the Kuna facility in a letter dated May 12, 2006. USFWS responded in a letter dated May 17, 2006, that EPA should use the county species list for Canyon County (the facility itself is located in Ada County but the discharge is located in Canyon County). EPA contacted USFWS by telephone and e-mail on July 31st, 2006, once again requesting site-specific information about the endangered species that may be present in the vicinity of the discharge. USFWS again responded via e-mail that EPA should use the county species list.

The species list for Canyon County states that the following endangered or threatened species may occur in the county:

- Gray wolf (*Canis lupus*) – Experimental/non-essential population
- Bald eagle (*Haliaeetus leucocephalus*) – Threatened
- Idaho springsnail (*Pyrgulopsis idahoensis*) – Endangered

In an E-mail message dated May 15, 2006, Ed Murrell of NOAA Fisheries stated that there are no threatened or endangered species under NOAA fisheries' jurisdiction in the Boise drainage.

B. Potential Effects on Listed Species

EPA has determined that the issuance of this NPDES permit will have no effect on any of the endangered or threatened species on the Canyon County species list. The rationale for this determination, for each species, is provided below.

Gray Wolf – Endangered

The main threats to the gray wolf include direct human-caused mortality and habitat loss. The issuance of an NPDES permit to the City of Kuna WWTP will have no effect on any of these threats. Therefore, the issuance of this permit will have no effect on this species.

Bald Eagle – Threatened

The bald eagle was once widespread throughout North America, and their presence has been greatly reduced in many parts of their former range. Bald eagle populations have suffered a slow decline due mainly to the gradual destruction of their habitat and food sources. Habitat loss continues to be the most significant long-term threat to all bald eagle populations (USFWS 1986). A precipitous population decline in bald eagles was also the result of reproductive failure due to eggshell thinning following widespread application of DDT from the 1940s through 1972. Other factors that contributed to the species' decline include shooting, incidental poisoning, trauma, electrocution, and other general causes of mortality (USFWS 1986).

The primary threats to bald eagles are prey displacement or mortality, bioaccumulation of contaminants through prey species, or direct exposure to contaminants. The issuance of an NPDES permit to the City of Kuna for a discharge of treated sewage would not affect any of the threats to bald eagles. The only pollutants which can cause toxic effects that are expected to be in the discharge in significant quantities are ammonia and chlorine. The concentrations of these pollutants in the effluent is expected to be low because the WWTP will not use chlorine disinfection, and because the effluent limits will require the concentrations to be low.

To minimize the potential effects on desirable species of aquatic life from chlorine discharge into receiving waters, EPA (1986) established criteria for chlorine at 11 µg/L as a 4-day average and 19 µg/L as a 1-hour average. Idaho applies water quality criteria for chlorine that are equivalent to those recommended by EPA (1986) for residual chlorine to nearly all waters of the State for the protection of aquatic life. The permits include total residual chlorine limits based on application of the above water quality standards with a mixing zone that takes into account the 25 percent of the stream flow allowed by the Idaho water quality standards. This will ensure protection of downstream water quality.

Once discharged to the receiving water, chlorine is not only diluted but is neutralized upon reaction with air, sunlight, contacting surfaces, and with impurities in water and wastewater (Tikkanen et. al. 2006). Potential acute effects of chlorine are extremely low because of the dilution and neutralization that occurs when the effluent is discharged. With the very quick dissipation of chlorine and the stringent effluent limits, only a very small area near the discharge point would have even marginally toxic concentrations of chlorine at any given time.

Chlorine has been shown to cause avoidance responses in fish (Heath 1995). In freshwater, residual chlorine is composed of both free chlorine (made up of hypochlorous acid and hypochlorite ions) and combined chlorine (primarily made up of monochloramine). Free chlorine is more toxic than the combined form, and fish avoid it at lower concentrations (Cherry et al., 1979). Both marine and freshwater fish species have been shown to avoid chlorine at concentrations well below the lethal level (but it is important to understand that temperature, body size, and time of exposure can influence the organism's response). Wastewater treatment plant effluents may also have elevated temperatures. This combination of a contaminant that is avoided by fish (at sub-lethal levels) and elevated water temperature, would elicit an avoidance response. Thus, even if there was a small area of relatively higher chlorine concentration near the discharge point, fish would easily avoid the area.

The extremely small areas of somewhat higher chlorine concentration in the stream, if any, would result in insignificant effects to aquatic species' maintenance, reproduction, or growth. Chlorine does not bioconcentrate through the food chain. The main route of exposure of chlorine to bald eagle would be through dietary exposure and incidental water exposure. Since the chlorine concentration in the water is expected to be low and chlorine does not bioconcentrate, it is expected that chlorine will have no effect on bald eagle through either dietary exposure or loss of prey availability.

Ammonia toxicity is related to the unionized fraction, which increases as pH and temperature increase. Therefore, Idaho's water quality criteria for ammonia become more stringent as pH and temperature increase.

The 95th percentile pH observed at USGS stations 13211260, 13211309, 13211345, 13211350, 13211440, and 13211445 on Indian Creek (a total of 75 measurements) is 8.4 standard units, and

the average pH is 8.1 standard units). When EPA evaluated the impact the discharges of ammonia and calculated effluent limits, the 95th percentile Indian Creek pH was used as a conservative measure. Further, the pH of domestic wastewater discharges is generally near neutral.

Fish are adept at sensing and avoiding very low concentrations of ammonia. Thus, even if there was a small area of higher ammonia concentration, fish could easily avoid it. In addition, fish have been reported to enter waters that contain acutely toxic concentrations of ammonia without suffering any obvious long-term effects, as long as the trips are followed by periods in which the fish are in waters that contain ammonia concentrations below acute toxicity levels (Thurston et al. 1981). The ammonia concentrations in the effluent vicinity and the extremely small effected area, if any, would not result in loss of prey for bald eagles. Indirect effects of ammonia, such as nutrient enrichment for primary producers, would also be insignificant, because the ammonia effluent limits are very stringent.

The discharges of ammonia from the City of Kuna will not affect bald eagles. The exposure of ammonia from this facility to bald eagles is most likely through dietary exposure through fish in the area and loss of prey. Since the discharges should result in insignificant effects to fish in the area, the discharge should result in minimal exposure to bald eagles through loss of prey or incidental water exposure resulting in no effect on bald eagles.

In 1969, the European Inland Fisheries Advisory Commission (EIFAC) concluded that pH values ranging from 5.0 to 6.0 are unlikely to harm any species unless either the concentration of free carbon dioxide exceeds 20 parts per million (ppm) or the water contains iron salts precipitated as ferric hydroxide, a compound of unknown toxicity. Values for pH ranging from 6.0 to 6.5 are unlikely to harm fish unless free carbon dioxide is present in excess of 100 ppm, while pH values ranging from 6.5 to 9.0 are harmless to fish, although the toxicity of other compounds (e.g. ammonia) may be affected by changes within this range. These and other studies evaluating the effects of pH on various fish species and macroinvertebrates led EPA (1986) to conclude that a pH range of 6.5 to 9.0 appears to provide adequate protection for the life of freshwater fish and bottom dwelling invertebrates. Idaho's water quality criterion for pH is equal to this range.

The pH range observed at USGS stations 13211260, 13211309, 13211345, 13211350, 13211440, and 13211445 in Indian Creek (a total of 75 measurements) is 7.3 to 8.6 standard units. All measurements have been within the range of the water quality criteria. EPA has established water quality-based effluent limits for pH which are derived from and comply with the water quality criteria for pH, as required by 40 CFR 122.44(d)(1)(vii). Therefore, pH effects of the effluent, if any, will be limited to such a small area as to be negligible in terms of fish population survival, reproduction, and growth. Therefore the pH of the discharge will have no effect on bald eagles.

Idaho Springsnail – Endangered

The Idaho springsnail has only been found in the Snake River in Idaho (USFWS, 1995; Natureserve, 2007). The permitted discharge is to Indian Creek, which is a tributary of the Boise River, which is a tributary of the Snake River. The Boise's confluence with the Snake River is approximately 20 river miles downstream of Indian Creek's confluence with the Boise, at River Mile 395 on the Snake. According to the Snake River Aquatic Species Recovery Plan (USFWS,

1995), the current distribution and recovery area of the Idaho Springsnail is between river miles 518 and 553 on the Snake River. As such, the recovery area and current distribution of the Idaho Springsnail is located at least 123 river miles upstream of the point where the river receiving the permitted discharge via a tributary flows into the Snake River. Even the historic range of the Idaho springsnail extended only as far downstream as Snake River mile 416, which is 21 river miles upstream of the Boise River's confluence with the Snake.

Because the Idaho springsnail does not occur in Indian Creek or the Boise River and occurs in the Snake River only at locations upstream of the Boise River's confluence with the Snake, the issuance of an NPDES permit for a point source discharge of pollutants to a tributary of the Boise River will have no effect on the Idaho springsnail.

EPA will provide USFWS and NOAA Fisheries with copies of the draft permit and fact sheet during the public notice period. Any comments received from these agencies regarding this determination will be considered prior to issuance of this permit.

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