

FACT SHEET

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

City of Middleton
15 North Dewey Avenue
Middleton, Idaho 83664

Permit Number: ID-002183-1

Public Notice date:

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue an NPDES permit to the City of Middleton. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to the Boise River. 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.

This Fact Sheet includes:

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

The State of Idaho Proposes Certification.

EPA is requesting that the Idaho Division of Environmental Quality certify the NPDES permit for the City of Middleton, under section 401 of the Clean Water Act. The state provided preliminary comments prior to the Public Notice which have been incorporated.

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 regional Director for the Office of Water will make a final decision regarding permit reissuance. 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 a request for an evidentiary hearing is submitted 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 (See address below). Draft permits, Fact Sheets, and other information can also be found by visiting the Region 10 website at www.epa.gov/r10earth/offices/water/npdes.htm.

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-0225 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

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

Middleton Public Library
307 East Main Street
Middleton, Idaho 83644
(208) 585-3931

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I. APPLICANT

City of Middleton
NPDES Permit No.: ID-002183-1

Facility Mailing Address:
15 North Dewey Avenue
Middleton, Idaho 83644

II. FACILITY INFORMATION

A. Activity

The City of Middleton is located in Canyon County in southwest Idaho along the north bank of the Boise River. The city owns, operates, and has maintenance responsibility for a facility that treats domestic wastewater from local residents and commercial establishments. Middleton has a current population of approximately 2,000. The facility receives no industrial wastes.

The permit application indicates the design flow of the facility to be 1.83 million gallons per day (mgd). Actual flow at the plant over the past five years has averaged 0.3 mgd. Treatment of wastewater consists of a 4-cell step aeration lagoon followed by an extended detention chlorination basin. The system features a primary lagoon of 3.7 acres, followed by three secondary lagoons operated in series totaling 1.95 acres. During the summer months, treated effluent is generally discharged in batches to the Boise River on a daily basis. The frequency of discharge drops during the winter months to once every 1 to 4 days. Sludge from the treatment process is biologically treated internally within the system and is stored indefinitely at the bottom of the ponds.

A map has been included in Appendix A which shows the location of the treatment plant and the discharge location.

B. Background

The NPDES permit for the wastewater treatment plant expired on April 22, 1991. Under the federal Administrative Procedures Act, a federally issued NPDES permit is administratively extended (i.e. continues in force and effect) provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. Since the City of Middleton did submit a timely application for a new permit, the most recent permit was administratively extended.

The city completed an upgrade of its facility in 1989. A review of the facility's Discharge Monitoring Reports for the past five years indicates that the facility has generally been in compliance with its permit effluent limits.

III. RECEIVING WATER

A. Outfall Location

Treated effluent from the City of Middleton wastewater treatment facility is discharged from outfall 001, located at latitude 43° 41' 52" and longitude 116° 38' 18", to the Boise River at river mile 24.

B. Water Quality Standards

A State's water quality standards are composed of use classifications, and numeric and/or narrative water quality criteria. 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 Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 16.01.02.140.01.x) protect the Boise River beginning at River Mile 50 (Veterans State Park) downstream to the City of Caldwell for the following beneficial uses: agricultural water supply, cold water biota, salmon spawning, primary contact recreation, and secondary contact recreation.

The criteria that the State of Idaho has deemed necessary to protect the beneficial uses for the Boise River, and the State's anti-degradation policy are summarized in Appendix B.

C. Water Quality Limited Segment

A water quality limited segment is any waterbody, or definable portion of water body, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. The Boise River at Middleton has been listed as a "water quality limited segment." This segment of the Boise River has been listed as "water quality limited" for nutrients, sediment, dissolved oxygen, temperature and bacteria.

Section 303(d) of the CWA requires States to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited. A TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards and allocates that load capacity to known point sources and nonpoint sources.

The Idaho Division of Environmental Quality, Boise Regional Office has prepared a TMDL for the Boise River. The report, entitled *Lower Boise River, Subbasin assessment, Total Maximum Loads* (hereafter referred to as the Boise River TMDL), was submitted to EPA on December 18, 1998. The Boise River TMDL addresses sediment and fecal coliform bacteria in the Boise River. It also allocates wasteload allocations to point sources discharging directly to the Boise River, and load allocations to the mouths of tributaries and drains discharging directly to the Boise River. The Boise River TMDL determined that low dissolved oxygen (DO) is not a concern in the Boise River. A TMDL for nutrients and temperature for the Boise River has been deferred until the year 2001. Some of the conditions in the draft permit are based on the Boise River TMDL. If the final TMDL is not issued prior to the end of the public comment period, the TMDL-based conditions will be removed from the final permit.

IV. EFFLUENT LIMITATIONS

In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. A technology-based effluent limit requires a minimum level of treatment for municipal point sources based on currently available treatment technologies. A water quality-based effluent limit is designed to ensure that the water quality standards of a waterbody are being met. For more information on deriving technology-based effluent limits and water quality-based effluent limits see Appendix C.

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

Table 1: Effluent Limitations

Parameters	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
BOD ₅	45 mg/l (687 lbs/day)	65 mg/l (992 lbs/day)	----
TSS	70 mg/l (1070 lbs/day)	105 mg/l (1605 lbs/day)	----
Fecal Coliform Bacteria (May 1 - September 30)	50 colonies/100 ml	100 colonies/100 ml	500 colonies/100 ml

Fecal Coliform Bacteria (October 1 - April 30)	100 colonies/100 ml	200 colonies/100 ml	800 colonies/100 ml
Total Residual Chlorine ¹	0.048 mg/l (48 µg/l)	----	0.067 mg/l (67 µg/l)
Notes: 1. The analytical method for total residual chlorine shall achieve a minimum level of 0.1 mg/l (100 µg/l) in accordance with 40 CFR § 136. The permittee will be considered in compliance with the average monthly limit and the maximum daily limit for total residual chlorine when the measured values are below the minimum level of 100 µg/l.			

In addition to the requirements listed above, the following limitations shall also apply:

1. The pH range of the effluent shall be between 6.5 - 9.0 standard units.
2. 65 percent removal requirements for BOD₅: For any month, the monthly average effluent concentration shall not exceed 35 percent of the monthly average influent concentration.
3. There shall be no discharge of floating solids or visible foam other than trace amounts.

V. SLUDGE REQUIREMENTS

Currently, sludge from the treatment process is stored at the bottom of the facultative ponds. The permittee does not anticipate having to remove the sludge from the bottom of the ponds during the term of this permit (five years).

Section 405(f) of the CWA requires sludge use and disposal requirements to be incorporated into NPDES permits issued to a treatment works treating domestic wastewater. In addition, the sludge permitting regulations in 40 CFR §122 and §124 apply to all treatment works treating domestic wastewater.

General conditions have been incorporated into the proposed permit requiring the permittee to comply with all existing federal and state laws, and all regulations applying to sludge use and disposal.

VI. MONITORING REQUIREMENTS

Section 308 of the Clean Water Act and federal regulation 40 CFR §122.44(i) requires that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to EPA.

Table 2 below presents the proposed monitoring requirements based on the minimum sampling necessary to adequately monitor the facility's performance. Effluent monitoring for Outfall 001 is required only when the facility is actually discharging to the Boise River. Table 3 below presents the proposed ambient monitoring requirements for the Boise River, upstream of Outfall 001. Monitoring in the Boise River will be required once per month, when a discharge is occurring from Outfall 001. Nutrient monitoring has been included in the proposed permit to help support the development of a TMDL for the Boise River. Nutrient monitoring will be required for a two year period.

TABLE 2: Influent/Effluent Monitoring Requirements

Parameter	Sample Location	Sample Frequency	Sample Type ¹
Flow, mgd	Effluent	Daily	----
BOD ₅ , mg/L	Influent and effluent	1/week	8-hour composite
TSS, mg/L	Effluent	1/week	8-hour composite
pH, standard units ²	Effluent	1/week	grab
Total Residual Chlorine	Effluent	1/week	grab
Fecal Coliform Bacteria, colonies/100 ml	Effluent	5/week	grab
Temperature, °C	Effluent	3/week	grab
Total Ammonia as N, mg/L	Effluent	1/month	8-hour composite
Total Kjeldahl Nitrogen, mg/l	Effluent	1/month	8-hour composite
Nitrate-Nitrite, mg/l	Effluent	1/month	8-hour composite
Total Phosphorus, mg/L	Effluent	1/month	8-hour composite
Ortho-Phosphate, mg/l	Effluent	1/month	8-hour composite
Footnotes:			
<ul style="list-style-type: none"> An eight (8) hour composite sample shall consist of three discrete aliquots collected over an eight hour period. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in <i>Standard Methods for the Examination of Water and Wastewater</i>, 18th Edition. 			

TABLE 3: Boise River Monitoring Requirements

Parameter	Sample Frequency	Sample Type
pH, standard units	1/month	grab
Temperature, °C	1/month	grab
Total Ammonia as N, mg/l	1/month	grab
Total Kjeldahl Nitrogen, mg/l	1/month	grab
Nitrate-Nitrite, mg/l	1/month	grab
Total Phosphorus, mg/l	1/month	grab
Ortho-Phosphate, mg/l	1/month	grab

VII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

The federal regulation at 40 CFR §122.41(e) requires the Permittee to develop and submit a Quality Assurance Plan to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Permittee is required to submit a Quality Assurance Plan within 60 days of the effective date of the draft permit. The Quality Assurance Plan shall consist of standard operating procedures the Permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Additional Permit Provisions

Sections II, III, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they can not 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 other general requirements.

VIII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service if their actions could adversely affect any threatened or endangered species. EPA has determined that issuance of this permit will not affect any of the threatened or endangered species in the vicinity of the discharge. See Appendix E for further details.

B. State Certification

Section 401 of the Clean Water Act requires EPA to seek state 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.

C. Permit Expiration

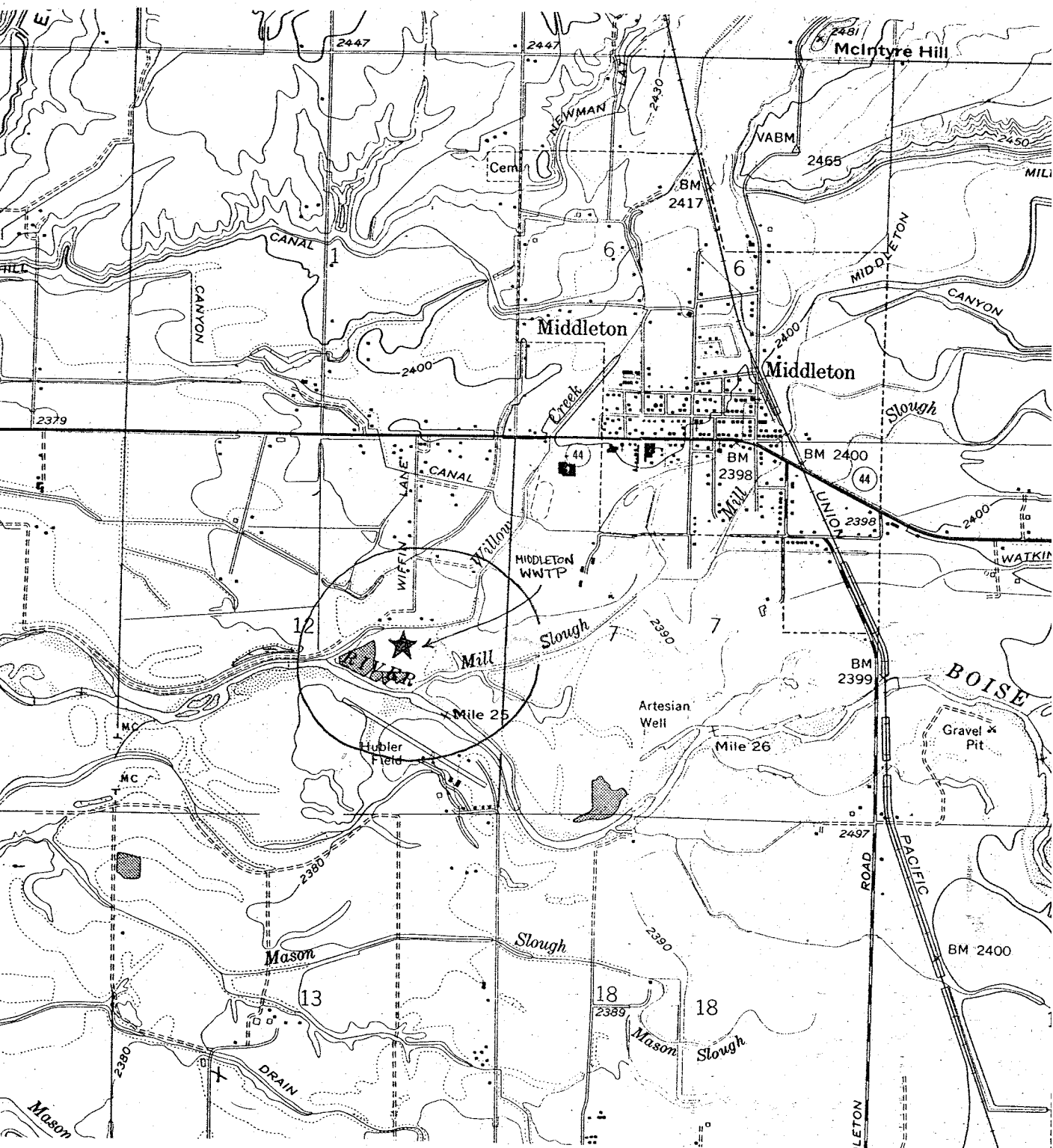
This permit will expire five years from the effective date of the permit.

REFERENCES

State of Idaho, 1997. *Water Quality Standards and Wastewater Treatment Requirements*. IDAPA 16, Title 01, Chapter 02.

EPA 1991. *Technical Support Document for Water Quality-based Toxics Control*. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, D.C., March 1991. EPA/505/2-90-001.

APPENDIX A
Map of Middleton Wastewater Treatment Facility



APPENDIX B
Idaho Water Quality Standards

A. Water Quality Criteria

The following water quality criteria are necessary for the protection of designated beneficial uses in the Boise River:

1. IDAPA 16.01.02.200.05 - Surface waters of the State shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.
2. IDAPA 16.01.02.200.06 - Excess Nutrient. 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.
3. IDAPA 16.01.02.200.08 - Sediment. Sediment shall not exceed quantities specified in section 250, or , in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Subsection 350.02.b.
4. IDAPA 16.01.02.250.01.a. - Primary Contact Recreation: Between May 1 and September 30 of each calendar year, waters designated for primary contact recreation are not to contain fecal coliform bacteria significant to the public health in concentrations exceeding:
 1. 500/100 ml. at any time,
 2. 200/100 ml in more than ten percent of the total samples taken over a thirty day period; and
 3. a geometric mean of 50/100 ml based on a minimum of five samples taken over a thirty day period.
5. IDAPA 16.01.02.250.01.b - Secondary Contact Recreation: Waters designated for secondary contact recreation are not to contain fecal coliform significant to the public health in concentrations exceeding:
 1. 800/100 ml. at any time,
 2. 400/100 ml in more than ten percent of the total samples taken over a thirty day period; and
 3. a geometric mean of 200/100 ml based on a minimum of five samples taken over a thirty day period.

6. IDAPA 16.01.02.250.02.a.i - Hydrogen ion concentration (pH) values within the range of 6.5 to 9.5 standard units.
7. IDAPA 16.01.02.250.02.a.iii - Total chlorine residual:
 1. One hour average concentration not to exceed 19 $\mu\text{g/l}$; and
 2. Four day average concentration not to exceed 11 $\mu\text{g/l}$.
8. IDAPA 16.01.02.250.02.c.i - Dissolved oxygen concentrations shall exceed 6.0 mg/l at all times.
9. IDAPA 16.01.02.250.02.c.ii - Water temperature of 22°C or less with a maximum daily average of no greater than 19°C.
10. IDAPA 16.01.02.250.02.c.iii - Ammonia:
 1. The one hour average concentration of un-ionized ammonia (as N) is not to exceed $(0.43/A/B/2)$ mg/L, where:

A = 1 if the water temperature (T) is $\geq 20^\circ\text{C}$, or
 A = $10^{(0.03(20-T))}$ if T < 20°C, and

B = 1 if the pH is ≥ 8.0 , or
 B = $(1 + 10^{(7.4-\text{pH})}) \div 1.25$ if pH is < 8.0
 2. The four day average concentration of un-ionized ammonia (as N) is not to exceed $(0.66A/B/C)$ mg/L, where:

A = 1.4 if T is $\geq 15^\circ\text{C}$, or
 A = $10^{(0.03(20-T))}$ if T < 15°C, and

B = 1 if the pH is ≥ 8.0 , or
 B = $(1 + 10^{(7.4-\text{pH})}) \div 1.25$ if pH is < 8.0

C = 13.5 if pH is ≥ 7.7 , or
 C = $20(10^{(7.7-\text{pH})}) \div (1 + 10^{(7.4-\text{pH})})$ if the pH is < 7.7
11. IDAPA 16.01.02.250.02.d - Salmon Spawning: Water temperature of 13°C or less with a maximum daily average no greater than 9°C. The Boise River TMDL indicated that Rainbow trout, Brown trout, and mountain whitefish are present in the Boise River, therefore the temperature criterion is applicable between October 1 through July 15.

B. Anti-Degradation Policy

The State of Idaho has adopted an anti-degradation policy as part of their water quality standards. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses. The three tiers of protection are as follows:

- Tier 1 - Protects existing uses and provides the absolute floor of water quality.
- Tier 2 - Protects the level of water quality necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water in waters that are currently of higher quality than required to support these uses. Before water quality in Tier 2 wastes can be lowered, there must be an anti-degradation review consisting of: (1) a finding that it is necessary to accommodate important economical or social development in the area where the waters are located; (2) full satisfaction of all intergovernmental coordination and public participation provisions; and (3) assurance that the highest statutory and regulatory requirements for point sources and best management practices for nonpoint sources are achieved. Furthermore, water quality may not be lowered to less than the level necessary to fully protect the “fishable/swimmable” uses and other existing uses.
- Tier 3 - Protects the quality of outstanding national resources, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance. There may be no new or increased discharges to these waters and no new or increased discharges to tributaries of these waters that would result in lower water quality.

The Boise River is a Tier 1 waterbody, therefore, water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. An NPDES permit can not be issued that would result in the water quality criteria being violated. The draft permit contains effluent limits which ensure that the existing beneficial uses for the Boise River will be maintained.

APPENDIX C

Basis for Effluent Limitations

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (CWA) provide the basis for the effluent limitations and other conditions in the draft permit. The CWA requires Publicly Owned Treatment Works (POTWs) to meet performance-based requirements (effluent limits) based on available wastewater treatment technology. EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that the technology-based effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent, water quality-based effluent limits designed to ensure that water quality standards are met. The draft effluent limits reflect the more stringent of either the technology-based limits or the water quality-based limits.

The following explains in more detail the derivation of technology-based effluent limits and water quality-based effluent limits.

A. Technology-based Evaluation

The CWA requires Publicly Owned Treatment Works to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” that all POTWs were required to meet by July 1, 1977. EPA developed “secondary treatment” regulations which are specified in 40 CFR 133. These technology-based limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH.

The definition of “secondary treatment” includes special considerations regarding waste stabilization ponds. The regulations allow alternative limits for facilities, such as the City of Middleton, using waste stabilization ponds. These alternative limits are called “treatment equivalent to secondary treatment.”

The regulation also includes a provision for an Alternative State Requirement (40 CFR 133.105(d)). This allows the State the flexibility to set permit limits above the maximum levels for “treatment equivalent to secondary treatment.” For waste stabilization ponds, the *Idaho Water Quality Standards and Wastewater Treatment Requirements* (IDAPA16.01.02.420.02.b) establish average monthly limits for BOD₅ and TSS. The technology-based limits for BOD₅ and TSS are contained in Table C-1.

TABLE C-1: Technology-based Effluent Limits for BOD and TSS

Parameters	Average Monthly Limit	Average Weekly Limit	Percent Removal Requirements
BOD ₅	45 mg/l	65 mg/l	65
TSS	70 mg/l	105 mg/l	----
Footnotes:			
1. Although not specified in the Idaho State Water Quality Standards, a weekly average effluent limitation for BOD ₅ and TSS has been established in accordance with 40 CFR §122.45(d)(2). The average weekly limit is 1.5 times the value of the monthly average limitation.			

In accordance with 40 CFR § 122.45(f), NPDES permits must also express these requirements in terms of mass-based limits. The draft permit establishes loading limits based on the plant design capacity of 1.83 mgd (40 CFR § 122.45(b)). The limits are calculated by multiplying the concentration limits by the design flow and a conversion factor of 8.34 (pounds)(liters)/(milligrams)(million gallons) as shown below:

Biological Oxygen Demand (BOD₅)

Monthly Average Load = (1.83 mgd)(45 mg/L)(8.34) = 687 lbs/day

Weekly Average Load = (1.83 mgd)(65 mg/L)(8.34) = 992 lbs/day

Total Suspended Solids (TSS)

Monthly Average Load = (1.83 mgd)(70 mg/L)(8.34) = 1070 lbs/day

Weekly Average Load = (1.83 mgd)(105 mg/L)(8.34) = 1605 lbs/day

In addition to the requirements listed above, the Idaho *Water Quality and Wastewater Treatment Requirements* also require the following technology-based limitations for wastewater discharges:

1. The pH range shall be between 6.0 - 9.0 standard units.
2. Fecal Coliform Bacteria (IDAPA 16.01.02.420.02.b): Fecal coliform concentrations in treated effluent are not to exceed a geometric mean of 200 colonies/100 ml based on no more than one week of data and a minimum of five samples.

B. Water Quality-based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the Clean Water Act. This section requires the establishment of limitations in permits necessary to meet water quality standards by July 1, 1977.

The regulations at 40 CFR 122.44(d)(1) implement section 301(b)(1)(C) of the Clean Water Act. These regulations require that NPDES 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 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 wasteload allocation (WLA).

In determining whether water quality-based limits are needed and developing those limits when necessary, EPA uses the approach outlined below:

1. Determine the appropriate water quality criteria
2. Determine whether there is “reasonable potential” to exceed the criteria
3. If there is “reasonable potential” develop a WLA
4. Develop effluent limitations based on WLAs

The following sections provide a detailed discussion of each step. Appendix D contains the calculations based on these steps for establishing the total residual chlorine limit contained in this permit.

A. Determine Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. For Idaho, the State water quality standards are found at IDAPA 16, Title 1, Chapter 2. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in Section III of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, “reasonable potential” and the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

B. Reasonable Potential Evaluation

To determine if there is “reasonable potential” to cause or contribute to an exceedence of the water quality criteria for a given pollutant, the EPA compares applicable water quality criteria to the maximum expected receiving water concentrations for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is “reasonable potential” and a water quality-based effluent limit must be included in the permit.

EPA used the recommendations in Chapter 3 of the *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991) to conduct the “reasonable potential” analysis for total residual chlorine. The maximum expected receiving water concentration C_d is determined using the following mass balance equation:

$$C_d \times Q_d = (C_e \times Q_e) + (C_u \times Q_u) \quad \text{or}$$

$$C_d = \frac{(C_e \times Q_e) + (C_u \times Q_u)}{Q_d}$$

where,

C_d = receiving water concentration downstream of the effluent discharge

C_e = maximum projected effluent concentration

= maximum reported effluent value \times reasonable potential multiplier

Q_e = maximum effluent flow

C_u = upstream concentration of pollutant

Q_d = receiving water flow downstream of the effluent discharge

= $Q_e + Q_u$

Q_u = upstream flow

= upstream flow \times %MZ (if a mixing zone is available)

Sections 1 through 4 below discuss each of the factors used in the mass balance equation to calculate C_d .

1. Effluent Concentration

The maximum projected effluent concentration (C_e) in the mass balance equation is represented by the 99th percentile, calculated using the statistical approach recommended in the TSD. The 99th percentile effluent concentration is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier. The reasonable potential multiplier accounts for uncertainty in the data. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. A partial listing of reasonable potential multipliers can be found in Table 3-1 of the TSD. EPA evaluated Middleton's permit application and discharge monitoring reports (DMRs) from January 1994 through November 1998 to determine the maximum reported effluent concentrations.

2. Effluent Flow

The effluent flow used in the equation is the design flow of the facility. The facility's permit application indicates a design flow of 1.83 mgd.

3. Upstream (Ambient) Concentration

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the Middleton

WWTP discharge. Where there were no data to determine ambient concentration, zero was used in the mass balance equation.

4. Upstream Flow

The 7-day, 10-year low flow (7Q10) is the 7-day average low flow that has a 10 percent chance of occurring in any given year. The 1-day, 10-year low flow (1Q10) is the 1-day low flow that has a 10 percent chance of occurring in any given year. The 7Q10 and 1Q10 for the Boise River at Middleton are 61.75 cubic feet per second (cfs) and 28.1 cfs, respectively. These figures were derived from United States Geological Survey (USGS) data from 1975 to 1996.

In accordance with state water quality standards, only the Idaho Division of Environmental Quality (IDEQ) may authorize mixing zones. If IDEQ authorizes a different size mixing zone in its final 401 certification, EPA will recalculate the reasonable potential and effluent limits based on the final mixing zone. If the State does not authorize a mixing zone in its 401 certification, EPA will recalculate the permit limits based on meeting water quality standards at the point of discharge.

Under Idaho water quality standards, dischargers are generally not authorized to use the entire upstream flow for dilution of their effluent. Instead, the standards contain the following restrictions on mixing zones for determining compliance with chronic criteria:

- The size may be up to 25 percent of the stream width or 300 meters plus the horizontal length of the diffuser, whichever is less;
- The mixing zone may be no closer to the 7Q10 than 15 percent of the stream width; and
- The mixing zone may not be more than 25 percent of the volume of the stream flow.

Based on the above standards, twenty five percent of the above flows were used in the mass balance equation for total residual chlorine to determine whether there was reasonable potential to cause exceedances the acute and/or chronic criteria. The 1Q10 flow is used in the acute calculation and the 7Q10 is used in the chronic calculation.

C. Wasteload Allocation (WLA) Development

The first step in developing a permit limit is development of a wasteload allocation for the pollutant. A wasteload allocation is the concentration (or loading) of a pollutant that

the Permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. Wasteload allocations are determined in one of the following ways:

(a) TMDL-Based Wasteload Allocation

Where the receiving water quality does not meet water quality standards, the wasteload allocation is generally based on a TMDL developed by the State. A TMDL is a determination of the amount of a pollutant from point, non-point, and natural background sources, 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 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 (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 margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the allocation for point source.

The Boise River TMDL developed WLAs for total suspended solids and fecal coliform bacteria for sources that discharge directly to the Boise River.

(b) Mixing zone based WLA

Where the state authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutant and the water quality criteria. The mass balance equation is the same as that used to calculate reasonable potential, with the acute or chronic criterion substituted for C_d and the WLA substituted for C_e .

Because acute aquatic life and chronic aquatic life apply over different time frames and may have different mixing zones, it is not possible to compare them directly to determine which criterion results in the most stringent limits. The acute criteria are applied as a one-hour average and may have a smaller mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone. To allow for comparison, the acute and chronic WLAs are statistically converted to a long-term average WLAs. The most stringent long-term average WLA is used to calculate the permit limits. When the State authorizes a mixing zone for the discharge, the WLA is calculated by using a simple mass balancing

equation. The equation takes into account the available dilution provided by the mixing zone, and the background concentrations of the pollutant.

(c) “End-of-Pipe” WLA

In some cases, there is no dilution available, either because the receiving water exceeds the criteria or because the state has decided not to authorize a mixing zone for a particular pollutant. When there is no dilution, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee does not contribute to an exceedence of the criteria. As with the mixing-zone based WLA, the acute and chronic criteria must be converted to long-term averages and compared to determine which one is more stringent. The more stringent WLA is then used to develop permit limits.

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

D. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability (through the CV), sampling frequency, and the difference in time frames between the monthly average and daily maximum limits.

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there is not enough data to calculate a CV, EPA assumes a CV of 0.6 for both monthly average and daily maximum calculations. Appendix D contains the permit limit calculation for total residual chlorine.

Water Quality-Based Effluent Limits

(a) Floating, Suspended or Submerged Matter

Idaho state water quality standards require surface waters of the state to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. A condition of the permit requires that there shall be no discharge of floating solids or visible foam in other than trace amounts.

(b) Excess Nutrients

The Idaho state water quality standards require surface waters of the state be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. The Boise River has been listed as water quality limited for nutrients. There was insufficient information to adequately address nutrients in the Boise River TMDL. Therefore, the nutrient portion of the TMDL has been deferred to the year 2001. Monitoring for nutrients has been incorporated into the draft permit to help gather information to support the development of the TMDL.

(c) Sediment/TSS

The Boise River is listed as water quality limited for sediment. The Boise River TMDL assigned wasteload allocations to point sources that discharge directly to the Boise River. The following wasteload allocations for total suspended solids (TSS) were assigned to the City of Middleton:

Average Monthly Limit: 1070 lbs/day
Average Weekly Limit: 1605 lbs/day

(d) Fecal Coliform Bacteria

The Boise River is listed as water quality limited for bacteria. The Boise River TMDL assigned wasteload allocations to point sources that discharge directly to the Boise River. The following wasteload allocations for fecal coliform bacteria were assigned to the City of Middleton:

May 1 - September 30

Average Monthly Limit: 50 colonies/100 ml
Average Weekly Limit: 100 colonies/100 ml
Maximum Daily Limit: 500 colonies/100 ml

October 1 - April 30

Average Monthly Limit: 100 colonies/100 ml

Average Weekly Limit: 200 colonies/100 ml
Maximum Daily Limit: 800 colonies/100 ml

(e) Total Residual Chlorine

The Idaho state water quality standard for total residual chlorine for protection of aquatic life (IDAPA 16.01.02.250.02.a.iii) is 0.019 mg/l (19 $\mu\text{g/l}$) measured as a one-hour average concentration and 0.011 mg/l (11 $\mu\text{g/l}$) measured as a four-day average concentration. When reasonable potential was found for this parameter, the criteria were converted to daily maximum and monthly average permit limits of 0.067 mg/l (67 $\mu\text{g/l}$) and 0.048 mg/l (48 $\mu\text{g/l}$), respectively. Appendix D contains the permit limit calculation for total residual chlorine.

The analytical method used to measure total residual chlorine must be an EPA approved method in accordance with 40 CFR § 136 and achieve a *minimum level* of 0.1 mg/l (100 $\mu\text{g/l}$). Minimum level is defined as the lowest concentration of a particular pollutant that gives recognizable signals and an acceptable calibration point. The minimum level is different from the *method detection limit* which is defined as the minimum concentration that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The proposed average monthly and maximum daily limits for chlorine are below the minimum level of 0.1 mg/l (100 $\mu\text{g/l}$). As a result, the permittee will be considered in compliance with the permit limits when the measured values are below 0.1 mg/l (100 $\mu\text{g/l}$).

(f) pH

The Idaho state water quality standards require surface waters of the state to have a pH value within the range of 6.5 - 9.5 standard units.

(g) Temperature

The Boise River has been listed as water quality limited for temperature. However, the Boise River TMDL recommended that temperature limitations be deferred until other regulatory options (such as developing site specific criteria or doing a use attainability analysis) are explored.

In the interim, temperature monitoring has been incorporated into the draft permit to help gather information to help determine the effects of the facility's discharge to the Boise River.

(h) Ammonia

The Idaho state water quality criteria for ammonia are based on the pH and temperature of the receiving water. Currently, data does not exist to determine the appropriate criteria for ammonia. The draft permit will require pH, temperature, and ammonia to be monitored in the effluent and ambient water so that, when the permit comes up for reissuance, data will be available to determine if the effluent is causing or contributing to an exceedance of the water quality standards for ammonia.

(i) Dissolved Oxygen

The Boise River TMDL determined that dissolved oxygen is not a pollutant of concern in the Boise River.

APPENDIX D
Water Quality-based Effluent Limit Calculation for Total Residual Chlorine

This section describes the process of how EPA determined reasonable potential for total residual chlorine and how the effluent limits were calculated. The calculations were performed according to procedures outlined in Chapter 5 of the TSD.

EPA used the following assumptions:

1Q10 = 28.1 cfs (based on USGS data from 1975 to 1996)

7Q10 = 61.75 cfs (based on USGS data from 1975 to 1996)

Mixing zone = 25% of Boise River (if State does not authorize use of mixing zone in its 401 Certification, the limit will be recalculated based on meeting water quality criteria at the point of discharge)

1. Reasonable Potential Determination

(a) Determine the appropriate water quality criteria

The water quality criteria is determined based on the use of the receiving water. The Boise River is protected for primary contact recreation, secondary contact recreation, cold water biota, salmonid spawning, and agricultural water supply. In water protected for aquatic life, the Idaho standards require that chlorine discharges not exceed 19.0 $\mu\text{g/l}$ measured as one hour (acute) average concentration and 11.0 $\mu\text{g/l}$ measured as a four-day (chronic) average concentration.

(b) Determine whether there is “reasonable potential” to exceed the criteria

There is RP to exceed water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation:

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

where,

C_d = receiving water concentration at the edge of the mixing zone

C_e = maximum projected effluent concentration (0.23 mg/l)

= maximum reported effluent concentration (0.23 mg/l) \times reasonable potential multiplier (1)

Q_e = maximum effluent flow (2.8 cfs)

C_u = upstream concentration of pollutant (0 mg/l)

Q_u = upstream flow (1Q10 for acute and 7Q10 for chronic)

$C_{d\text{-Acute}}$ = 0.07 mg/L (70 $\mu\text{g/l}$)

$C_{d\text{-Chronic}}$ = 0.04 mg/L (40 $\mu\text{g/l}$)

Both the acute and chronic values are greater than their respective criterion, therefore a total residual chlorine limit must be included in the permit.

2. Water Quality-based Effluent Limit Calculation

(a) Calculate a wasteload allocation

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

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

$$WLA_{acute} = 66.7 \text{ ug/l}$$

$$WLA_{chronic} = 71.6 \text{ ug/l}$$

(b) Convert the WLAs to Long Term Averages

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

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

- CV = coefficient of variation of the effluent concentration, standard deviation/mean (see below for discussion) = 0.23
- $\sigma^2 = \ln(CV^2 + 1) = 0.05$
- z = 2.326 for 99th percentile probability basis

$$LTA_{acute} = 66.7 \times 0.604 = 40.3 \text{ ug/l}$$

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

- CV = coefficient of variation of the effluent concentration (see below for discussion) = 0.23
 - $\sigma^2 = \ln(CV^2/4 + 1) = 0.013$
 - z = 2.326 for 99th percentile probability basis
- $$LTA_{chronic} = 71.6 \times 0.77 = 55.3 \text{ ug/l}$$

CV calculation = EPA has calculated a CV based on average monthly sampling from

1994 through 1998.

(c) Calculate Average Monthly and Maximum Daily Permit Limits

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

To derive the MDL and the AML for chlorine the calculations would be as follows:

$$\begin{aligned} MDL &= LTA_{acute} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,} \\ CV &= \text{coefficient of variation} = 0.23 \\ \sigma^2 &= \ln(CV^2 + 1) = 0.05 \\ z &= 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis} \\ MDL &= 40.3 \text{ ug/L} \times 1.65 = \mathbf{67 \text{ ug/l}} \end{aligned}$$

$$\begin{aligned} AML &= LTA_{acute} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,} \\ CV &= \text{coefficient of variation} = 0.23 \\ \sigma^2 &= \ln(CV^2/n + 1) = 0.013 \\ z &= 1.645 \text{ for } 95^{\text{th}} \text{ percentile probability basis} \\ n &= \text{number of sampling events required per month} = 4 \\ AML &= 40.3 \text{ ug/L} \times 1.2 = \mathbf{48 \text{ ug/l}} \end{aligned}$$

The AML and MDL calculated above have been incorporated into the draft permit.

APPENDIX E Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service regarding potential effects an action may have on listed endangered species.

In a letter dated February 11, 1999, the U.S. Fish and Wildlife Service identified the Gray wolf as being a federally-listed endangered species that may occur in the area of the discharge. There are no proposed or candidate species in the area of the discharge. In a letter dated February 9, 1999, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service stated that there are no listed endangered species within the Boise River basin.

EPA has determined that the requirements contained in the draft permit will not have an impact on the Gray wolf. Hunting and habitat destruction are the primary causes of the Gray wolf's decline. Issuance of an NPDES permit for the Star Water and Sewer District wastewater treatment plant will not result in habitat destruction, nor will it result in changes in population that could lead to increased habitat destruction. Furthermore, issuance of the NPDES permit will not impact the food sources of the Gray wolf.

EPA will provide USFWS and NMFS 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 reissuance of this permit.