

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Upper Yampa Water Conservancy District

Project No. 9202-160 – Colorado

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(September 15, 2009)

In accordance with the National Environmental Policy Act of 1969, as amended, and the Federal Energy Regulatory Commission's (Commission) regulations (18 CFR Part 380), the Office of Energy Projects has prepared an environmental assessment (EA) regarding Upper Yampa Water Conservancy District's (District) request for a non-capacity license amendment for the Stagecoach Project (FERC No. 9202) located on the Yampa River in Routt County, Colorado. The District requests Commission approval to amend the project's license to (1) increase the height of the project dam spillway's crest elevation by 4 feet, and (2) increase the maximum operating storage elevation of Stagecoach Reservoir by 4 feet. This would increase the maximum storage capacity in Stagecoach Reservoir from 33,275 acre-feet to 36,460 acre-feet, and increase the project's potential for increasing downstream water supply. This EA concludes that the proposed license amendment, with staff's recommended mitigation measures, would not constitute a major federal action significantly affecting the quality of the human environment.

Any comments should be filed within 30 days from the date of this notice and should be addressed to Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426. Copies of the EA are available for review in the Commission's Public Reference Room. The EA also may be viewed on the Commission's web site at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number (P-9202) in the docket number field to access the document. For assistance, please contact ferconlinesupport@ferc.gov or call toll-free at (866) 208-3676. For TTY, contact (202) 502-8659.

For further information regarding this notice, please contact B. Peter Yarrington at (202) 502-6129, or via email at peter.yarrington@ferc.gov.

Kimberly D. Bose,
Secretary.

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ENVIRONMENTAL ASSESSMENT
NON-CAPACITY AMENDMENT OF LICENSE

Stagecoach Hydroelectric Project
Project No. 9202
Colorado



Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, N.E.
Washington, DC 20426

September 2009

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LIST OF ACRONYMS

APE	area of potential effects
BA	biological assessment
BLM	U.S. Bureau of Land Management
BOR	U.S. Bureau of Reclamation
BO	biological opinion
BOD	Biological Oxygen Demand
°C	degrees Celsius
Colorado DOW	Colorado Department of Wildlife
Colorado DPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission or FERC	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CR	Routt County Route
D2SI	Division of Dam Safety and Inspections
DO	dissolved oxygen
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FERC Form 80	Licensed Hydropower Development Recreation Report
FWS	U.S. Fish and Wildlife Service
licensee or UYWCD	Upper Yampa Water Conservancy District
mg/L	milligrams per liter
msl	mean sea level
NHPA	National Historic Preservation Act
National Register	National Register of Historic Places
NRCS	Natural Resources Conservation Service
SHPO	State Historic Preservation Officer
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UYWCD or licensee	Upper Yampa Water Conservancy District
WQC	Water Quality Certification

SUMMARY

On December 4, 2008, Upper Yampa Water Conservancy District (licensee) filed a proposal to amend the license for the Stagecoach Project, located on the Yampa River in Colorado, to raise the height of the dam spillway crest by 4 feet, thereby raising the maximum pool elevation of Stagecoach Reservoir by 4 feet, from 7,200 feet mean sea level (msl) to 7,204 feet msl. This would increase the reservoir's maximum storage capacity from 33,275 acre-feet to 36,460 acre-feet. The increase in reservoir elevation would increase the reservoir surface area from 771 to 819 acres, an increase of 48 acres.

The additional reservoir capacity would increase the ability to store high springtime flows, which would increase water availability to meet current and future demands for irrigation, municipal and industrial purposes. The additional capacity would also benefit recreation at Stagecoach State Park and surrounding areas and benefit downstream fish and wildlife through retention of water for releases during low-flow periods.

Power at the Stagecoach Project is generated during planned reservoir releases. The proposal would not affect the project's peak generation capacity, which is limited by the project's 800-kilowatt generator. However, it would allow more efficient generation over longer periods of time.

The proposed work has the potential, through erosion, sedimentation, and water contamination, to affect water quality in the reservoir and downstream in the Yampa River. The licensee proposes to address such possible impacts through the use of standard water quality protection measures, such as the use of silt fences, hay bales, and diversion dikes. The licensee would also temporarily lower the reservoir level to avoid construction at the dam in the wet. The licensee has applied for a Section 401 water quality certification from the state, and would comply with the conditions in the certificate that is issued. It would also comply with conditions in the Section 404 permit that is expected to be issued by the U.S. Army Corps of Engineers (Corps) to protect water quality and wetlands. To help coordinate erosion and sedimentation control measures and protect aquatic and terrestrial resources, staff recommends in this environmental assessment (EA) that the licensee file, for Commission approval and prior to the start of any ground-disturbing work, a Comprehensive Erosion and Sediment Control Plan, and a Drawdown, Refill and Flow Release Plan.

The majority of the measures proposed to protect aquatic and terrestrial resources during operation at the increased reservoir elevation are assembled in a Wildlife Mitigation Plan, which was written in agreement with the Colorado Department of Wildlife (Colorado DOW). The Wildlife Mitigation Plan includes measures to protect dissolved oxygen (DO) concentrations in the Yampa River, through installation of a boulder aeration structure to be located immediately downstream of the project. To help ensure the successful enhancement to post-construction downstream water quality, staff

recommends that the licensee file a Boulder Aeration Structure Installation Plan at least 90 days prior to installation, and, within 90 days of installation and the completion of all construction, a Boulder Aeration Structure Completion Report.

The licensee currently monitors and records DO concentrations and water temperatures daily, and proposes to continue the monitoring during and after construction. However, Staff notes that the Commission required, through an order issued December 12, 2008,¹ that any amendment regarding an increase in reservoir levels at the Stagecoach Project include the installation of continuous temperature and DO monitoring equipment. The licensee did not include such provisions in its amendment request. Therefore, staff recommends that the installation of continuous water quality monitoring equipment be required, with completion within 60 days of the proposed construction, and that the licensee file a Continuous Water Quality Monitoring Report and Plan within 90 days of construction completion.

Although the northern pike population in Stagecoach Reservoir has created a popular pike fishery, these fish prey upon trout in the reservoir, and, through escapement past the dam, pose a threat to federally-listed threatened and endangered fish populations further downstream in the Yampa River. An increase in reservoir level could create more shallow-water habitat for pike in the reservoir, and could allow for increases in downstream escapement. Through measures identified in its Wildlife Mitigation Plan, the licensee addresses these issues. The licensee would also consult with the U.S. Fish and Wildlife Service (FWS) and the Colorado DOW concerning further measures, and necessary studies, if needed.

Approximately 16 acres of wetlands could be impacted by the proposed 4-foot raise in maximum reservoir level, primarily at the upstream end of the reservoir. The licensee's Wildlife Mitigation Plan includes measures to mitigate effects to wetlands, including the construction of a 7.1-acre wetland area. Also, as mentioned above, the licensee would comply with wetland mitigation conditions identified by the Corps. To help ensure that all wetland mitigation measures are clearly addressed, staff recommends in this EA that the licensee file, for Commission approval, a Wetland Mitigation and Monitoring Plan that is separate from the Wildlife Mitigation Plan. The Wetland Mitigation Plan should include criteria to be used in measuring wetland mitigation success, and also contingency plans to be implemented if mitigation is not successful. Similarly, to help ensure the success of the mitigation measures included in the Wildlife Mitigation Plan, staff recommends that that plan be amended to include post-construction monitoring and adaptive management elements to help ensure mitigation success. Staff is recommending that both plans include identification of any proposed mitigation areas that may be outside the project boundary, as mapped in the licensee's July 29, 2009 filing

¹ Order Approving Modification of Water Quality Monitoring Schedule and Requiring Continuously Recording Water Quality Monitoring System under Article 408, issued December 12, 2008. 125 FERC ¶ 62,246.

with the Commission, and include, if necessary, a schedule for filing a revised project boundary for Commission approval.

To help ensure that effective consultation occurs with the resource agencies as described in the licensee's proposal, and to keep the Commission informed of the status of resource protection and mitigation measures, staff recommends that the licensee file annual reports with the Commission summarizing relevant resource agency consultation.

This EA reviews information on four federally-listed fish species found downstream of the Stagecoach Project in the Yampa River. Because the proposal would cause some changes in flows released to the Yampa River, and could also affect the escapement of predacious northern pike, the licensee worked with the FWS prior to filing its amendment proposal with the Commission. The Commission filed a biological assessment (BA) with the FWS, dated April 7, 2009, with a request for formal consultation under the Endangered Species Act. As part of the consultation, the FWS has asked the licensee to become a signatory to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River. The FWS is expected to file a biological opinion (BO) with the Commission in response to the BA in the near future. Any mandatory conditions identified in the BO would be made requirements of the Stagecoach Project license.

The Stagecoach Reservoir is a popular recreation area which has been designated a state park, and provides fishing, boating, swimming, sightseeing, and other recreation opportunities. The licensee's proposal to raise the maximum elevation of the reservoir would impact recreation access facilities at the reservoir. The licensee proposes to reduce construction impacts by starting construction activities after the summer recreation season has ended. To further reduce any impacts to recreation, staff recommends that, prior to any construction-related drawdowns, the licensee file, prior to any construction drawdowns outside of the normal reservoir level seasonal range, for Commission approval, an Informational Signage and Underwater Hazard Survey Plan. The plan would include identification of access areas around Stagecoach Reservoir that would be posted with informational signs concerning water levels, access issues and identification of alternate access areas, the potential for boating obstructions, and a contact for further information. The plan would also indicate how any boating hazards created by drawdowns would be marked to warn boaters.

On the basis of our independent analysis, construction and operation at the Stagecoach Project as proposed by the licensee in its amendment request, utilizing the licensee's proposed mitigation measures and the staff-recommended measures described in this EA, would cause at most minor, primarily temporary, adverse impacts to environmental resources, and would cause no material adverse impacts to water quality. Approval of the licensee's amendment request, with the recommended mitigation measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission Office of Energy Projects Division of Hydropower Administration and Compliance

Stagecoach Hydroelectric Project FERC Project No. 9202 Colorado

1.0 APPLICATION

Application Type: Non-Capacity Amendment of License
Date Filed: December 4, 2008, supplemented June 15, 2009
Applicant's Name: Upper Yampa Water Conservancy District
Water Body: Yampa River
County and State: Routt County, Colorado
Federal Lands: The project does not occupy any federal lands

2.0 PURPOSE AND NEED

On December 4, 2008, the Upper Yampa Water Conservancy District (UYWCD or licensee) filed its Application for a Non-Capacity Related Amendment of Minor Hydropower License. The licensee requests an amendment of the March 31, 1987 project license² in order to raise both the height of the spillway crest and the normal maximum operating elevation of Stagecoach Reservoir by 4 feet, from 7,200 feet mean sea level (msl) to 7,204 feet msl. This would enlarge the reservoir's storage capacity from 33,275 acre-feet to 36,460 acre-feet, thereby increasing potential storage for downstream water supply. The proposed increase in normal maximum reservoir elevation would increase the surface area of the reservoir from 771 to 819 acres, an increase of 48 acres.

² 38 FERC ¶ 62,343, Order Issuing License and Dismissing Competing Preliminary Permit Applications (March 31, 1987).

The licensee states in its application that it is requesting the amendment for the following reasons.

- The existing storage capacity of the Yampa River Basin water supply is inadequate to meet both existing and future water needs in the region.
- The enlargement of Stagecoach Reservoir would allow recreational use to continue if not to slightly increase.
- The greater water storage capacity and the ability to produce additional hydroelectric power during periods when the demand for electricity is also high would be expected to enhance base flow levels critical for threatened and endangered fishes found downstream of the project in the Yampa River.
- The additional head of water would result in power being generated over a longer period of time and also more efficiently. The licensee estimates that the enlargement of Stagecoach Reservoir would result in the generation capacity being increased by about 6 percent, or by approximately 300,000 kilowatt-hours.
- As passed by the 2005 legislature, House Bill 05-1177, entitled “Colorado Water Supply for the 21st Century Act” requires state and local water districts to assemble the data collected in connection with the “Colorado Statewide Water Supply Initiative” requirements passed by the 2003 legislature, “develop a basin-wide consumptive and non-consumptive water supply needs assessment, conduct an analysis of available unappropriated waters with the basin, and ... propose projects or methods for meeting those needs.” The licensee states that enlargement of Stagecoach Reservoir would put the licensee in compliance with these state laws.

Staff notes that the Colorado Statewide Water Supply Initiative, as more fully described in the environmental report filed with the licensee’s amendment request, notes that water conservation, as opposed to additional water storage, cannot meet all of the state’s future water needs, and that to supply the needed water, additional storage projects have to be constructed. Among the projects listed for the Yampa River Basin is the enlargement of Stagecoach Reservoir.

To determine effects or impacts and identify any environmental measures that may be necessary as a result of increasing the project’s reservoir level, Commission staff prepared this environmental assessment (EA), which describes and evaluates probable environmental effects and impacts of the proposed action, and a no-action alternative.

3.0 PROJECT DESCRIPTION AND OPERATION

The Stagecoach Project is located on the Yampa River, in Routt County, Colorado, about 16 miles south of Steamboat Springs (Figure 1). The project consists, in pertinent part, of: (1) a 140-foot-high, 450-foot-long roller-compacted concrete dam, with a crest elevation of 7,210 feet msl, and parapet walls on the crest at 7,213.5 feet msl; (2) a 55-foot-wide ogee spillway located in the center of the dam with a crest at elevation of 7,200 feet msl and a stepped face on the downstream side; (3) a multi-purpose reservoir (Stagecoach Reservoir) which has a surface area of about 771 acres, with storage of about 33,275 acre-feet at a normal maximum operating reservoir elevation of 7,200 feet msl; (4) a stilling basin at the base of the spillway; (5) a 14.67-foot by 14.67-foot reinforced concrete intake tower with multi-level openings controlled by three 6-foot by 6-foot slide gates with invert elevations at 7,182 feet, 7,157 feet and 7,085 feet, respectively, and a 6-foot by 8-foot slide gate at the base for the penstock inlet; and (6) a 40-foot by 40-foot powerhouse housing a single, horizontal-shaft Francis turbine-generator unit with an installed capacity of 800 kilowatts. The reservoir provides water for municipal and agricultural use, recreation, and hydropower generation.

The Stagecoach Project is generally operated as a run-of-river facility, with power generated using the planned and required reservoir releases. Commitments to provide water for irrigation, municipal, and industrial purposes, and to provide flows to protect the downstream trout fishery, are permitted to be stored and released. Typically, the reservoir is filled with snowmelt and runoff in the spring and early summer, with the reservoir generally reaching its peak storage in June of each year. Starting in July and continuing into the winter months, water is released in excess of the inflow, drawing the reservoir down to its low level, typically occurring in March of each year. Historic data show yearly drawdowns of about 8 to 10 feet.

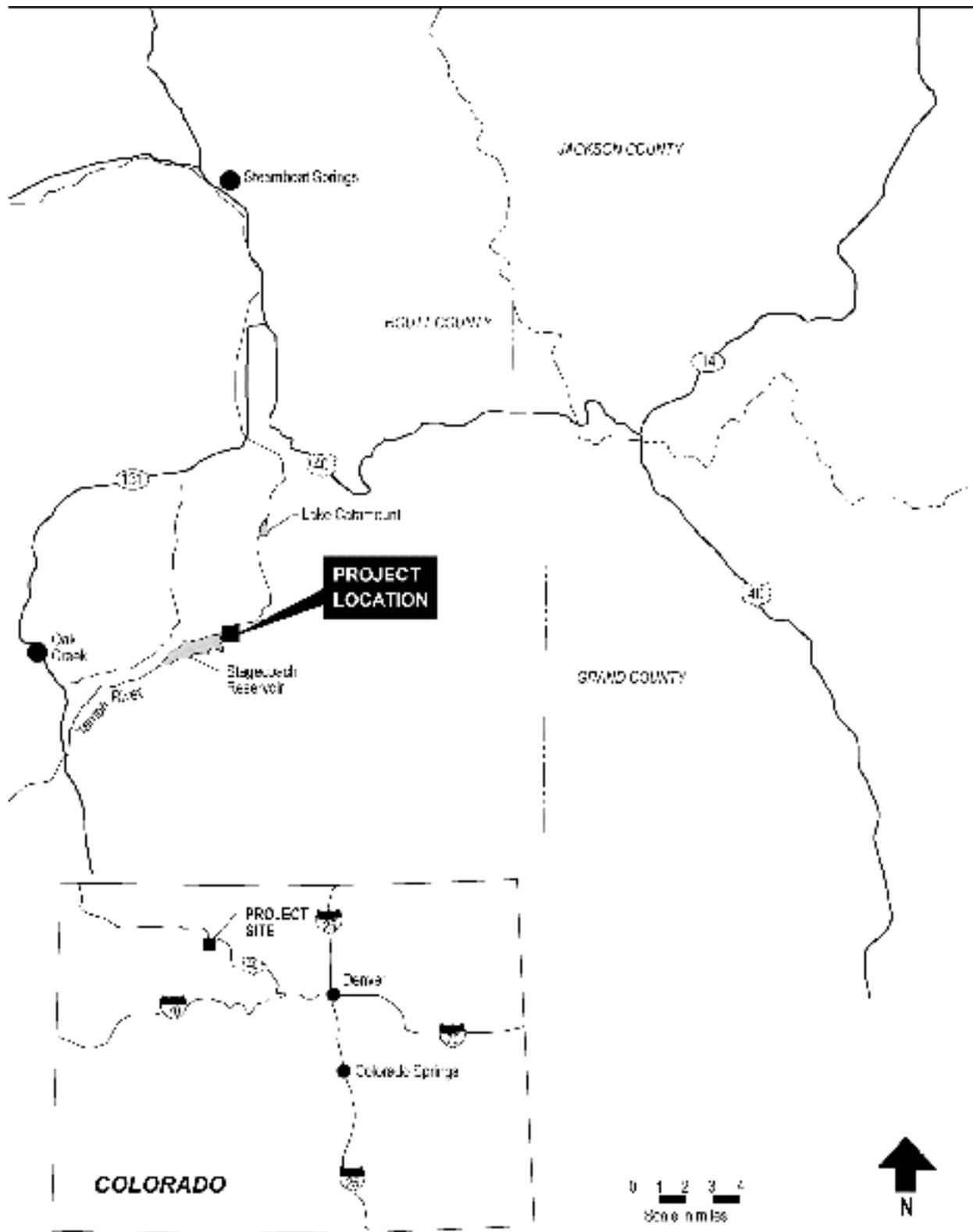


Figure 1. Stagecoach Project Location Map (Source: UYWCD, 2008, as modified by staff)

Pursuant to the project license, the licensee releases a minimum flow from the project that is determined by time of year. A minimum flow of 40 cubic feet per second (cfs), or the flow into the reservoir (whichever is less), is required between December 1 and July 31, and a minimum flow of 20 cfs is required from August 1 to November 30. Generally, minimum flows are exceeded substantially to meet water commitments and generate power. During droughts, power generation is reduced, and downstream water commitments and minimum flow requirements determine discharge. Flow in and out of the reservoir is measured at upstream and downstream U.S. Geological Survey (USGS) gaging stations (Figure 2).

4.0 PROPOSED ACTION AND ALTERNATIVES

4.1 PROPOSED ACTION

The licensee proposes to raise both the height of the spillway crest and the normal maximum operating elevation of Stagecoach Reservoir by 4 feet, from 7,200 feet msl to 7,204 feet msl. This would enlarge the reservoir's storage capacity from 33,275 acre-feet to 36,460 acre-feet. The proposed increase in reservoir surface elevation would increase the surface area of the reservoir from 771 to 819 acres, an increase of 48 acres.

The proposal would not affect the project's peak generation capacity, as it is limited to the 800 kilowatt capacity of the existing generator. However, the additional head of water would result in power being generated over a longer period of time, and more efficiently. The licensee estimates that the enlargement of Stagecoach Reservoir would result in the generation capacity being increased by about 6 percent, or by approximately 300,000 kilowatt-hours.

4.1.1 General Description of Construction

Primary construction activities included in the licensee's proposed action are as follows: (1) raising the spillway crest by constructing a cast-in-place, concrete-reinforced, ogee spillway on top of the existing spillway crest; (2) modifying the upper gate of the intake tower so that the upper gate takes water from 4 feet higher in the reservoir, to match the increased reservoir elevation; (3) placing a boulder aeration structure downstream in the Yampa River within 250 feet of the stilling basin to aerate flow releases; (4) modifying recreation facilities that would be impacted by the increase of the normal maximum reservoir elevation; and (5) removing shoreline vegetation between elevations of 7,200 feet msl and 7,204 feet msl.

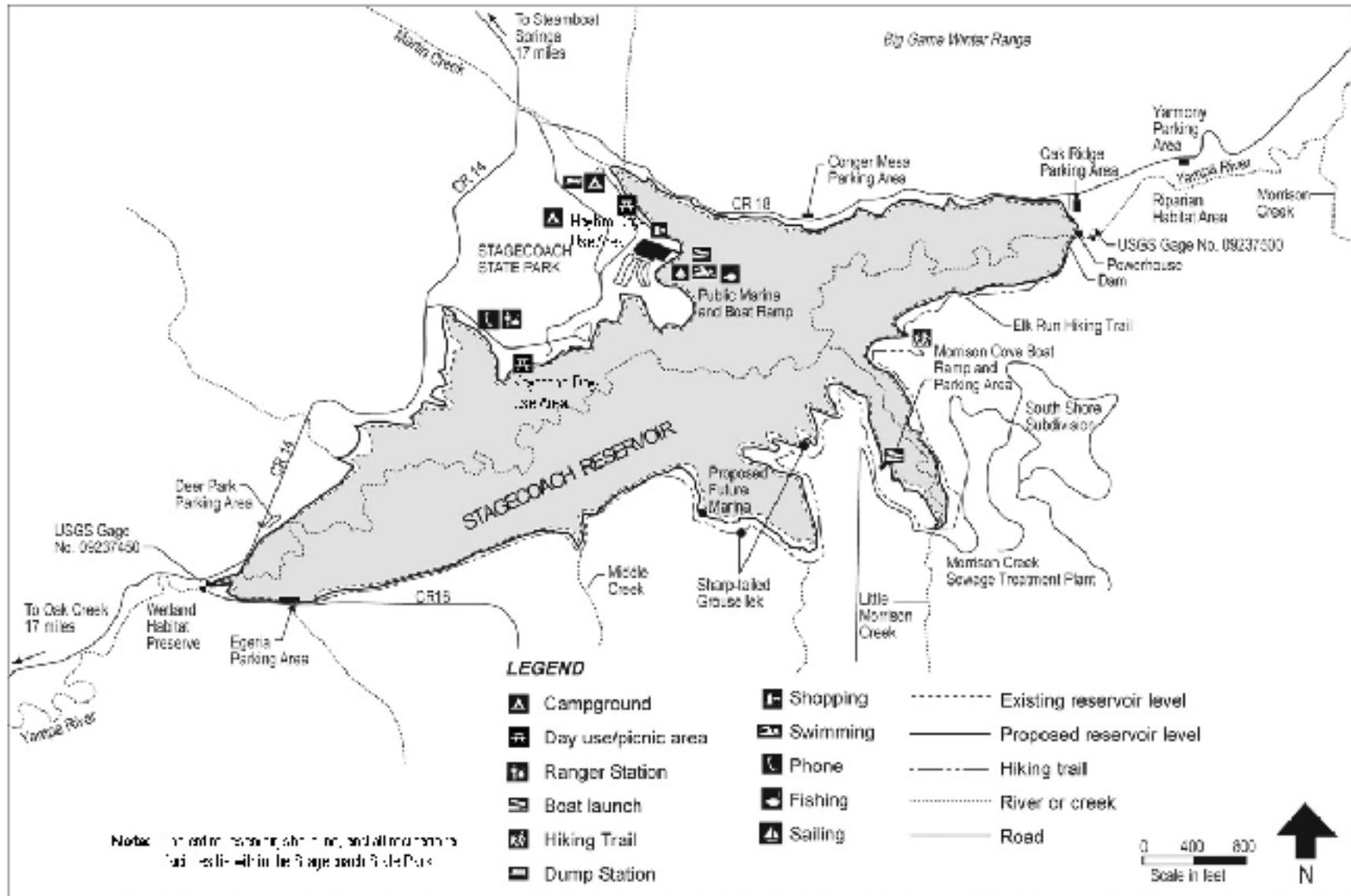


Figure 2. Stagecoach Project Facilities (Source: UYWCD, 2008, as modified by staff)

4.1.2 Modification to Project Facilities

Reconstruction of Spillway Crest

The project spillway is a 55-foot-wide uncontrolled ogee spillway, with an uncontrolled crest at an elevation of 7,200 feet msl. It is located in the center section of the dam. It has a stepped downstream face, and discharges to a stilling basin at the toe of the spillway and adjacent to the powerhouse.

The reconstruction of the spillway crest would involve the removal of the upper 5.5 feet of the existing reinforced concrete spillway crest (down to elevation 7,194.5 feet msl), and preparation for construction of a new cast-in-place, reinforced concrete ogee crest.

The new spillway crest would be at elevation 7,204 feet msl, which is 4 feet higher than the existing crest. The higher crest elevation would allow for a higher maximum reservoir level under normal operating conditions. The higher crest elevation would also functionally reduce the capacity of the spillway on the crest of the dam, and allow, at higher flows, overtopping of the parapet walls to either side of the spillway. The parapet walls are at an elevation of 7,213.5 feet msl. Overtopping would occur at an estimated flow of 6,440 cfs, which is approximately 4,530 cfs lower than would be necessary for overtopping with the current configuration.

Construction work would likely involve concrete jackhammers, concrete drills, torches to cut reinforcing bars, bucket loaders, dump trucks, concrete trucks, and other associated heavy equipment. Access to the site is currently available, but material and equipment storage areas may require temporary removal of vegetation and grading.

Modification of the Intake Tower Upper Gate

The existing outlet works consist of a reinforced concrete intake tower, a concrete-encased welded-steel penstock located at the base of the dam with a bifurcation that directs water to the turbine and to a jet-flow gate. The intake tower is a 14.67-foot by 14.67-foot square reinforced concrete structure founded on bedrock, and anchored to the upstream face of the dam. The tower has multi-level openings controlled by three 6-foot by 6-foot slide gates with invert elevations at 7,182, 7,157, and 7,085 feet msl. There is also a 6-foot by 8-foot slide gate at the base of the tower, which serves as a guard gate for the penstock. All of the intake tower gates are protected with trashracks and are operated from the dam crest.

The licensee proposes to install a structure on the intake tower to enable the upper gate to draw water from a higher elevation based on the increased reservoir elevation. The structure would create a bulkhead approximately 3.5 feet upstream of the upper gate

that would allow water to enter from above the existing gate opening. A new intake opening and trashrack would be installed above the bulkhead.

4.1.3 Construction of Boulder Aeration Structure

To enhance downstream dissolved oxygen (DO) levels, the licensee proposes to design and install, after approval from the Colorado Department of Wildlife (Colorado DOW), a boulder aeration structure within 250 feet below the powerhouse and stilling basin. This structure would be made up of large boulders, approximately 4 feet in diameter, and would span the width of the river immediately below the stilling basin. Boulders would be placed in the streambed at a 2 to 7 percent slope to allow for rapid aeration of project discharge. The licensee proposes to install the structure either prior to, or simultaneously with, modifications to the dam.

It would be feasible to place the boulders with a crane if there was sufficient access and room to swing the crane boom. Some site preparation may be required to accommodate boulder placement, including, but not limited to, development of a temporary access road, boulder stockpile site, and minor clearance of vegetation to accommodate crane operation.

4.1.4 Construction at Recreation and Wetland Areas

Stagecoach Reservoir and the existing recreation facilities located around the reservoir are leased to the state of Colorado to be operated and maintained by Colorado State Parks as Stagecoach State Park. Recreational facilities within Stagecoach State Park that would be affected by the 4-foot raise in reservoir elevation would be relocated at the same time that the work at the spillway was being performed, with work being completed prior to the following spring recreation season. Wetland mitigation would involve, in part, the construction of a 7.1-acre wetland/waterfowl mitigation area on the north side of the reservoir. Details regarding the proposed recreation and wetland work are provided under sections 4.1.7.3, Wetland Mitigation, and 4.1.7.5, Recreation Mitigation.

4.1.5 Shoreline Clearing

Vegetation immediately surrounding project facilities may need to be cleared to allow large construction equipment to access the project dam and spillway. However, since most of the land immediately surrounding the project is open, only a limited amount of vegetation would be involved. If vegetation is removed, no pesticides or other chemicals would be used before or after construction.

It is expected that the majority of this work would involve the use of chainsaws, handsaws, and pruning shears. It is expected that cut trees and other removed vegetation would be either disposed of upslope on licensee-owned lands, or removed by boat, barge,

or other means and disposed of at a licensed disposal facility elsewhere. Construction access would likely be from land or from a boat or barge.

4.1.6 Drawdown and Construction Schedule

The licensee proposes that construction commence in late August 2010 and continue through November 2010. The licensee intends to avoid constructing in the wet by drawing down the reservoir level down below the normal seasonal levels. Based on a mean August inflow of 70 cubic feet per second (cfs) and power plant discharge of 109 cfs, the reservoir could be lowered about 0.6 feet by the first of September if the drawdown were to commence in the latter half of August. Based on September mean flows, the reservoir could be lowered an additional one foot every 10 days. The licensee estimates that actual construction would begin with the reservoir drawn down about two feet, approximately in mid-September. The total depth of drawdowns necessary to complete the proposed construction was not identified.

During the period in which the reservoir would be drawn down for construction, the licensee would also construct the boulder aeration structure downstream in the Yampa River, and perform the proposed mitigation measures for wetlands and recreation facilities. Construction of these measures would be completed by the following spring recreation season. The exact length of time needed would be a function of the inflow to the reservoir and the operation of the powerhouse, both of which would control the rate of reservoir drawdown.

4.1.7 Proposed Resource Protection Measures

The licensee included a Wildlife Mitigation Plan with its application. The Wildlife Mitigation Plan is an agreement between the licensee and the Colorado DOW that includes specific measures to avoid, minimize, and mitigate possible impacts to water quality, fisheries, wetlands, and wildlife. The licensee also proposes measures to protect recreation at the project. The measures regarding water quality, fisheries, wetlands, wildlife, and recreation are summarized below.

4.1.7.1 Water Quality Protection

To reduce any potential for adverse effects to water quality in Stagecoach Reservoir and in the Yampa River downstream, the licensee proposes the following measures.

1. Apply to the Colorado DPHE for a Water Quality Certification, and comply with the certification's terms and conditions.
2. Design and install a structure on the upper gate of the project intake tower to effectively raise the invert of the upper gate by 4 feet, to match the

proposed increase in reservoir surface elevation. This structure would be installed as part of the construction process for the new spillway crest.

3. Design, with input and approval from the Colorado DOW, and install a boulder structure within 250 feet below the stilling basin to accelerate aeration of flows and increase downstream DO concentrations.
4. Continue to monitor discharge water DO and temperature and maintain both at required levels downstream. In the Yampa River, DO levels of at least 4.0 milligrams per liter (mg/L), with a target level of 6.0 mg/L, must be maintained at all times, and DO levels of at least 6.0 mg/L must be maintained. Water temperatures of between 12 and 16 degrees Celsius must be maintained at the stilling basin from July 1 through September 30 annually. The licensee would submit monthly reports on its water quality monitoring to the Colorado DOW.
5. Implement requirements identified by the Routt County Department of Health, including, if necessary, relocation of the existing vault restrooms located at: (1) the Wetland Habitat Preserve off CR 16; (2) the parking lot off CR 14; and (3) the parking lot at the Little Morrison Creek boat ramp off CR 18A. If any relocation is deemed unnecessary, the licensee would notify the Colorado DOW in writing that their surveys determined that the proposed increased reservoir level would not adversely affect the integrity of the restroom at the specific location. If relocation is deemed necessary, the work would be performed prior to the reservoir being refilled above an elevation of 7,200 feet msl.
6. Install temperature sensors at each gate opening to monitor reservoir stratification after construction is complete and the reservoir has been filled to elevation 7,204 feet msl.
7. Coordinate with the resource agencies to help guide future release strategies.

4.1.7.2 Northern Pike Control

In order to reduce northern pike reproduction in the reservoir and reduce pike escapement from Stagecoach Reservoir and their movement downstream in the Yampa River into the critical habitat of federally-listed fishes, the licensee proposes the following conservation measures, included in the Commission's biological assessment (BA) submitted to the U.S. Fish and Wildlife Service (FWS) on April 7, 2009:

1. Prevent northern pike from using the wetland/waterfowl mitigation area proposed for the north side of the reservoir for spawning/rearing habitat by

installing a gravel filter or grate at its entrance, prior to filling the reservoir above 7,200 feet msl.

2. Further prevent northern pike from using the wetland/waterfowl mitigation area for spawning/rearing habitat by installing a barrier in the existing 4-foot diameter culvert pipe under CR 16. The barrier would have no openings greater than 1 ¼ inch and would also be installed prior to filling the reservoir above 7,200 feet msl.
3. Reduce the amount of available shoreline spawning/rearing habitat during the initial years of operation at the new maximum reservoir elevation by clearing any remaining shoreline vegetation up to the new normal high water line.
4. Limit near-shore northern pike spawning habitat, and reduce the potential for pike escapement through spill, by operating the reservoir to reduce spill in the spring.
5. Develop revised escape minimization measures, if necessary. The Colorado DOW is currently implementing a 5-year northern pike control program effort to control northern pike at Lake Catamount, downstream of the Stagecoach Reservoir on the Yampa River. If, at the end of the 5-year program, it is determined that the control program is not effective, and significant numbers of northern pike are traveling downstream into the critical habitat of federally-listed fishes, including documented escapement from Stagecoach Reservoir, the licensee would develop and implement revised escapement minimization measures in consultation with the Colorado DOW and the FWS. Any revised escapement minimization measures would be developed and implemented no later than June 30, 2015.
6. Participate financially in studies to determine the escapement of northern pike from Stagecoach Reservoir. The licensee would coordinate with the Colorado DOW to determine the appropriate financial contribution level, not to exceed \$5,000 per year or \$10,000 for the escapement studies. The Colorado DOW would approve the type of studies to be conducted. The funding would be available from the date of the agreement until June 30, 2015.
7. Conduct an annual spring meeting in early March to review the licensee's operations to minimize reservoir spilling. The licensee, Colorado DOW, and FWS would review and evaluate northern pike control efforts, northern pike escapement studies, and the status of northern pike in the Yampa River. Additional measures to address northern pike control and/or

northern pike escapement from the reservoir may be necessary and would be supported by the licensee.

In the BA, which was drafted by the licensee and adopted by the Commission, it is noted that northern pike management in the Yampa River system is a very dynamic process. As a result, the licensee acknowledges that additional measures may be requested as a result of future studies and findings.

4.1.7.3 Wetland Mitigation

The proposed action would inundate some wetland areas that are valuable to wildlife. To mitigate this loss, the licensee proposes the following measures:

1. Design and construct, with Colorado DOW input and approval, a 7.1-acre wetland/waterfowl mitigation area between CR 14 and the reservoir in the upland area located between Stagecoach State Park's parking area north of the reservoir inlet and the state park near the park headquarters. The slope of the constructed wetland would not have a slope greater than 3:1. The created wetland would be intended to provide a suitable area for waterfowl production that would replicate the wetland south of CR 16 that would be inundated by the proposed increase in reservoir level.
2. Salvage the mature willow plants at the reservoir inlet and use them as part of on-site wetland mitigation efforts. If the licensee has excess willows available from this salvage effort, it would provide them to the Colorado DOW for use in other wetlands and/or stream bank restoration efforts. All vegetation harvesting would be conducted prior to the reservoir being filled above an elevation of 7,200 feet msl.
3. Work cooperatively with the Colorado DOW and Stagecoach State Park to implement seasonal restrictions to the remaining wetlands in the Wetland Habitat Preserve to protect sandhill cranes.
4. Work with the Colorado DOW to explore alternatives to enhance sandhill crane habitat elsewhere in the Stagecoach Project area.

In addition to these measures included in the Wildlife Mitigation Plan, the licensee would consult with the U.S. Army Corps of Engineers (Corps) on a Section 404 permit, to include as necessary off-site wetland mitigation monitoring schedules, and any contingency plans.

4.1.7.4 Wildlife Mitigation

The proposed action would inundate some areas currently used as leking habitat by sharp-tailed grouse.³ To mitigate this loss, the licensee would perform the following measures, as described in the Wildlife Mitigation Plan.:

1. Implement a vegetation manipulation plan, with Colorado DOW input and approval, that would increase visibility of mating birds at leking locations. Vegetation manipulation would be done through strategic mowing and/or burning. All vegetation manipulation would be conducted prior to the reservoir being filled above an elevation of 7,200 feet msl.
2. Seed all disturbed upland areas with a sharp-tailed grouse-friendly seed mixture, which would be preapproved by the Colorado DOW. All seeding would be done concurrent with those activities creating the disturbances.
3. Conduct an annual spring meeting in early March to review the licensee's operations to minimize reservoir spilling, which could result in the reservoir filling later in the runoff season. Postponing reservoir fill would likely benefit breeding grouse on the two leks that would be inundated by the raise.
4. Mitigate any loss of elk wintering habitat by continuing to honor the closure of CR 18 from the dam to entrance of Stagecoach State Park from January 1 to March 31 annually.

4.1.7.5 Recreation Mitigation

The licensee proposes to mitigate impacts to recreation at Stagecoach State Park through the following measures:

1. Raise the swim beach with imported sand. If necessary, construct a retaining wall bordering the beach. The beach slope to the water would remain the same. The concrete patio would be moved or rebuilt.
2. Extend the marina boat ramp.
3. Replant existing small trees on the shoreline upland from the new water surface elevation.

³ Leks are areas where male birds display and compete for the attention of breeding females.

4. Relocate the handicap fishing access and parking area located at the Keystone Day-Use Area to an upland site, and upgrade the facilities to Americans with Disabilities Act standards.
5. Rip-rap the shoreline at the vault restroom on CR 14 where necessary.
6. Armor the shoreline bordering the parking area along CR 16 if necessary.
7. Relocate the Morrison Creek boat ramp if extension is not practical.
8. Relocate affected trail sections at the Wetland Habitat Preserve's parking and viewing area to a higher elevation.
9. Raise the Little Morrison Creek Bridge and, if necessary, relocate the Elk Run Trail in this area to a higher elevation.

The licensee proposes to install signage to alert float fishermen of limited headroom under the CR No. 14 Bridge when reservoir levels increase above 7,200 feet msl.

4.2 STAFF RECOMMENDED ALTERNATIVE

Staff's recommended alternative includes the licensee's proposal and environmental protection measures, with the following modifications and additions to help ensure protection of resources in the project area. The reasoning supporting our recommendations can be found in the appropriate resource sections of this EA.

Recommendation 1: Comprehensive Erosion and Sediment Control Plan

To help ensure the protection of project-area resources including water quality, fisheries, and also downstream federally-listed species from the effects of erosion and sedimentation, and to help coordinate related erosion and sedimentation control measures, staff recommends that the licensee file, for Commission approval, prior to the start of any ground-disturbing work, a Comprehensive Erosion and Sediment Control Plan (Comprehensive ESCP). The Comprehensive ESCP should address measures that would be taken during and after all phases of construction proposed by the licensee, and should include: (1) the erosion and sediment control elements identified in the licensee's proposal; (2) the consultation required by license article 405; (3) any provisions that may be required by a Water Quality Certification issued by the Colorado DPHE; and (4) any provisions that may be required by a 404 permit issued by the Corps. The plan should describe methods, including the planting of native vegetation on disturbed lands, to prevent future erosion and sedimentation, and specify the plant species to be used. The plan should also include information on monitoring and remediation actions that would be taken, if necessary, to help ensure the success of erosion and sedimentation control

measures. The Comprehensive ESCP should be developed in consultation with the Colorado DPHE, Colorado State Highway Department, the Corps, the U.S Bureau of Reclamation (BOR), and the Natural Resources Conservation Service (NRCS), and include copies of approvals from the agencies that chose to participate in the plan's development.

Recommendation 2: Drawdown, Refill and Flow Release Plan

To help ensure protection of aquatic resources from rapid changes in water levels and flow rates associated with any drawdown that may be necessary during the proposed work, staff recommends that the licensee file, for Commission approval prior to the start of any ground-disturbing work, a Drawdown, Refill and Flow Release Plan. The Drawdown, Refill and Flow Release Plan should include: (1) identification of water levels reductions and durations that are expected to be necessary for the proposed work (2) a summary of the latest information on the construction water year and predicted inflows and water extractions and outflows, and predicted reservoir levels during the proposed work period; (3) a proposal for achieving the reservoir level reductions and flow releases that would be necessary to conduct the proposed work, and (4) identification of maximum rates of change in reservoir levels and flow releases that should be observed to protect aquatic resources. The plan should identify how flows would be released during the proposed work, and how additional releases, if necessary to achieve or maintain reservoir levels necessary for the proposed work, would be made. Finally, the plan should include information on the refilling of the reservoir after construction is complete, identifying any maximum reservoir refill rates and maximum rates of change in flow releases that should be observed to protect aquatic resources. The licensee should develop the plan in consultation with the Colorado DOW and the FWS. The plan should include copies of comments from the resource agencies with indications of how the report accommodates the comments.

Recommendation 3: Boulder Aeration Structure Installation Plan

To help ensure protection and enhancement of downstream water quality, fisheries, federally-listed species, and other aquatic resources, staff recommends that the licensee file, for Commission approval, at least 90 days prior to the start of construction of the structure, a Boulder Aeration Structure Installation Plan. The plan should include: (1) a schedule and sequence of activities to be used to perform the work; (2) a description of any water level or flow modifications that may be necessary to accomplish the work; (3) a description of the materials, tools and methods to be used to perform the work; and (4) identification of the elements within the Comprehensive Erosion and Sediment Control Plan that would be used to prevent erosion, sedimentation and any other negative effects to water quality that could occur during the work. The licensee should develop the plan in consultation with the Colorado DPHE; the Colorado DOW; and the FWS.

The plan should include copies of comments from the resource agencies with indications of how the plan accommodates the comments.

Recommendation 4: Boulder Aeration Structure Completion Report

To help ensure protection and enhancement of downstream water quality, fisheries, federally-listed species, and other aquatic resources, staff recommends that the licensee file, for Commission approval, within 90 days of the completion of all construction and return to normal project operation, a Boulder Aeration Structure Completion Report. The report should include, but not be limited to, a description, as-built drawings, and photographs of the completed structure; a description of any difficulties encountered in the completion of the structure; and notes on the success of the aeration structure, to include dissolved oxygen measurements taken upstream and downstream of the structure, at several identified project generation levels and distances downstream, demonstrating the structure's effects on dissolved oxygen in the Yampa River. The licensee should develop the report in consultation with the Colorado DPHE; the Colorado DOW; and the FWS. The report should include copies of comments from the resource agencies with indications of how the report accommodates the comments. The report should include copies of the data recorded by the continuous water quality monitoring equipment recommended below, with any comments on the effectiveness of the structure as identified in the data.

Recommendation 5: Installation of Continuous Water Quality Monitoring Equipment

To further help ensure protection and enhancement of downstream water quality, fisheries, and federally-listed species, as well as compliance with the Commission's December 12, 2008 order,⁴ staff recommends the licensee install continuous water temperature and dissolved oxygen monitoring equipment, to include a data logging system, the ability to be queried remotely, and alarms for elevated water temperatures and low dissolved oxygen levels, as required by the December 12, 2008 order. We recommend that the licensee consult on the installation of the equipment and the location of the monitoring probes with the Colorado DPHE; the Colorado DOW; and the FWS. The equipment should be installed within 60 days of the completion of the proposed construction.

Recommendation 6: Continuous Water Quality Monitoring Report and Plan

Following installation of the continuous water temperature and dissolved oxygen (DO) monitoring equipment required by the December 2008 order, the licensee should

⁴ Order Approving Modification of Water Quality Monitoring Schedule and Requiring Continuously Recording Water Quality Monitoring System under Article 408, issued December 12, 2008. 125 FERC ¶ 62,246.

file, for Commission approval, a Continuous Water Quality Monitoring Report and Plan, within 90 days of the completion of construction. The report and plan should include a description of the equipment installed and a map showing the location of the monitoring probes, copies of water temperature and DO concentration data produced by the equipment, a maintenance schedule for the equipment, and a description of how detection of elevated water temperature or low DO levels would be responded to. The report and plan should include copies of comments from the resource agencies, and indications of how the report and plan accommodate the comments.

Recommendation 7: Amendment of Wildlife Mitigation Plan

The licensee included with its application a Wildlife Mitigation Plan, which was produced in consultation with the Colorado DOW. To help ensure the success of the measures included in the Wildlife Mitigation Plan, we recommend that the licensee amend the plan to include post-construction monitoring and adaptive management elements, that include, at minimum: (1) an schedule for the work described in the Wildlife Mitigation Plan; (2) identification of mitigation areas to be monitored; (3) criteria to be used in measuring mitigation success; (4) a schedule for the monitoring; and (5) an adaptive management strategy. The licensee should amend the plan in consultation with the Colorado DOW, and file the updated plan, for Commission approval, at least 90 days prior to the start of construction. The Amended Wildlife Mitigation Plan should include identification of any mitigation areas that may be outside the project boundary as mapped in the licensee's July 29, 2009 filing with the Commission, and include, if necessary, a schedule for filing a revised project boundary for Commission approval.

Recommendation 8: Wetland Mitigation Plan

The licensee included wetland mitigation measures in its Wildlife Mitigation Plan, which was produced in consultation with the Colorado DOW. However, the licensee also needs to complete consultation with the Corps concerning a Section 404 permit prior to any ground-disturbing activity. The Section 404 permit may include additional wetland mitigation measures that are not contained in the Wildlife Mitigation Plan. So that all wetland mitigation measures associated with the licensee's proposal are clearly addressed, and to help ensure the success of all measures that are required, we recommend that the licensee file a separate Wetland Mitigation and Monitoring Plan, to include, at minimum: (1) a review of the wetland mitigation measures contained in the Wildlife Mitigation Plan referenced above; (2) descriptions of wetland mitigation measures required through the Corps' Section 404 permit; (3) an approximate schedule for all wetland mitigation work; (4) identification of wetland mitigation areas to be monitored; (5) criteria to be used in measuring wetland mitigation success; (6) a schedule for the monitoring; and (7) contingency plans to be implemented if the mitigation is not successful. The licensee should develop the plan in consultation with the Colorado DOW, the Corps, and the FWS, and file the plan, for Commission approval,

at least 90 days prior to the start of construction. The Wetland Mitigation and Monitoring Plan should include identification of any mitigation areas that may be outside the project boundary as mapped in the licensee's July 29, 2009 filing with the Commission, and include, if necessary, a schedule for filing a revised project boundary for Commission approval.

Recommendation 9: Annual Consultation Reports and Commission Notification

To help ensure effective consultation occurs between the licensee and the resource agencies in accordance with the licensee's Wildlife Mitigation Plan, and to keep the Commission informed of resource protection issues and mitigation measures, the licensee should file with the Commission, on an annual basis, reports summarizing consultations with the resource agencies regarding: (1) measures identified in the Wildlife Mitigation Plan, (2) measures identified in the recommended Wetland Mitigation Plan; (3) measures recommended or required for the protection of federally-listed species during Endangered Species Act (ESA) consultation; and (4) any other relevant resource agency consultation. The annual summary reports should include evidence that copies of the reports were supplied to the resource agencies at the same time that they were filed with the Commission.

In addition, if consultation with the resource agencies determines that the licensee should provide funding for studies, or provide plans for development and/or implementation of escapement minimization or other mitigation measures, or consider changes in project structures or operation, the licensee would need to notify the Commission as quickly as possible, in the event that such measures require Commission approval.

Recommendation 10: Informational Signage and Underwater Hazard Survey Plan

To help ensure public safety during periods of reduced reservoir elevation, staff recommends that the licensee file, for Commission approval, prior to the drawdown of the reservoir, beyond normal seasonal ranges, an Informational Signage and Underwater Hazard Survey Plan. The plan should contain the following information: (1) identification of the formal access areas around Stagecoach Reservoir that would be posted with informational signs concerning affected access; (2) information to be provided on the signs, to include identification of recreation areas, ramps or launching lanes that would be significantly affected by construction or reduced water levels, an approximate schedule for any unseasonal low water levels that should be expected, the potential for underwater boating obstructions, and identification of alternate access areas; and (3) contact information which park visitors could use to obtain further information. The plan should include a proposal for implementing an underwater hazard survey. The survey should identify all boating hazards to a depth of three feet below the expected lowest drawdown elevation. The plan should also include a description of how

underwater hazards would be conspicuously marked to adequately warn boaters of their presence. The Informational Signage and Underwater Hazard Survey Plan should be developed in consultation with Colorado State Parks. The plan should include copies of comments from Colorado State Parks with indications of how the report accommodates the comments.

4.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Commission would not approve the license amendment to increase the spillway crest height, and thus increase the Stagecoach Reservoir storage capacity. Therefore, under this alternative: (1) the existing storage capacity of the Yampa River Basin water supply would not be increased; (2) no additional recreational capacity would be realized at the Stagecoach Reservoir; (3) threatened and endangered species would not receive the benefits of increased base flows; (4) the Stagecoach Project would not be able to produce power over a longer period of time or increase efficiency; and (5) the licensee would have to seek other means of complying with the Colorado Water Supply for the 21st Century Act.

4.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Three increases in spillway elevation were studied by the licensee: 2 feet, 4 feet, and 6 feet. The licensee selected the 4-foot increase in spillway elevation raise after studies determined that an increase of 4 feet would provide the best balance among environmental impacts, storage capacity, and cost factors.

The licensee also considered proposing the use of an inflatable Obermeyer weir on the spillway crest. However, studies identified potential operation concerns with the use of an Obermeyer weir during winter periods. The licensee indicates that it would be willing to install an Obermeyer weir under the amendment proposal if so required by the Commission. Impacts associated with the Obermeyer weir would be similar to those of the concrete spillway.

5.0 CONSULTATION AND COMPLIANCE

5.1 PRE-FILING CONSULTATION

As part of its pre-filing consultation process, the licensee hosted a joint agency meeting and a public meeting on August 16, 2006, in Steamboat Springs, Colorado, to discuss the proposed license amendment. The licensee included in its application copies of the published meeting notices along with meeting summaries and lists of attendees. The following Federal and state agencies worked with the licensee during the pre-filing process: the U.S. Fish and Wildlife Service (FWS); U.S. Army Corps of Engineers (Corps); Colorado Division of Water Resources (Colorado DWR); Colorado Department

of Wildlife (Colorado DOW); Colorado Department of Public Health and Environment, Water Quality Control Division (Colorado DPHE); Colorado Water Conservation Board; and Colorado State Parks-Stagecoach State Park. In addition, representatives of the Yampa Town Board, Yampa Town Clerk, Routt County, Routt County Planning, Morrison Creek District, and private citizens participated in the meetings. The following issues and potential impacts were identified:

- changes in dissolved oxygen levels in the reservoir and downstream;
- changes in water temperature;
- potential increases of algae in reservoir;
- potential water contamination from vault restrooms;
- frazil ice and downstream fog;
- escapement of northern pike from the reservoir;
- increases in northern pike spawning habitat;
- effects on ice fishing and spring fishing;
- impacts of water depletion on threatened and endangered species;
- impacts on wetlands, and associated mitigation;
- impacts on sharp-tail grouse habitat;
- affects to recreation resources, and mitigation;
- effects on float fishing;
- potential flooding of a county road;
- requirement for a floodplain development permit;
- the need for a County PUD Amendment; and
- increases in shoreline erosion.

After the August 16 meetings, the licensee continued to consult with the resource agencies and developed a report entitled “Resolution of Issues Identified at August 16, 2006 Joint Meetings,” which addresses each issue identified above. The licensee

included a copy of the report in its December 1, 2008 application a copy of this document. Records of communication with agencies and other stakeholders were also provided.

Except as discussed in the resource sections of this EA, we find that either the licensee has adequately responded to the filed comments, or that the issues identified are outside the scope of this EA.

5.2 PUBLIC NOTICE AND RESPONSES

On February 17, 2009, the Commission issued a public notice accepting the licensee's December 1, 2008 amendment application and indicating that it was preparing an environmental analysis and soliciting comments, motions to intervene and protests, as well as recommendations, terms and conditions, and fishway prescriptions. The notice set a 60 day period for filing comments, ending on April 20, 2009.

Entity	Filing Date	Filing Type
U.S. Department of Interior, Office of the Secretary	April 9, 2009	Comments
U.S. Department of Interior, Office of the Solicitor	April 15, 2009	Intervention
Dequine Family LLC	April 20, 2009	Comments
State of Colorado Department of Public Health and Environment	April 20, 2009	Comments

U.S. Department of Interior, Office of the Secretary (DOI) filed comments on behalf of the FWS concerning the escape of northern pike from Stagecoach Reservoir. FWS wrote that northern pike escape from reservoirs in the Yampa River Basin and travel downstream into designated critical habitat of the federally-listed endangered Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Northern pike are known to prey upon and compete with these endangered fishes. The Upper Colorado River Endangered Fish Recovery Program, in which FWS participates, has identified predatory non-native fish as the greatest threat to the endangered fish populations in the Yampa River. The DOI stated that water depletions also adversely affect these endangered fishes and their critical habitat. New water depletions from the Yampa River would result from increased evaporation with the enlargement of Stagecoach Reservoir.

The Dequine Family LLC (Dequine) filed comments stating that the licensee's application does not address impacts on Morrison Creek that would result from diversions from the creek into Stagecoach Reservoir. Dequine further stated that the

Commission must give equal consideration to the potential impacts on Morrison Creek, indicating that diversions from Morrison Creek are necessary for the proposed reservoir enlargement and within the Commission's jurisdiction.⁵ Dequine states that the UYWCD may not increase power production to offset the environmental impacts of reduced flows on Morrison Creek. Further, the UYWCD must present evidence of future demand for water from Stagecoach Reservoir, and must also prove and the Commission must find that the enlargement of Stagecoach Reservoir is in the public interest.

The Colorado DPHE filed comments on the proposal, stating that it has preliminarily determined that this project will cause only temporary changes in water quality. The Colorado DPHE also wrote that its comments did not constitute a Section 401 Water Quality Certification.

5.3 COMPLIANCE

5.3.1 Section 401 Water Quality Certification

Under Section 401 of the Clean Water Act,⁶ an applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the Clean Water Act. By letter dated March 10, 2009, the licensee applied to the Colorado DPHE, for water quality certification for the proposed action. A Water Quality Certification has yet to be issued.

5.3.2 Section 404 Permit

Section 404 of the Clean Water Act requires that anyone interested in depositing or discharging dredged or fill material into waters of the United States, including wetlands, must receive authorization for such activities. Such discharges include return water from dredged material disposed on upland property and generally any fill material like rock, sand, or dirt. The Corps is responsible for administering the Section 404 permitting process. Activities in wetlands for which permits may be required include, but are not limited to, placement of fill material, ditching activities when the excavated material is side-cast, levee and dike construction, mechanized land clearing, land leveling, road construction, and dam construction.

⁵ The proposed action does not include the construction of any water diversion structure on Morrison Creek, which joins the Yampa River below the project dam; therefore, no environmental analysis can be done. If the licensee wishes to construct a water diversion on the creek, it would need to file more information so indicating, so that environmental effects can be analyzed.

⁶ 33 U.S.C. §803(j) (2006).

The licensee applied for a Section 404 permit from the Corps, and the application is currently being processed.

5.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA)⁷ requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. We define the action area for analysis of the licensee's proposal as the project reservoir and the surrounding land area, and the Yampa River downstream to its confluence with the Green River. Four fish species that are listed as endangered under the ESA are found downstream of the project in the Yampa River and may be affected by project operations. These species are the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Suitable habitat of one candidate species, the yellow-billed cuckoo, exists downstream along the Yampa River. Historical records, however, indicate that sightings of this species are rare in western Colorado.

Our analysis of effects on federally-listed species resulting from the proposed action is presented in Section 6.2.5, Threatened and Endangered Species. We determined that approval of the proposed action would likely have adverse effects on the four listed fish species, but that these effects would be mitigated by the conservation measures proposed by the licensee as part of its proposal. Therefore, we find that approval of the proposed action, with staff's recommended measures, would not likely jeopardize the continued existence of the listed species, or cause destruction or adverse modification of critical habitat.

The Commission designated the licensee as its non-federal representative for the purpose of preparing a draft biological assessment (BA) on the potential effects of raising the storage level on listed species and their habitat. The licensee included its draft BA in its application filed on December 4, 2008. On March 25, 2009, the licensee filed an errata letter, providing language it wished to be included in the draft BA. Commission staff provided the BA to the FWS in a package dated April 7, 2009, informing the FWS that the Commission adopted the draft BA as a final BA without modification, requesting formal consultation under the ESA, and, if deemed necessary, the preparation of a biological opinion (BO).

In a letter dated July 15, 2009, the FWS responded to the Commission's request for formal consultation and the submission of the final BA. The FWS wrote that a Recovery Implementation Program for Endangered Fish Species in the Upper Colorado

⁷ 16 U.S.C. §1536 (2006).

River had been initiated in 1988. A Recovery Implementation Program Recovery Action Plan (RIPRAP), which identified actions to recover endangered fishes in the most expeditious manner, was included in an Agreement between the participants on October 15, 1993. On January 10, 2005, the FWS issued its Final Programmatic Biological Opinion on the Management Plan for Endangered Fishes in the Yampa River Basin (Yampa River PBO). The FWS determined that projects that fit under the umbrella of the Yampa River PBO would avoid a likelihood of jeopardy and/or adverse modification of critical habitat due to water depletion impacts. It has been calculated that approval of the licensee's proposal would result in an average annual depletion of 470 acre/feet from the Yampa River, which qualifies for participation under the Yampa River PBO. Therefore, the FWS provided with the July 15, 2009 letter a copy of the Recovery Agreement to be signed by the licensee and returned to the FWS. The FWS indicated that it would supply the Commission with its BO on the licensee's amendment proposal when it receives a copy of the Recovery Agreement signed by the licensee.

5.3.4 Essential Fish Habitat

Pursuant to the amended Magnuson-Stevens Fishery Conservation and Management Act, the United States Congress mandated that habitats essential to federally- managed commercial fish species be identified, and that measures be taken to conserve and enhance their habitat (Public Law 104-297). Congress defined essential fish habitat (EFH) for federally-managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH is applicable to federally-managed commercial species that live out at least one component of their lifecycle in marine waters, such as anadromous species. The Stagecoach Project is located outside of the range of anadromous species or any other species with at least one component of their lifecycle in marine waters. Therefore, we conclude that the Proposed Action would not adversely affect EFH.

5.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that the Commission evaluate the potential effects on properties listed or eligible for listing in the National Register of Historic Places (National Register). Such properties listed or eligible for listing in the National Register are called historic properties. Section 106 also requires that the Commission seek concurrence with the State Historic Preservation Officer (SHPO) on any finding involving effects or no effects on historic properties, and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of effects on historic properties. If Native American (i.e., aboriginal) properties have been identified, Section 106 also requires that the Commission consult with interested Indian tribes that might attach religious or cultural significance to such properties. In this case, the Commission must take into account whether any historic

property could be affected by the proposal within the project's area of potential effects (APE), and allow the Advisory Council an opportunity to comment.

The licensee was designated by the Commission as a non-federal representative to initiate consultation with the SHPO, pursuant to 36 CFR §800.2(c)(4) of the regulations implementing Section 106 of the NHPA, and determine the potential effects of raising the storage level on any historic property. The licensee's application indicates that the SHPO, by letter dated August 2, 2006, issued its opinion that the proposed undertaking would result in no historic properties being affected, based on the results of previous cultural resource inventories within the area of potential effects. The Southern Ute Indian Tribe, also by a letter to the licensee dated August 2, 2006, determined that there are no properties of religious and cultural significance to this tribe that are listed on the National Register within the area of potential effect and the proposed project will have no effect on any such properties that may be present.

6.0 ENVIRONMENTAL ANALYSIS

6.1 GENERAL DESCRIPTION OF PROJECT AREA

The Stagecoach Project is located on the Yampa River in Routt County, Colorado, approximately 16 miles south of Steamboat Springs, Colorado. The Yampa River is a major tributary of the Green River, which in turn is a major tributary of the Colorado River. The Yampa River rises in the Flat Tops in northwestern Colorado, in Routt National Forest in southeastern Garfield County, and flows northeast, past the town of Yampa, and north to the city of Steamboat Springs, where it turns abruptly west. It then receives its primary tributary, the Elk River, near the small town of Milner. It continues west along the north side of the Williams Fork Mountains, past the town of Craig. It joins the Little Snake River in Moffat County, just east of Dinosaur National Monument. Inside Dinosaur National Monument, it joins the Green River near Colorado's border with Utah. The Green River then joins the Colorado River at Canyonlands National Park (UYWCD, 2008).

6.2 RESOURCE ISSUES AND MITIGATION ALTERNATIVES

6.2.1 Geological and Soil Resources

6.2.1.1 Affected Environment

The Stagecoach Project is located on the western flank of the Park Range and on the southeastern flank of the Washakie sedimentary basin at a geologic transition between Precambrian granitic rocks of the range and sedimentary rocks of the basin fill. At the dam site, sandstone units of the Browns Park Formation of Tertiary Age abut and surround on three sides a large island-like mass of gneiss of Precambrian Age. The Yampa River has cut a narrow notch through the gneiss at the dam site. Consequently,

the rock on both abutments is massive to moderately jointed gneiss, whereas rock higher on the northern slope of the valley and throughout nearly all of the reservoir area is the Browns Park Formation. This sandstone sequence, about 1,200 feet thick, overlies a 200-foot thick sequence of Browns Park conglomerate, which in turn overlies the gneiss beneath the reservoir area. The sedimentary beds dip generally eastward at 5 to 10 degrees. Both the conglomerate and the gneiss crop out at the upstream end of the reservoir area. Basalt caps the Browns Park sandstones high on the northern slope of the valley at the dam site (UYWCD, 2008).

Two faults are located in the vicinity of the Stagecoach Dam. The Martini-Morrison Creek fault has been inferred about 0.75 mile upstream of the dam site. Activity along the Martin-Morrison Creek fault probably last occurred in the early Tertiary (70 to 50 million years ago), since Tertiary Age Browns Park conglomerate is continuous across the fault zone. Movement on the Steamboat Fault, mapped as a north-south trending fault running through the upstream end of the reservoir, apparently took place since deposition of the Browns Park sandstone, but apparently not since emplacement of what are Pleistocene Age (1.8 million to 10,000 years ago) landslide deposits that cover the fault trace nearby (UYWCD, 2008).

According to the licensee's application, a seismic study of these and other faults in the vicinity was performed to assess the design basis and maximum credible earthquakes that could affect the dam and appurtenant structures during their design life and to estimate seismic coefficients for use in structural design. Although the chance of a significant earthquake occurring during the design life of the structure is judged to be low, design basis and maximum credible earthquake parameters were used in design (UYWCD, 2008).

Rock cores taken from the dam site indicate that the area's bedrock contains a few narrow shear zones. The shear zones could be indicative of ancient faulting; however, there is not substantial evidence of faulting at the dam site from review of the geology and study of the drill logs. It is believed that the displacement along the shear zones has not involved faulting and has been relatively small (UYWCD, 2008).

Soil in the project area is largely alluvial sands and gravels containing a large percentage of silts and clay. The soils along both sides of the reservoir consist largely of Lintim Loam, Foidel Loam, and Cryoborolls-Cryorthents soils with some rock outcrop (NRCS, 2009). The soil has been eroded by wave action along the reservoir at the current maximum high water elevation, where the banks are steep. This bank erosion has generally not cut into the soil more than a few feet. A small landslide was mapped on the north shore of the reservoir about 0.5 miles upstream from the dam, during the design of the dam. The toe of the landslide had been cut into by the river, indicating that the slide took place a considerable time ago. The toe of the landslide was inundated during the

original filling of the reservoir. No movement or cracking has been observed (UYWCD, 2008).

6.2.1.2 Environmental Effects and Recommendations

Construction

Proposed construction activities that may affect geological and soil resources in the project area include: (1) reconstruction of the elevated spillway, (2) placement of a boulder aeration structure downstream of the powerhouse and stilling basin, (3) removal of vegetation along the reservoir between the elevations of 7,200 and 7,204 feet msl, (4) work at the recreation facilities and wetland areas around the reservoir (see Figure 2).

The reconstruction of the dam crest and placement of the boulder aeration structure would require the use of heavy construction equipment that could cause the compaction of soils. However, the existing powerhouse access road parallels the channel downstream of the dam, where the boulder aeration structure is to be installed. This road may provide an adequate vantage point for use of a crane or boom to place the boulders. It may be necessary to construct a small temporary access road or work area for the placement of the boulders. However, since these activities would mostly occur in areas previously disturbed and compacted, compaction of soils in the project area should not be significant.

The proposed work has the potential to cause erosion of soils that are disturbed adjacent to the water, and soils exposed to precipitation or other moisture. The licensee plans to control soil erosion during and after the proposed work through the use of soil erosion control measures. Erosion control measures, consultation, and recommendations are further discussed in the next section, 6.2.2, Water Quantity and Quality.

Operation

The small landslide mapped on the north shore about 0.5 miles upstream of the dam would be further inundated with the proposed increase in reservoir elevation. However, due to the nature of the soils and the gentle slope of the ground, failure of the slide would not be expected. Any additional movement would be incremental, causing tension cracking along the ground. The licensee proposes to periodically monitor the area during project operation, and contact qualified engineers if cracks in the slide area are observed. Very minor, long-term soil erosion along the steeper banks of the reservoir shoreline, similar to the current condition, would be expected to continue during project operation following completion of the proposed reservoir elevation increase.

With implementation of the licensee's proposed measures and completion of the required consultation with the state and the Corps, and use of the measures contained in the staff-recommended Comprehensive ESCP, as described in the next section, the

proposed action should result in, at most, short-term, minor impacts to geology and soils of the project area.

6.2.1.3 Effects of No-action Alternative

Under the no-action alternative, the normal maximum operating level at Stagecoach Reservoir would remain at 7,200 feet. Any effects on geological and soil resources arising from project operation under the no-action alternative would be addressed under article 405 of the project license. Therefore, there would not be any short-term or long-term effects on geology and soils resources.

6.2.2 Water Quantity and Quality

6.2.2.1 Affected Environment

Water Quantity

The total drainage area of the Yampa River above Stagecoach Reservoir is about 228 square miles. The annual inflow hydrograph for Stagecoach Reservoir is typical of most rivers and streams in the upper Colorado River Basin, with high discharge in the spring and early summer, caused mostly by snowmelt runoff, and diminishing inflows through the summer. Inflows normally remain relatively low during the fall and throughout the winter when most of the precipitation falls as snow.

Stagecoach Reservoir has a surface area of 771 acres, and a storage capacity of 33,275 acre-feet at a maximum reservoir surface elevation of 7,200 feet. The reservoir has a maximum depth of about 120 feet. It provides for municipal, agricultural, and recreational uses, as well as for hydroelectric generation and storage for flood control. The reservoir assists in flood control because it is annually lowered by 8 to 10 feet over the fall and winter, prior to the spring runoff period. Figure 3 charts the reservoir level between 1989 and May 2006. During the recreation season of June, July, and August, the drawdown of the reservoir has averaged about 2.4 feet.

While the reservoir fulfills the uses described above, the project is operated to generate power and to provide flow releases to the Yampa River for water users and maintaining aquatic habitat downstream. Under the current license conditions, the minimum flow released from Stagecoach Reservoir is 40 cfs or inflow, whichever is less, between December 1 and July 31, and 20 cfs between August 1 and November 30.

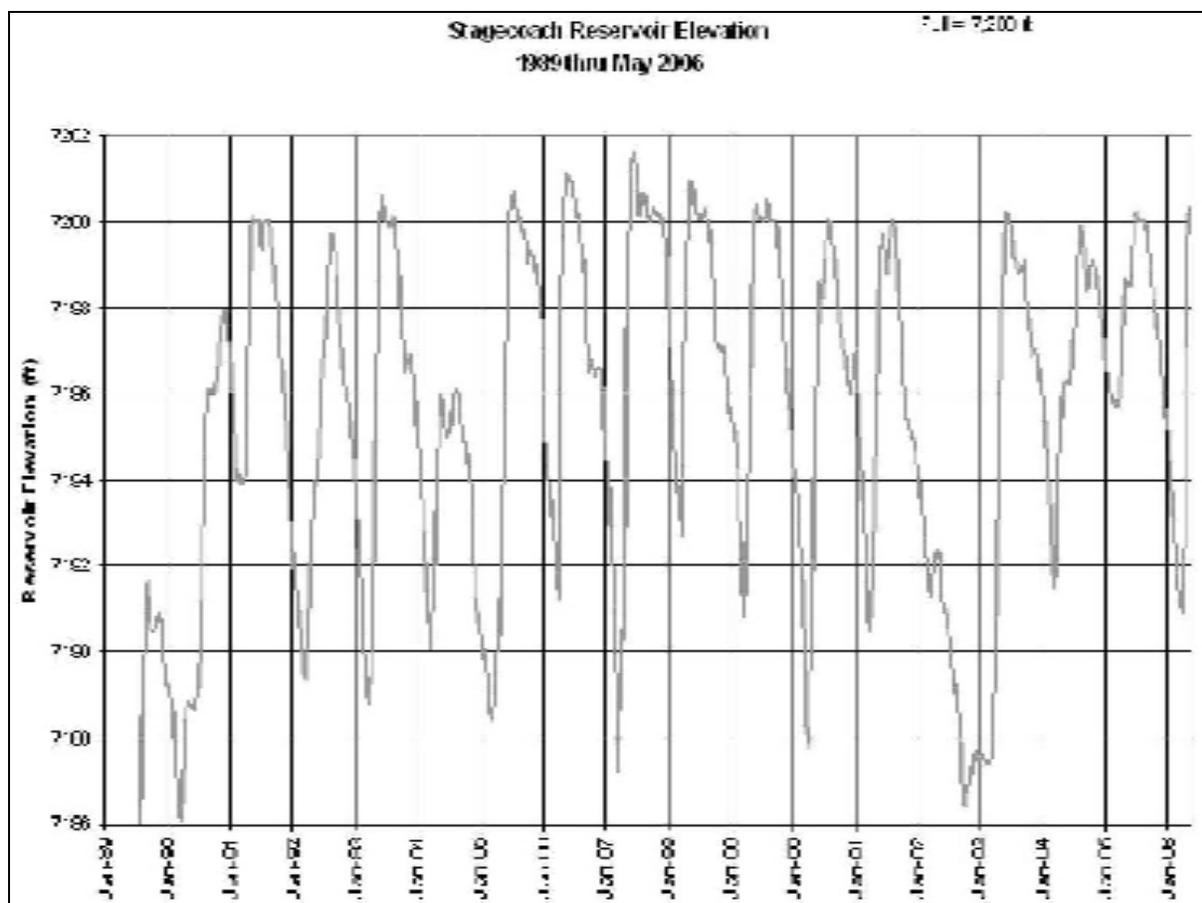


Figure 3. Stagecoach Reservoir elevations for 1989 through May 2006 (Source: UYWCD, 2008)

The U.S. Geological Survey (USGS) gage No. 09237450, located on the Yampa River upstream of the reservoir, records project inflows other than small tributaries such as Martin, Middle, and Little Morrison creeks, which flow directly into the reservoir (see Figure 2). USGS gage No. 09237500, located immediately below the dam, records both the water discharged from hydropower generation and from spillage. Both gages continuously monitor gage height and streamflow, with values posted online and refreshed at 15 minute intervals. Table 1 provides the monthly minimum, mean, and maximum inflows and outflows for Stagecoach Reservoir for Water Years 1989 to 2008. Based on an average inflow of about 70 cfs and the existing reservoir storage capacity of 33,275 acre-feet, the reservoir has a residence time of about 240 days.

Table 1. Stagecoach Reservoir monthly inflow (in cfs) and outflow for October 1, 1988, to September 30, 2008 (Source: USGS, 2009)

Month	Yampa River above Stagecoach Reservoir USGS gage No. 09237450			Yampa River below Stagecoach Reservoir USGS gage No. 09237500		
	Min	Mean	Max	Min	Mean	Max
October	30	53	127	26	58	110
November	35	55	93	35	57	95
December	19	45	78	27	56	93
January	18	44	81	28	59	90
February	25	44	83	28	59	85
March	41	69	124	18	60	90
April	53	119	283	32	70	166
May	15	125	305	12	102	303
June	13	118	382	13	104	378
July	19	105	184	22	85	172
August	28	79	167	34	78	156
September	19	54	148	32	68	135

Spillage of the reservoir over the dam spillway normally occurs during average or wet years, typically in the late spring and early summer. Table 2 provides the approximate number of days that spillage has historically occurred from 1989 through 2008, based on the maximum capacity of the low level outlet (109 cfs) and the daily historical streamflow recorded below the reservoir at USGS gage No. 09237500.

Table 2. Number of days per water year of historical reservoir spillage for October 1, 1988, to September 30, 2008 (Source: USGS, 2009, as modified by staff)

Water Year	Number of days of spill
1989	0
1990	0
1991	57
1992	0
1993	34
1994	0
1995	59
1996	103
1997	142
1998	110
1999	73

Water Year	Number of days of spill
2000	0
2001	1
2002	0
2003	12
2004	0
2005	6
2006	31
2007	0
2008	53

Water Quality

Stagecoach Reservoir and the Yampa River downstream of the project are classified under Colorado water quality standards as Aquatic Life Cold 1, Recreation 1a, Water Supply, and Agriculture. State standards require that dissolved oxygen (DO) concentrations be no lower than 7 milligrams per liter (mg/L) during trout spawning periods (spring and fall), and 6 mg/L the remainder of the year. Water temperature is not to exceed a mean daily average of 20°C, and pH values can range between 6.5 and 9.0 (Colorado Department of Health: Water Quality Control Commission, 2006).

Stagecoach Reservoir thermally stratifies from early summer through fall, with colder, denser, oxygen-deficient water sinking to the bottom of the reservoir. Data included in the licensee's application indicate that DO concentrations decrease rapidly below depths of 15 to 20 feet during June, July, and August. This corresponds to an elevation of 7,185 feet when the reservoir is full under existing conditions, and is the mid-point of the top gate opening on the intake tower (UYWCD, 2008).

The licensee operates the project to maximize water quality by adjusting operation of the upper two gates on the intake tower. From July through September, the licensee operates the project to maintain project discharge water temperatures of 12 to 16°C, rather than a certain DO concentration, due to the rapid reaeration of project discharge downstream of the project. Subsequently, DO concentrations in the stilling basin may be as low as 4.0 mg/L during late summer-early fall, with a goal of maintaining a DO concentration of 6.0 mg/L further downstream. This operating regime was approved by Commission order in 1998.⁸

⁸ Order Approving Modification of Water Quality Monitoring Schedule and Requiring Continuously Recording Water Quality Monitoring System under Article 408, issued December 12, 2008. 125 FERC ¶ 62,246.

Although water quality in the project reservoir is considered good, the Colorado DPHE, in its most recent water quality report, indicated that there is reason to suspect water quality problems in Stagecoach Reservoir, specifically for DO concentration (Colorado DPHE, 2008). In 1996, low DO concentrations in Stagecoach Reservoir were attributed to significant algal growth and decay in the reservoir (Colorado DPHE and Yampa River Basin Partnership, 2002).

Article 408 of the project license requires the licensee to develop a plan to monitor water quality (DO concentrations, water temperature, and presence of certain metals) at the project. The licensee's water quality monitoring plan, first approved in 1989, has been modified a number of times, most recently in the Commission's December 12, 2008 order. In that order, the Commission required the licensee to install a continuous water temperature and DO monitoring system as part of any license amendment pertaining to a lake raise. The required system is to have alarms for elevated water temperatures and low DO concentrations, and the ability to be remotely accessed.

Staff's review of water quality data collected by the licensee from downstream of the project in summer and fall 2008 (UYWCD, 2008a) indicates that water temperatures in the project discharge in June and July ranged from 9.7 to 13.8°C, with DO concentrations averaging 9.7 and 7.9 mg/L, respectively. In August and September, water temperatures increased to 12.5 to 15.4°C, with DO concentrations averaging 6.4 and 6.8 mg/L, respectively. In October, water temperature ranged from 8.6 to 13.9°C, and DO concentrations averaged 7.2 mg/L, respectively. The lowest DO concentration recorded in the stilling basin was 5.7 mg/L, on August 23 and 26, 2008. These data indicate that the required water quality parameters at the project were being met.

6.2.2.2 Environmental Effects and Recommendations

Water Quantity

The licensee expects the proposed construction activities to last from late August 2010 to November 2010. A review of reservoir operation and elevation records indicates that the reservoir is routinely drawn down more than 3 feet below crest during this time. The construction of the new spillway crest would require the removal of about 5.5 feet of the existing spillway crest. To allow construction in the dry, the reservoir level would need to be drawn down approximately 7.5 feet to an elevation of about 7,192.5 feet msl. Project records show annual drawdowns of about 8 to 10 feet. The licensee expects to be able to take advantage of the normal annual drawdown in performing the work at the dam spillway, although relatively minor manipulations in water levels outside of the normal drawdown pattern may be necessary to perform the work. As discussed in the next section under Water Quality, construction-related drawdowns have the potential to increase shoreline erosion and re-suspend lake sediments, and could require changes in downstream flow releases, and staff is therefore recommending that the licensee file a Drawdown, Refill, and Flow Release Plan. Such a plan would help to ensure that

licensee's proposal would have no more than very minor effects to water quantity and flows during the proposed construction activities.

As discussed earlier, the proposed 4-foot raise in the maximum pool elevation would result in an additional 3,185 acre-feet of storage in Stagecoach Reservoir. As a result, Stagecoach Reservoir would have more storage for flows from storms, wetter seasons, and wetter years, and other sources that cannot be stored now. The increased storage would allow the licensee to better meet existing and future water demands.

Modeling conducted by the licensee indicates that, with the proposed maximum reservoir elevation increase, the number of days that the reservoir spills would be reduced by about 30 percent on average. In some average water years, the reservoir level could reach the increased height of the proposed spillway a few weeks later than what has historically occurred with the present spillway height. Similar to existing conditions, during extremely dry years the reservoir might not fill completely due to low inflows and the minimum flow release requirements.

To help ensure that Stagecoach Reservoir reaches full pool conditions, the licensee proposes to use inflow predictions based on snowpack conditions, which are available for the drainage basin's snowmelt-driven hydrograph, to govern hydropower generation. These reports are created every month for the January to June time period by the U.S. Department of Agriculture. For example, during the spring of a year with below-normal snowpack, the licensee proposes to limit reservoir releases to 40 cfs (the minimum downstream flow requirement) to enhance the likelihood of the reservoir reaching the peak elevation of 7,204 feet in the summer. In years with average or above average snowpack conditions, the licensee would have more leeway with project operations during the spring and early summer, while still ensuring that the project reaches an elevation of 7,204 feet msl by early summer.

Operation of the project as proposed, with an increased spillway elevation and increased maximum reservoir elevation, should result in no more than minor adverse effects to water quantity, and could reduce the rate of some seasonal flow releases. However, the added reservoir capacity should provide benefits to local water users by increasing availability to meet current and future demands, and providing benefits to downstream fish and wildlife through the ability to store and release water during natural late-season low-flow periods.

Water Quality

The construction that would be necessary to raise the height of the project spillway by 4 feet, and subsequently raise the maximum level of the reservoir, would have the potential to affect water quality through erosion and sedimentation, accidental discharge

of cement or petroleum products, changes in temperature and DO concentrations, and leakage from existing restroom facilities that are near the shoreline.

Erosion and Sedimentation

Construction work associated with the proposed license amendment has the potential to affect water quality through erosion and sedimentation. Construction site access, use of laydown areas, any necessary additional drawdown of the reservoir, construction at the spillway, installation of the boulder aeration structure, and relocation of recreation areas all have the potential to cause erosion and introduce or re-suspend sediment into Stagecoach Reservoir and the Yampa River. In order to minimize erosion and sedimentation, the licensee proposes to use standard water quality protection measures, such as silt fencing, diversion dikes, straw bales, sediment traps, erosion control blankets, and stabilization of construction entrances, and revegetation of disturbed areas. The licensee would also comply with any measures required through the state's Water Quality Certification and the Corps' Section 404 permit. In addition, license article 405 requires the licensee to consult with the Colorado Department of Natural Resources, the Colorado State Highway Department, the BOR, and the NRCS before starting any land-clearing or land-disturbing activities.

To help coordinate related erosion and sedimentation control measures and requirements, and therefore aid in ensuring the protection of water quality and related resources, staff recommends that the licensee file, for Commission approval, prior to the start of any ground-disturbing work, a Comprehensive Erosion and Sediment Control Plan (Comprehensive ESCP). The Comprehensive ESCP should address measures that would be taken during and after all phases of construction proposed by the licensee, and should include: (1) the erosion and sediment control elements identified in the licensee's proposal; (2) the consultation required by license article 405; (3) any provisions that may be required through a Water Quality Certification issued by the Colorado DPHE; and (4) any provisions that may be required by a Section 404 permit issued by the Corps. The plan should describe methods, including the planting of native vegetation on disturbed lands, to prevent future erosion and sedimentation, and specify the plant species to be used. The plan should also include information on monitoring and remediation actions that would be taken, if necessary, to help ensure the success of erosion and sedimentation control measures. The Comprehensive ESCP should be developed in consultation with the Colorado DPHE, Colorado State Highway Department, the Corps, the BOR, and the NRCS, and include copies of approvals from the agencies that chose to participate in the plan's development. The Comprehensive ESCP would also need to be submitted to the Commission's Division of Dam Safety-San Francisco Regional Office prior to commencement of construction as part of the overall Quality Control and Inspection Plan.

Drawdowns of the reservoir necessary for the proposed construction, beyond normal seasonal water level reductions, has the potential to increase shoreline erosion, re-suspend lake sediments, and alter downstream flows. Therefore, staff recommends that the licensee also file a Drawdown, Refill, and Flow Release Plan. As outlined in Section 4.2, Staff Recommended Alternative, this would require the licensee to file, for Commission approval, a protocol for any additional drawdown of the reservoir that may be necessary for the proposed work, to include a description of maximum rates of change in water levels and flows that would be allowed in the reservoir and downstream in the Yampa River, and how required flow releases would be maintained.

Discharge of Cement or Petroleum Products

The work that is proposed by the licensee has the potential to cause adverse effects to water quality through construction-related accidental discharges of cement or petroleum products into the reservoir and/or the Yampa River downstream of the dam. To minimize the potential for such discharges, the licensee proposes to lower the reservoir below the spillway crest during construction to allow work to be performed entirely in the dry, as discussed under Water Quantity, and follow any provisions that may be required through the Water Quality Certification to be issued by the Colorado DPHE and any provisions that may be required by a Section 404 permit issued by the Corps.

Temperature and Dissolved Oxygen

As discussed above, the licensee operates the project to maximize downstream water quality, primarily releasing flow from the top two gates of the intake tower. Under existing conditions, the mid-point of the top gate is at an elevation of 7,185 feet msl, which equates to a depth of about 15 feet in the reservoir in June, July, and August. Below this depth, DO concentrations rapidly decrease as a result of stratification of the reservoir. Raising the maximum reservoir elevation by 4 feet would cause water to be withdrawn from lower in the reservoir, possibly causing changes in temperature and DO concentrations in the water released downstream at certain times.

To protect against changes in downstream water quality due to withdrawal of water from a different depth following a change in the maximum reservoir elevation, the licensee proposes to design and install a new trashrack and bulkhead structure on the upper gate of the intake tower to raise the invert of the upper gate by 4 feet. Installation of the proposed structure should allow continuance of withdrawal and downstream release of water from the upper level of the reservoir. We would expect this modification to eliminate potential adverse effects on water quality that would be caused by releasing water taken from deeper in the reservoir.

To enhance long-term DO maintenance in the Yampa River downstream of the project, the licensee proposes to install a boulder aeration structure within 250 feet of the stilling basin at the base of the dam. The design of the structure would be developed in consultation with Colorado DOW. Preliminary designs included with the licensee's proposal indicate the structure would be made up of large boulders, approximately 4 feet in diameter, and would span the width of the river immediately below the stilling basin, at a slope of 2 to 7 percent. The structure would be installed either prior to or simultaneously with modifications to the dam. To help ensure protection and enhancement of downstream water quality during and after construction of the proposed aeration structure, staff recommends that the licensee file, for Commission approval, a Boulder Aeration Structure Installation Plan, as described in Section 4.2, Staff Recommended Alternative. The licensee should develop the plan in consultation with Colorado DPHE, Colorado DOW and the FWS. The plan would need to include a schedule for the work, a description of any water level or flow modifications that may be necessary, a description of materials, tools and methods to be used, and identification of the elements within the Comprehensive Erosion and Sediment Control Plan that would be utilized in the work. No streambed work should be permitted until the plan is approved.

In addition, in order to document construction of the boulder aeration structure and determine its success in improving downstream water quality, the licensee should file with the Commission, a Boulder Aeration Structure Completion Report following completion of construction. As further described in Section 4.2, Staff Recommended Alternative, this report should document completion of construction of the aeration structure, and also provide information on post-construction downstream DO levels.

Following the licensee's proposed construction, initial filling of the reservoir to its new maximum operating elevation would cause the inundation of about 51 acres of existing shoreline and its vegetation, which would result in an increased Biological Oxygen Demand (BOD) as the vegetation decays. This would likely cause short-term decreases in DO concentrations. To eliminate this potential problem, the licensee would clear the area within the new inundation zone, between elevation 7,200 and 7,204 feet msl, prior to filling of the reservoir, and relocate some smaller trees uphill. Any remaining decrease in reservoir DO concentrations caused by the decay of submerged shoreline vegetation would be expected to be, at most, a temporary, minor effect on water quality.

Water Quality Monitoring

As noted above, the licensee is required by the Commission's December 12, 2008 order to install a continuous water quality monitoring system as part of any license amendment pertaining to a lake raise. Measures to fulfill this requirement were not included in the licensee's proposal. Therefore, the licensee needs to install a continuous water temperature and DO monitoring and data logging system as part of its proposal, as

required by the Commission's order. Installation should occur within 60 days of completion of the proposed construction. We recommend, as described in Section 4.2, Staff Recommended Alternative, that the licensee consult on the installation of the equipment, and the location of the monitoring probes, with the Colorado DPHE, the Colorado DOW, and the FWS.

Regarding the reporting of water quality monitoring results, the licensee proposes to submit monthly reports on water quality monitoring to the Colorado DOW and would coordinate with other agencies to help guide release strategies. The licensee currently files monthly water quality monitoring reports with the Commission to enable Commission staff to determine if additional measures are necessary to protect water quality downstream of the project. To help ensure maintenance of downstream water quality after completion of the proposed construction, and success in the installation of the required equipment, we recommend that the licensee file, for Commission approval, a Continuous Water Quality Monitoring Report and Plan. This plan, as described in Section 4.2, Staff Recommended Alternative, would include a description and location of the installed monitoring and recording equipment, samples of water quality monitoring data, a maintenance schedule for the equipment, and a description of measures that would be taken should water quality values be detected that are outside of acceptable ranges.

Leakage from Shoreline Restroom Facilities

As discussed in Section 6.2.7, Recreation, Stagecoach Reservoir lies entirely within Stagecoach State Park, and several recreational facilities exist along its shoreline, including vault restrooms for public use.⁹ Adverse effects to water quality could result through leakage from these facilities near shoreline areas to be inundated. In order to avoid such leakage and resulting reservoir water contamination, the licensee proposes to comply with any requirements of the Routt County Department of Health, including the relocation of those facilities located in areas expected to be inundated, if deemed necessary.

Conclusions - Water Quality

With the measures proposed by the licensee, including compliance with any requirements included in the state's Section 401 Water Quality Certification and the Corps' Section 404 permit, and the additional measures recommended by staff, construction and project operation under the licensee's proposal should not result in any material adverse impacts to water quality.

⁹ These facilities are found at the Wetland Habitat Preserve off CR 16; at the parking lot off CR 14; and the parking lot at the Little Morrison Creek boat ramp off CR 18A.

6.2.2.3 Effects of No-action Alternative

The no-action alternative would deny the licensee's proposal to raise the dam crest 4 feet. A denial of the current proposal would have no immediate adverse effects on the existing environment, including water quantity and quality. The intake tower would not be modified, and there would be no need to relocate the recreational facilities along the reservoir. However, any benefits to water quality resulting from the installation of the boulder aeration structure downstream of the stilling basin would not be realized under the no-action alternative.

6.2.3 Fisheries and Other Aquatic Resources

6.2.3.1 Affected Environment

Stagecoach Reservoir supports a coldwater sport fishery dominated by rainbow trout, northern pike, and white sucker, and it is a popular destination for recreational anglers. The Colorado DOW currently manages Stagecoach Reservoir as a rainbow trout fishery and trophy northern pike fishery. Anglers are allowed to keep four trout per day, with no limit on pike. The Colorado DOW stocks the reservoir with 12-inch rainbow trout in November, when northern pike in the reservoir are over-wintering in deep waters, allowing the trout time to grow several inches before pike become active in the early spring. Natural recruitment of fishes into the reservoir is considered low, because of heavy predation by pike, which are not native to the Yampa River Basin, but reproduce successfully in the reservoir, spawning in shallow water, particularly over aquatic vegetation along the shoreline. Pike grow large in the reservoir, and the state angling record, a 30-pound, 11-ounce fish, 46.5 inches in length, was taken from the reservoir in 2006 (UYWCD, 2008; Colorado DOW, 2009).

Gill net surveys of the reservoir in 2007 documented white sucker (46 percent of catch), rainbow trout (32 percent of catch) and northern pike (17 percent of catch), while walleye, flannelmouth suckers, and mountain whitefish collectively comprised 4 percent of the catch (UYWCD, 2008).

Downstream of the project dam, the Yampa River supports a significant coldwater sport fishery consisting of rainbow trout, brook trout, brown trout, and mountain whitefish. This reach also supports populations of mottled sculpin, speckled dace, red-sided shiner, white sucker, and fathead minnow (UYWCD, 2008). Rainbow trout are the most abundant game fish in the river. Rainbow trout densities below the dam were calculated at 4,437 fish per mile in 2000, 6,577 fish per mile in 2001, 4,199 fish per mile in 2002, and 1,028 fish per mile in 2003 (UYWCD, 2008). Currently, no stocking of rainbow trout occurs in this river reach, and the Colorado DOW monitors natural rainbow trout recruitment there (UYWCD, 2008). Table 3 lists the fish species found in Stagecoach Reservoir and in the Yampa River downstream (UYWCD, 2008).

Table 3. Fish species present in Stagecoach Reservoir, and in Yampa River immediately downstream of the dam (Source: UYWCD, 2008).

Common Name	Scientific Name	Stagecoach Reservoir	Yampa River downstream	Game fish	Native
Rainbow trout	<i>Oncorhynchus mykiss</i>	Present	Present	Yes	No
Splake	<i>Salvelinus namaycush</i> <i>x S. fontinalis</i>	Present	-----	Yes	No
Kokanee	<i>Oncorhynchus nerka</i>	Present	-----	Yes	No
Snake River cutthroat trout	<i>Oncorhynchus clarki</i> <i>ssp.</i>	Present	????	Yes	No
Northern pike	<i>Esox lucius</i>	Present	Present	Yes	No
Brook trout	<i>Salvelinus fontinalis</i>	Present	Present	Yes	No
Brown trout	<i>Salmo trutta</i>	Present	Present	Yes	No
Mountain whitefish	<i>Prosopium williamsoni</i>	Present	Present	Yes	Yes
Mottled sculpin	<i>Cottus bairdi</i>	-----	Present	No	Yes
Speckled dace	<i>Rhinichthys osculus</i>	-----	Present	No	Yes
Redside shiner	<i>Richardsonius balteatus</i>	Present	Present	No	Yes
White sucker	<i>Catostomus commersoni</i>	Present	Present	No	Yes
Bluehead sucker	<i>Catostomus discobolus</i>	Present	-----	No	Yes
Fathead minnow	<i>Pimephales promelas</i>	-----	Present	No	Yes
Walleye	<i>Sander vitreus</i>	Present	-----	Yes	No
Flannelmouth sucker	<i>Catostomus latipinnis</i>	Present	-----	No	No

Rainbow trout spawn in the gravel substrate of the river reach immediately below Stagecoach Dam in June and July, concurrent with high flow releases from the project. Juvenile trout then emerge in August. Mountain whitefish are known to spawn in this reach in October. Northern pike are not abundant in this reach (UYWCD, 2008).

Fishing downstream of the dam is open year-round, and regulations restrict anglers to the use of artificial flies and lures. From Stagecoach dam to 0.6 mile downstream, all fishing is catch and release; below this, there is a two fish limit (UYWCD, 2008).

Several articles in the Stagecoach Project license require measures to monitor and benefit fish populations in the project area, including development of plans for:

- (1) monitoring trout spawning gravel (article 410);
- (2) constructing and maintaining fish habitat enhancement structures in the river downstream of the dam (article 411);
- (3) monitoring changes in fish populations resulting from project operation (article 413);
- (4) supplying funding for stocking the reservoir with trout (article 414); and
- (5) conducting a turbine mortality study (article 415).

There are four native Colorado River Basin fishes found downstream of the Stagecoach Project in the Yampa River which are listed as endangered under the Endangered Species Act. These are the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Escapement of northern pike from the reservoir, and the possible predation by escaped pike on these listed fishes, is addressed as part of this section, below, and also in Section 6.2.5, Threatened and Endangered Species.

6.2.3.2 Environmental Effects and Recommendations

Effects of the licensee's proposal to fisheries and other aquatic resources and recommendations for mitigation are divided into sections covering construction and Operation. Issues specific to northern pike have been placed in a separate final section.

Construction

As discussed in Section 6.2.2, Water Quality and Quantity, Stagecoach Reservoir is drawn down annually under normal project operation, and is generally below full pool in summer, fall, and winter. During June, July, and August, the reservoir is drawn down an average of 2.4 feet below the spillway, with a total drawdown of 8 to 10 feet by the end of winter. Under the licensee's proposal, construction would occur August through November, during the period when the reservoir is normally being drawn down, and may not require significant additional water level manipulation. The minimum flows required by the project license would be released. In addition, water available through spring inflows to the reservoir would influence whether any further drawdown is necessary beyond that which occurs under normal operation.

To help ensure protection of aquatic resources from rapid changes in water levels and flow rates associated with any drawdown that may be necessary during the proposed work, staff recommends that the licensee file, for Commission approval, prior to the start of any ground-disturbing work, a Drawdown, Refill, and Flow Release Plan, as discussed in the previous section.

The construction proposed by the licensee has the potential to affect fisheries and other aquatic resources through erosion and sedimentation in both Stagecoach Reservoir and downstream in the Yampa River. Such water quality impacts can negatively affect aquatic organisms through reductions in water clarity that can interfere with sight-feeding and avoidance of predators, decrease respiration and cause abrasion of gills, and interfere with reproduction through smothering of spawning areas or eggs. However, fishes and other aquatic resources in the project area should be adequately protected by the measures described under Section 6.2.2, Water Quality and Quantity, above.

The construction proposed by the licensee, as mitigated by the water quality protection measures as discussed, would have, at most, short-term, minor impacts to fish populations and other aquatic resources in the project area.

Operation

Effects to Reservoir Fishes

Upon completion of the proposed construction, the increase in maximum reservoir elevation would increase the surface area of the reservoir by about 48 acres, or 6 percent during years when there is sufficient inflow for the reservoir to fill in the spring and summer. The increased surface area likely would, in some locations, for example at the upstream end of the reservoir, increase shallow-water habitat. This shallow habitat, particularly if aquatic plants were to become established there, would increase valuable habitat for juvenile fishes, and also macroinvertebrates upon which juvenile and many adult fish feed. Any increases in shallow-water habitat could also benefit reproduction of non-native northern pike in the reservoir, as discussed specifically below. Overall, the licensee's proposal would not be expected to have any long-term, measureable negative impacts to the habitat of fishes or other living resources in the reservoir.

As discussed in Section 6.2.2, Water Quality and Quantity, the increase in maximum reservoir elevation may cause minor changes in reservoir stratification depths, resulting in seasonal changes to vertical distribution of water temperatures and DO concentrations. Changes in stratification levels in the reservoir caused by changes in water levels would be confined to certain periods in only some years, and the annual reservoir level variations that occur already create fluctuations in stratification. It would be unlikely that there would be any significant effects to reservoir fisheries would occur through changes in stratification.

The decay of shoreline terrestrial vegetation that may be inundated during the first years when the reservoir is brought to its new maximum elevation could cause minor reductions in DO concentration in some near-shore waters. However, because the licensee proposes to remove shoreline terrestrial vegetation that could be inundated, effects to living aquatic resources through decreases in shallow-water DO due to plant decomposition should be insignificant.

The licensee's proposal, with the identified mitigation measures, should not cause any negative impacts to reservoir fishes or other aquatic resources through effects to water quality.

Effects to Downstream Fishes

Fish habitat in the Yampa River downstream of the Stagecoach Project following completion of the proposed construction should not be significantly impacted by the increased maximum reservoir elevation. Under the licensee's proposal, streamflows would not be significantly different than those released prior to the change, except possibly during some periods of high inflows. Then, the additional storage capacity could decrease or delay higher downstream flow releases. However, such changes would be offset by increases in the availability of water from releases in the summer and fall. This would be expected to benefit rainbow trout spawning in the river in the late summer and fall.

The licensee's proposal could impact the popular downstream trout fishery through effects to water quality during project operation. However, as discussed above in Section 6.2.2, Water Quality and Quantity, any operational impacts to water quality should be minimized or eliminated through the licensee's proposed mitigation measures, including modification of the upper intake gate, installation of a boulder aeration structure downstream of the project, and regular consultation with the FWS and the Colorado DOW. Staff's recommendations regarding the licensee's plans for the installation of the boulder aeration structure, a Boulder Aeration Structure Completion Report, and a Continuous Water Quality Monitoring Report and Plan, would further help protect downstream resources.

Operation of the project under the licensee's proposed increase in maximum reservoir surface elevation, with the implementation of the proposed and staff-recommended mitigation measures discussed above, should not cause any negative impacts to fisheries or other aquatic resources in the project area.

Northern Pike

As noted, northern pike are an important component of the recreational fishing opportunity at Stagecoach Reservoir. However, any significant increases in the

population of these fish in Stagecoach Reservoir and their passage downstream into the Yampa River could further threaten fishes listed under the Endangered Species Act that are found further downstream. Effects to federally-listed fishes are discussed in Section 6.2.5, Threatened and Endangered Species.

Northern Pike Habitat and Reproduction

The proposed increase in the maximum water surface elevation at Stagecoach Reservoir would result in an increase in reservoir surface area by 48 acres, creating additional shallow-water northern pike spawning habitat and summer habitat. Ultimately, this could lead to an increase in the population of northern pike in the reservoir. This could negatively affect the reservoir's rainbow trout population through increased predation.

Northern pike spawn at the project during April and May, when water temperatures are between 8°C and 13°C. When these temperatures are reached in Stagecoach Reservoir in the spring, the reservoir is normally being filled. Under the proposed reservoir level increase, reservoir filling would start at about the same time that it does currently, but could take an additional 2 to 3 weeks to completely fill to the newer, higher elevation, depending on inflow. This could lengthen the time until pike can access newly-inundated shallow areas along the reservoir shoreline for spawning.

Using available information to further examine effects to pike, the licensee used a model to determine that the most important parameters regarding changes to the pike population would be (1) the ratio of spawning habitat to summer habitat, and (2) the percent of midsummer area with emergent/submergent aquatic vegetation. Pike are known to inhabit waters near shore and up to 13 feet in depth in eutrophic lakes such as Stagecoach Reservoir. The licensee estimates that the area inhabited by pike in Stagecoach Reservoir at typical mid-summer reservoir elevations is approximately 142 acres in size. Assuming that sufficient aquatic vegetation would occur down to a depth of 13 feet, increasing the reservoir capacity as proposed should result in an increase in summer pike habitat of about 3 percent. Effects on pike spawning habitat are difficult to predict, and, other than possible postponement of access to new spawning areas, as noted above. Effects of proportionately greater seasonal drawdowns on vegetation in spawning areas are uncertain, as are the effects of water storage levels in wet versus dry years. The proposed water level increase should expand wetland areas from approximately 5.85 acres to approximately 16.4 acres, likely expanding quality pike habitat. Overall, the ratio of pike spawning habitat to pike summer habitat under the proposed action may be similar to that which currently exists.

To reduce the potential for increasing northern pike habitat under the proposed elevation increase, the licensee would remove as much terrestrial vegetation around the shoreline as possible that would be inundated as possible, and would construct a gravel

filter or grate at the wetland/waterfowl mitigation area to be constructed on the north side of the reservoir to prohibit the entry of pike to spawning and rearing habitat. In addition, a barrier would be installed in the culvert under CR 16 to further prevent adult northern pike from entering the constructed wetland area.

The licensee proposes to meet annually with the Colorado DOW and the FWS to discuss operations prior to the spring reservoir refilling and pike spawning periods. Depending on snow pack estimates, the licensee may be able to keep reservoir levels lower during the pike spawning period, further limiting access to flooded wetland areas for spawning.

Northern Pike Escapement

Northern pike can escape downstream to the Yampa River through: (1) the intake gates and powerhouse; (2) over the spillway; and (3) through the bypass jet valve. However, the bypass jet valve is rarely operated, and live escapement of fishes through its operation is unlikely.

During the proposed construction, project generation would continue and the reservoir would be drawn down to elevations similar to those that are normally observed seasonally. The reduced reservoir levels would eliminate the potential for pike escapement over the reservoir spillway during construction. The licensee indicates that the likelihood of pike entrainment through the intake gates and turbine could slightly increase during construction, because the depths of water that pike prefer could be lowered as a function of lowering the reservoir surface level, increasing the fish's access to the intake gates.

Escapement of fry via the spillway: Water has flowed over the spillway in about 75 percent of the years in which the project has operated. In years when spillage occurs, it can begin as early as early May, but more often it begins in late May or June. However, most northern pike spawning takes place in the upper portion of the reservoir, well upstream from the dam and spillway. Given the size of Stagecoach Reservoir and the high residence time of its water, the number of pike fry that are found in the vicinity of the spillway during spillage is likely low. Although under the proposal there might be an increase in spawning habitat and, therefore, the number of pike fry in the reservoir, flow over the spillway would be delayed until the reservoir fills an additional 3,185 acre-feet. At flows of 100 cfs, this would take an additional 16 days. This delay in spillage would reduce the escapement potential of pike fry over the spillway. Therefore, under the licensee's proposal, even though there could be greater numbers of pike fry present in the reservoir, the likelihood of fry passing over the spillway would seem to be about the same or less. The licensee indicates that the survival of pike over the spillway is unknown but is expected to be appreciable given the stair-step design of the spillway.

Escapement of fry via entrainment: Northern pike fry tend to remain near the water surface. Because the invert of upper intake gate is at an elevation of 7,182 feet msl, and reservoir levels in the spring are normally 12 to 18 feet above the upper intake, there is likely very little entrainment of pike fry into the turbine in any but the driest of years.¹⁰ Under the licensee's proposal, the level of entrainment of pike fry into the turbine would not be expected to measurably increase. However, there is the possibility that the proposed modifications to the intake tower could cause alterations to flow patterns at the intake gates, affecting fry entrainment rates. Survival of fry through the turbine could be relatively high because of their small size.

Escapement of juveniles and adults: Since larger fish are stronger swimmers, juvenile and adult pike would be less likely to leave the reservoir through spillage over the spillway. Downstream movement of juvenile and adult pike may be more likely to occur via entrainment through the intake tower gates and the powerhouse. Regardless of the licensee's proposal, the small size of the project's turbine/generator unit and its high speed is likely to ensure that the survival of northern pike entrained through the powerhouse is minimal. However, some juvenile northern pike may survive passage through the unit. Under existing conditions, water is withdrawn from multiple gates during the stratification period, primarily the upper gate. This operation would be similar under the proposed lake raise, and rates of entrainment would be expected to be similar. The exception would be during summer and fall, when the increased storage capacity would permit generation at a greater frequency. Therefore, an increased likelihood of entrainment could occur during that time. When the reservoir is not stratified, for example during late fall and winter, adult and juvenile northern pike are more likely to be found throughout the water column, increasing the chance of entrainment through the intake gates, similar to existing conditions.

To decrease the likelihood of downstream passage of pike over the spillway, the licensee proposes to manipulate water levels to reduce spring flows over the spillway. The licensee also proposes to use the results of Colorado DOW's study on northern pike in Catamount Reservoir to determine if the enlargement of Stagecoach Reservoir is increasing numbers of pike in Catamount Reservoir. If Colorado DOW determines that the northern pike control measures implemented at the Stagecoach Project and downstream of the project are not effective in preventing pike from reaching downstream reaches, including critical habitat for the four federally-listed fishes downstream, the licensee would develop and implement revised escapement minimization measures in consultation with FWS and Colorado DOW. Any revised escapement minimization measures would be developed and implemented no later than June 30, 2015.

¹⁰ The middle and lower intake gates are also 6 foot by 6 foot slide gates, with invert elevations at 7,157 and 7,085 feet, respectively.

Lastly, the licensee proposes to provide funding for studies to determine the degree of northern pike escapement from Stagecoach Reservoir. The licensee would coordinate with Colorado DOW to determine the appropriate financial contribution level, not to exceed \$5,000 per year or \$10,000 for the escapement studies, and the Colorado DOW would approve the type of studies to be conducted. This funding would be available from the date of the agreement until June 30, 2015.

The licensee did not provide a schedule for providing the Commission with information on consultation with Colorado DOW and the FWS regarding the Catamount Reservoir study, or participating in or providing funding for studies or development and implementation of escapement minimization measures that may be developed. The licensee should provide information on these issues in the Annual Consultation Reports recommended by staff. If changes in project structures or operation may be required at the Stagecoach Project, the licensee would need to notify the Commission as quickly as possible, in the event that such measures require Commission approval.

Conclusions - Fisheries

In summary, the proposed action, to include: (1) measures identified in the Wildlife Mitigation Plan included in the licensee's proposal; (2) other measures proposed by the licensee; (3) additional measures that may be required by the FWS's biological opinion; and (4) implementation of the staff recommendations described above, should result in no more than short-term, minor adverse impacts to the fisheries for trout and northern pike in the project area. Staff believes that no significant positive or negative effects to spawning pike or pike fry would be expected to result under the licensee's proposal with the identified mitigation measures.

Regarding any addition to negative effects of northern pike predation on federally-listed fishes downstream, the proposed action, accompanied by measures including water level control and agency consultation on operation, and any measures imposed through the BO, should ensure that increases in escapement of northern pike from Stagecoach Reservoir and resulting impacts to federally-listed fishes would be less than significant. Specific discussion of federally-listed fishes in the Yampa River downstream of the project can be found in Section 6.2.5, Threatened and Endangered Species.

6.2.3.3 Effects of No-action Alternative

The no-action alternative would deny the licensee's proposal to raise the spillway crest elevation at the project dam by 4 feet and raise the reservoir's maximum storage elevation by 4 feet. A denial of the proposal would have no adverse effects on the existing environment. Therefore, no adverse effects to fisheries or other aquatic resources would be associated with the no-action alternative.

6.2.4 Terrestrial Resources

6.2.4.1 Affected Environment

Vegetation

There are several vegetation communities within the Stagecoach Project area, as described in Table 4. Wetlands occur along the portions of the shoreline at the upstream end of the reservoir, and along some tributaries. Sagebrush occupies the gentle valley slopes adjacent to most of the reservoir shoreline, and agricultural meadows occur in some portions of the valley. Montane shrubland and forest occur mostly on steeper slopes away from the reservoir, but are located adjacent to the reservoir on the south shore near the dam. State-listed noxious weeds that may be present include Canada thistle, bull thistle and oxeye daisy (UYWCD, 2008).

Table 4. Terrestrial vegetation communities and dominant plant species at the Stagecoach Project (Source: UYWCD, 2008).

Vegetation community	Dominant plant species	Other common species
Wetlands	Sandbar willow, Geyer willow, Bebb willow, mountain willow, blue willow, mountain alder <u>Artificial wetlands:</u> Reed canarygrass, spreading bentgrass, various sedges, mint, curley dock <u>Natural wetlands:</u> riparian shrubs listed above, plus spreading bentgrass, Baltic rush, spikerush, mint	Various sedges rushes and grasses
Sagebrush	Big sagebrush, mountain snowberry, green rabbitbrush	Wild buckwheat, giant hyssop, lupine, Hood's phlox
Agricultural Meadows	Irrigated and dryland pasture and hayland meadows (smooth brome, alfalfa, bluegrass), as well as big sagebrush in abandoned or fallow areas	Dandelion, thistle, field pennycress, lupine, timothy, orchardgrass, meadow barley, wildrye

Vegetation community	Dominant plant species	Other common species
Montane Shrubland	Mountain snowberry, serviceberry, antelope bitterbrush, rabbitbrush, chokecherry, Gambel oak	Kentucky bluegrass, dryland sedges, American vetch, aspen peavine, meadowrue
Montane Forest	Quaking aspen, Colorado blue spruce, lodgepole pine, Douglas fir, buffaloberry, serviceberry, chokecherry, snowberry.	Gambel oak, rose, pachistima, Arnica, red osier dogwood, sedges, clematis, sweet cicely, wintergreen, dwarf bilberry, meadowrue

Wildlife

A variety of wildlife species inhabit the Stagecoach Project area. Game species include beaver, muskrat, mink, grouse, and various species of ducks. Small game and bird hunting is allowed in season at Stagecoach Reservoir. Suitable habitat for nesting raptors does not occur near the shoreline of the reservoir, though prairie falcon may nest in adjacent cliff and woodland habitats. Raptors likely utilize the entire study area for hunting or foraging. Raptor species using the area include turkey vulture, red-tailed hawk, Swainson's hawk, prairie falcon, American kestrel, Northern harrier, and bald eagle (UYWCD, 2008).

Two active sharp-tail grouse leks are present near the south shoreline of Stagecoach Reservoir. These leks are located immediately adjacent to the water where periods of high water have altered the native vegetation, and made these areas relatively free of the natural sagebrush, which normally occurs in the area. Sharp-tail grouse prefer lek sites with short, sparse vegetation such as grasses, weeds, forbs, and some shrubs. Open areas with sparse vegetation enable aggressive displays by males, and minimizes predation. Sparse shrubs providing escape cover from predators are often found adjacent to leks (USDA, 2007). Sharp-tail grouse normally use these leks from mid-April until approximately mid-May.

Elk severe winter range and winter concentration areas occur in sagebrush habitat on the south-facing slopes of Blacktail Mountain in the northern portion of the project area. An estimated 500 elk winter in the vicinity of Stagecoach Reservoir. Additionally, the northern and southwestern portions of Stagecoach Reservoir are classified as severe winter range for elk. These areas are also classified as winter concentration areas and severe winter ranges for mule deer. While mule deer generally do not occur near the reservoir in winter, the area is a summer concentration area for mule deer. Other animal

species inhabiting the sagebrush community in the project area include white-tailed jackrabbit, mountain cottontail, golden mantled ground squirrel, and deer mouse.

Rare Species

Rare species are those identified by the state of Colorado as endangered, threatened, or of special concern. Table 5 lists rare species potentially occurring in the project area, their classification, and a description of the habitats they occupy. Federally-listed species protected under the ESA are discussed in Section 6.2.5, Threatened and Endangered Species.

Table 5. Rare species as identified by the state of Colorado potentially occurring at Stagecoach Reservoir (Source: UYWCD, 2008).

Species	Status	Habitat	Occurrence
Bald eagle (<i>Haliaeetus leucocephalus</i>)	State Threatened	Lakes, reservoirs, and riparian corridors	Present; no nests or roosts within a mile. Winter forage near southern inlet, winter range northern inlet
Greater sandhill crane (<i>Grus canadensis tabida</i>)	State Special Consideration	Mudflats, wet meadows, and agricultural areas. Breed in grassy hummocks and watercourses, ponds lined with willows or aspens. Nest in wetlands.	Present: observed in wetlands at southern end of project area. May nest in vicinity of Stagecoach Reservoir and fall staging along Yampa River
Boreal toad (<i>Bufo boreas boreas</i>)	State Endangered	Marshes, wet meadows, streams, beaver ponds, and lakes in subalpine forest above 7,500 feet in elevation.	Not present; suitable habitat is in upstream portions of study area
Northern leopard frog (<i>Rana pipiens</i>)	State Special Consideration	Banks and shallows of marshes, ponds, lakes, reservoirs, streams, and irrigation ditches, as well as wet meadows.	Potentially present at reservoir; suitable habitat within project area.

6.2.4.2 Environmental Effects and Recommendations

Vegetation

Proposed construction activities at the dam and spillway area, and adjacent to the river downstream where the boulder aeration structure would be placed, may require the clearing of vegetation in the immediate areas to allow large construction equipment to access construction sites. Under the licensee's proposal, vegetation around the reservoir occurring between 7,200 feet and 7,204 feet in elevation, including approximately 31 acres of sagebrush and meadow habitat, would be mechanically cleared.

Inundated shoreline areas would be expected to develop aquatic and fringe wetland communities similar to those currently present around the perimeter of the reservoir over time. Measures within the licensee's Wildlife Mitigation Plan, included in the licensee's proposal, include a component to replace terrestrial wildlife habitat associated with these areas. Under the vegetation manipulation component of the Wildlife Mitigation Plan, the licensee would use mowing or fire to increase open areas in upland zones currently supporting tall sagebrush. Over time, intermittent inundation would make these areas unsuitable for sagebrush, and they would be expected to naturally maintain open meadow characteristics. This would mitigate for the loss of wildlife habitat functions associated with open meadow inundated by the raised reservoir elevation.

The licensee's Wildlife Mitigation Plan does not include any monitoring or adaptive management strategies to ensure successful mitigation for effects on vegetation. Therefore, staff recommends that the licensee, in consultation with Colorado DOW, amend the Wildlife Mitigation Plan to include post-construction monitoring and adaptive management elements, that include, at minimum: (1) an schedule for the work described in the plan; (2) identification of mitigation areas to be monitored; (3) criteria to be used in measuring mitigation success; (4) a schedule for the monitoring; and (5) an adaptive management strategy. The licensee should amend the plan in consultation with the Colorado DOW, and file the updated plan, for Commission approval, at least 90 days prior to the start of construction. The plan should include identification of any mitigation areas that may be outside the project boundary as mapped in the licensee's July 29, 2009 filing with the Commission, and include, if necessary, a schedule for filing a revised project boundary for Commission approval.

Following the proposed increase in maximum reservoir level, existing sagebrush communities present along the waterline are expected to convert to open meadow communities. The effects of this reduction in sagebrush would be minimal compared to the prevalence of this community in the project area. As such, with implementation of the recommended amended Wildlife Mitigation Plan, no significant long-term effects to vegetation outside of wetland and riparian areas should be anticipated.

Wildlife

Construction: Wildlife inhabiting the areas adjacent to project facilities at the downstream end of the reservoir, and near areas proposed for mitigative work, would likely be affected by the presence of construction equipment and noise generated by construction activities. These effects could temporarily displace wildlife and cause relocation to other suitable areas in the immediate vicinity. After construction activities cease, the construction equipment would be removed and human activity in the areas would return to normal levels. Only short-term, minor impacts to wildlife would be anticipated from the proposed construction activities.

Operation: Effects to wildlife from project operation following construction would be largely limited to areas that would be flooded by increased reservoir elevations. The increase in water elevation would inundate approximately 31 acres of sagebrush and meadow habitat, and approximately 23.1 acres of wetland habitat. Wildlife species that inhabit these areas would be displaced by rising water levels, and would need to colonize new areas that meet their habitat needs. This temporary loss of terrestrial habitat would have the most significant effect on species which utilize shoreline areas during reproduction, including sharp-tailed grouse. Modification and temporary reductions in wetland habitat could affect wildlife dependent on wetland areas, including the state-listed greater sandhill crane, boreal toad, and the northern leopard frog.

The licensee's Wildlife Mitigation Plan would help to minimize effects of project operations on wildlife. As described in the preceding section, the licensee would use the vegetation treatment component of the Wildlife Mitigation Plan to reduce sagebrush density in areas adjacent to existing grouse leks above the proposed high water line. This work would be performed in the spring, prior to filling the reservoir above the current elevation. The licensee would also seed upland disturbance areas, including those associated with a sharp-tailed grouse friendly seed mixture.

Under the Wildlife Mitigation Plan, the licensee would work with Colorado DOW and Stagecoach State Park to mitigate effects to sandhill crane by implementing seasonal restrictions within wetland areas, and exploring alternatives to further enhance crane habitat in the Stagecoach Project area. To mitigate effects of the loss in sagebrush habitat on wintering elk, the licensee would continue to implement seasonal road closures on CR 18 from the dam to the entrance road to Stagecoach State Park. This measure would reduce human traffic which can disturb elk already stressed by severe winter conditions.

Implementation of the proposed action, including the measures under the Wildlife Mitigation Plan, with the staff-recommended amendment, should not result in more than minor impacts to wildlife during the initial rise in water elevations. Additionally, the monitoring and adaptive management strategies that would be contained in the recommended amendment to the plan would help ensure successful mitigation for project

effects on wildlife. The recommended amended Wildlife Mitigation Plan should help ensure that the proposed action would not result in more than short-term, very minor impacts to wildlife.

6.2.4.3 Effects of No-action Alternative

Under the no-action alternative, the maximum reservoir elevation at Stagecoach Reservoir would not be changed, and there would not be any effects to vegetation or wildlife.

6.2.5 Wetlands and Riparian Areas

6.2.5.1 Affected Environment

The wetlands in the project study area consist of two types: fringe wetlands located around the perimeter of the Stagecoach Reservoir water line, and natural wetlands supported by groundwater and/or streams and drainages. Reservoir fringe wetlands, which have established along the shoreline of Stagecoach Reservoir since its original construction, were created from the impoundment of water maintained at seasonal levels. These wetlands, which are tied to the reservoir, are supported by surface runoff as well as the water in Stagecoach Reservoir. Dominant herbaceous plants in these wetlands include reed canarygrass, spreading bentgrass, sedges, field mint, and curly dock (UYWCD, 2008).

Natural wetlands in the project area are located adjacent to water in stream and drainage channels, as well as groundwater weeps and seeps. The vegetation in these natural wetlands is usually characterized as scrub-shrub wetlands, and is dominated by Geyer's willow and sandbar willow. Some of the natural wetlands in the project area support stands of thinleaf alder, which grows along the drainage channels. Understory species include sedges, spreading bentgrass, Baltic rush, Bolander's spikerush, and mint. Large areas of undisturbed natural wetlands and mitigation wetlands occur at the southern end of the reservoir at the Yampa River inlet; wetlands at this location consist primarily of herbaceous species. This "wetland habitat preserve" was developed as part of wetland mitigation for permitting of Stagecoach Reservoir in the 1980s. The preserve includes a recreational trail and vault toilets, and is used for education and wildlife observation (UYWCD, 2008).

The most recent wetland delineation for the Stagecoach Reservoir was completed in June 2004. This delineation included wetlands located at the normal maximum water line of 7,200 feet msl, and included those wetlands that would be affected if the water level were raised. Five wetland areas in the study area were identified as jurisdictional waters of the United States. These are areas of open water that include the reservoir, ponds, intermittent and perennial streams, and drainage ditches. Generally, wetlands

have established where the topography around the shore is relatively flat, with soils high in clay and moisture holding capacity. Wetlands generally are not found in the portions of shoreline that are flat with coarse or rocky soils or areas of eroding, steep slopes (UYWCD, 2008).

Riparian habitats are also located downstream of the reservoir along the Yampa River. Within the Yampa River Basin generally, there are 38 riparian plant associations comprising eight categories: (1) Evergreen Forest, found along the upper reaches of the Yampa River Basin between elevations of 7,200 and 9,400 feet; (2) Mixed Deciduous-Evergreen, found below the Evergreen Forest group and overlapping the Deciduous group; (3) Deciduous, found below 5,700 feet; (4) Tall-Stature Willow Shrubland, at intermediate and lower elevations; (5) Low-Stature Willow Shrubland, found at higher elevations; (6) Non-Willow Shrubland, occurring below 8,500 feet; (7) Herbaceous, occurring throughout the basin; and (8) Miscellaneous (UYWCD, 2008).

6.2.5.2 Environmental Effects and Recommendations

Raising the maximum water level at Stagecoach Reservoir to 7,204 feet would be expected to inundate 23.1 acres of existing wetlands, including nearly all of the existing fringe wetlands, 4.1 acres in the existing wetland preserve, and less than 0.1 acre associated with tributaries to the reservoir. Additionally, within the wetland habitat preserve, the 4-foot rise would inundate approximately 1,000 feet of upstream Yampa River shoreline, and 3.0 acres of ponds.

Also, any alterations to flows released after the proposed increase in maximum reservoir elevation could alter the magnitude and duration of peak flows downstream from the project to some degree, depending on flows available during a given water year, and other factors, and thereby affect riparian vegetation communities downstream along the Yampa River.

To mitigate for losses in wetland habitat, the licensee has included several wetland-specific measures in its Wildlife Mitigation Plan. First, the licensee would construct a 7.1-acre wetland area between CR 14 and the reservoir in the upland area between the Stagecoach State Park parking area and the park's road near the headquarters facilities. The licensee would also salvage mature willow plants at the reservoir inlet and use them as part of the wetland mitigation efforts, ensuring that plantings are suited to the local environment and increasing the success of the mitigation work. Over time, fringe wetlands would be expected to develop in response to increased water levels. These would replace the existing fringe wetlands that would be inundated under the new operations.

Additionally, the licensee is consulting with the U.S. Corps of Engineers to obtain a Section 404 Permit. The Section 404 permit may require additional wetland mitigation and should contain a wetland mitigation monitoring schedule requiring that the success of

compensatory wetland mitigation efforts be regularly monitored, with the results submitted to the Corps. The Section 404 permit should include contingency plans to be implemented if additional wetland mitigation is required to ensure that all wetlands affected by the project are adequately mitigated.

To help ensure coordination and success of the wetland mitigation measures, staff recommends that, prior to any ground-disturbing activity, the licensee file a Wetland Mitigation and Monitoring Plan, to include, at minimum: (1) a review of the wetland mitigation measures contained in the Wildlife Mitigation Plan referenced above; (2) descriptions of wetland mitigation measures required through the Corps' Section 404 permit; (3) an approximate schedule for all wetland mitigation work; (4) identification of wetland mitigation areas to be monitored; (5) criteria to be used in measuring wetland mitigation success; (6) a schedule for the monitoring; and (7) contingency plans to be implemented if the mitigation is not successful. The licensee should develop the plan in consultation with the Colorado DOW and the Corps, and file the plan, for Commission approval, at least 90 days prior to the start of construction. The Wetland Mitigation and Monitoring Plan should include identification of any mitigation areas that may be outside the project boundary as mapped in the licensee's July 29, 2009 filing with the Commission, and include, if necessary, a schedule for filing a revised project boundary for Commission approval.

The change in reservoir elevation would result in short-term adverse impacts to fringe wetlands, which should restore naturally over time. Moderate impacts would occur to the existing natural and mitigation wetlands as a result of inundation. The affects to these wetlands should be minimized through the wetland mitigation measures proposed by the licensee, any required by the Corps, and those recommended by Commission staff.

6.2.5.3 Effects of No-action Alternative

Under the no-action alternative, the high water level at Stagecoach Reservoir would remain at 7,200 feet and there would be no short-term or long-term effects on wetland or riparian resources.

6.2.6 Threatened and Endangered Species

6.2.6.1 Affected Environment

Bonytail Chub

The bonytail chub (*Gila elegans*), listed as endangered under the ESA in 1980, is endemic to the Colorado River Basin, but is now nearly extinct upstream of Lake Powell in southern Utah. Specimens of this fish were last collected in 1984 in the Colorado

River west of Grand Junction, Colorado, southwest of the project near the Colorado-Utah border. (UYWCD, 2008).

The bonytail chub was historically abundant in warmwater reaches of larger rivers from Mexico to Wyoming (FWS, 2002). This species is now adapted to mainstem rivers where it has been observed in pools and eddies (FWS, 2002) and has also been found in Colorado River reservoirs (UYWCD, 2008). Observations of spawning for this species are rare but have been made in the Green River in late June and early July. Flooded riverine habitats are important for young fish as nursery habitat. No wild reproducing populations are known to occur (UYWCD, 2008).

Threats to this species include streamflow regulation, habitat modification, competition and predation by nonnative fish species, hybridization, pesticides, and pollutants (FWS, 2002). Recovery efforts in the basin include stocking of hatchery-produced fish, both in the Green River in Utah, and in the Green and Yampa rivers near their confluence in Dinosaur National Monument in Colorado. Dinosaur National Monument is in the northwestern corner of Colorado, approximately 140 miles downstream of the Stagecoach Project (UYWCD, 2008).

Colorado Pikeminnow

The Colorado pikeminnow (*Ptychocheilus lucius*), previously known as Colorado squawfish, was listed as endangered under the ESA in 1967. This species is also endemic to the Colorado River Basin. The Colorado pikeminnow thrives in swift-flowing muddy rivers with quiet, warm backwaters (Colorado DOW, 2009a). It now occurs primarily in the Green River below its confluence with the Yampa River; in the Yampa River west of Craig, Colorado, about 65 miles downstream of the project; and in the Gunnison and Colorado rivers in Colorado (UYWCD, 2008). The Colorado pikeminnow is the largest member of the minnow family Cyprinidae in North America, and can reach 6 feet in length and nearly 80 pounds in weight (Colorado DOW, 2009a).

Threats to the Colorado pikeminnow include streamflow regulation, habitat modification, competition and predation by nonnative species, pesticides, and pollutants. Recovery efforts include maintaining more natural river flow patterns, stabilizing flows in late summer, ensuring that stocking of non-native species does not conflict with the fish's recovery, and construction of fish passage around dams and other barriers (UYWCD, 2008).

Humpback Chub

The humpback chub (*Gila cypha*) was listed as endangered in 1967 and is endemic to the Colorado River Basin (UYWCD, 2008). Currently, this species can be found in deep, canyon-bound portions of the Colorado River System (Colorado DOW, 2009b).

There are five known populations of humpback chub in the Upper Colorado River Basin: (1) in the Colorado River in Black Rocks, Colorado; (2) in the Colorado River in Westwater Canyon, Utah; (3) in the Colorado River in Cataract Canyon, Utah; (4) in the Yampa River in Yampa Canyon, Colorado; and (5) in the Green River in Desolation and Gray Canyons, Utah (UYWCD, 2008).

The humpback chub prefers deep, turbid, fast-moving water associated with large boulders and steep cliffs. Spawning occurs from April through July during high flows from snowmelt (Colorado DOW, 2009b). High spring flows are important for the humpback chub for maintaining channel and habitat diversity, flushing sediments, rejuvenating flood production, and depositing gravel and cobble used for spawning (UYWCD, 2008).

Threats to the humpback chub include streamflow regulation, habitat modification, blockage of migration routes by dams, and competition, predation, and possible hybridization with non-native species. Recovery efforts include streamflow regulation, fish population monitoring, and managing stocking of non-native fish (UYWCD, 2008). Currently, humpback chub populations appear to be recovering in Yampa Canyon in Dinosaur National Park, about 140 miles downstream of the project, and in a number of other areas as well (Colorado DOW, 2009b).

Razorback Sucker

Also endemic to the Colorado River Basin, the razorback sucker (*Xyrauchen texanus*) was listed as an endangered species under the ESA in 1991 (UYWCD, 2008). Once widespread in the Colorado River system, this species is now limited to a small number of individuals in the Yampa, Colorado, and Gunnison rivers (Colorado DOW, 2009c). Most fish occur in the lower 4 miles of the Yampa River in Colorado, over 140 miles downstream of the project, and in the Green River, from the mouth of the Yampa River to the confluence of the Duchesne River (UYWCD, 2008). The only known reproducing populations that remain occur in the middle Green River in Utah and in an off-channel pond on the Colorado River near Grand Junction, Colorado (Colorado DOW, 2009c).

The razorback sucker is a large fish, able to grow to about 15 pounds and has a sharp-edged keel behind its head (Colorado DOW, 2009c). This species spawns between mid-April and mid-June. Adult fish are adapted for swimming in swift currents, and habitat use by this species varies depending on season and location (UYWCD, 2008).

The loss of large floodplain habitat and predation by non-native fish are believed to be primary factors in the decline of the razorback sucker (Colorado DOW, 2009c). Other threats include streamflow modification, habitat modification, as well as competition with nonnative species. Recovery efforts include stocking in the Green, Colorado, Gunnison, and San Juan rivers (UYWCD, 2008).

Critical Habitat of Federally-Listed Fishes

Critical habitat for all four of the federally-listed fishes is located on the Yampa River in an area from Craig, Colorado, approximately 65 miles downstream of the Stagecoach Project, down to the area of the Yampa's confluence with the Green River, approximately 140 miles downstream of the project (UYWCD, 2008).

Yellow-billed Cuckoo

The yellow-billed cuckoo (*Coccyzus americanus*) is a neotropical migrant that breeds in large blocks of dense lowland riparian habitat. Preferred breeding areas typically consist of woodlands with cottonwoods and willows at 2,500 to 6,000 feet elevation; usually found within 300 feet of water. Although this habitat does not occur in the immediate vicinity of the reservoir, suitable habitat is present downstream along the Yampa River.

The yellow-billed cuckoo is an uncommon summer resident and a rare breeder in Colorado. This species is reported to arrive in Colorado from late May to June and remains until August. The Colorado Breeding Bird Atlas (Kingery, 1999, as cited in UYWCD, 2008b) reported one confirmed nesting observation along the Yampa River near Craig, Colorado, between 1987 and 1994. Habitat loss is a primary threat to this species, the principle causes of which are conversion to agriculture and other uses, dams and flow management, channelization, and livestock grazing.

6.2.6.2 Environmental Effects and Recommendations

Construction Effects to Federally-Listed Fishes

The four federally-listed fishes are not found in the immediate project area. The closest critical habitat for these species is located more than 60 miles downstream on the Yampa River, near Craig, Colorado. Given this distance, staff finds the proposed construction activities would not be expected to adversely affect the fishes or their identified critical habitat. Possible adverse effects on downstream water quality that could result from construction activities, and measures that would be taken to mitigate them, are discussed in Section 6.2.2. Measures proposed by the licensee and recommended by staff would greatly minimize the potential for construction-related adverse effects on downstream water quality, and no effects from the proposed construction would be expected to effect federally-listed species found 60 miles downstream.

Operational Effects to Federally-Listed Fishes

Consumptive water use in the Yampa River Basin, including evaporation of water from reservoirs, has been identified by the FWS as an adverse effect on the listed fish species found downstream (FWS, 2009). A Programmatic Biological Opinion was prepared by FWS in 2005 for implementation of the Management Plan for Endangered Fishes in the Yampa River Basin, which addresses existing depletions in the basin, as well as 53,000 acre-feet per year of new depletions (FWS, 2005). The licensee predicts water depletion associated with the proposed reservoir raise would be about 470 acre-feet, caused by evaporation from the increased reservoir surface area, and the storage of additional water. The enlargement is expected to increase the reservoir's surface area by about 48 acres (6 percent), and it is estimated that depletion due to evaporative loss from the increased area would be 35.2 acre-feet.

The proposed increase in reservoir storage would allow the licensee to capture more spring runoff in the Stagecoach Reservoir than is currently possible. Flows in the Yampa River downstream would not likely be reduced except during some high-flow periods in the spring of some years, when it could take an additional 2 to 3 weeks to fill the reservoir if the entire 3,185 acre-feet of storage had been depleted the previous year. This could reduce downstream flow releases by 75 to 113 cfs in the spring when spawning of humpback chub and razorback sucker may occur. High spring flows are considered important to both these species, thus this reduction in spring flow releases could result in an adverse effect to the listed species and their critical habitat. However, such reductions in flow would represent less than 2 percent of the average Yampa River flow in the May/June period (UYWCD, 2008).

The proposed increase in reservoir storage could allow the licensee to augment base flows downstream in the Yampa River from August through March by an additional 5 to 15 cfs. This would be possible through the increased storage availability of water allowing additional generation (UYWCD, 2008). This additional flow could have a minor benefit to the four federally-listed fishes downstream during periods when flows can be low. Over time, as this water is allocated for other uses, this minor benefit would likely be reduced.

In summary, adverse impacts on federally-listed fish species downstream may occur under the licensee's proposal through minor reductions in high flow releases in the spring, and also from increases in evaporative losses in the reservoir. These issues may be more specifically quantified by the FWS. However, increased storage may ultimately allow augmentation to downstream flow releases from August through March, benefiting the federally listed fish species.

Effects from Changes in Predation by Northern Pike

As reviewed under the discussion of Northern pike in Section 6.2.3, Fisheries and Other Aquatic Resources, increasing the maximum reservoir capacity as proposed by the licensee could create additional spawning habitat and summer habitat for northern pike in Stagecoach Reservoir, thereby increasing pike population in the reservoir. As a result, there could be an increase in downstream escapement of northern pike, leading to increased predation of federally-listed fishes by pike downstream in the Yampa River.

Regarding any addition to negative effects of northern pike predation on federally-listed fishes downstream, the proposed action, accompanied by measures including water level control and agency consultation on operation, should ensure that increases in escapement of northern pike and resulting impacts to federally-listed fishes would be less than significant.

Yellow-billed Cuckoo

Construction under the licensee's proposal would not have any effect on yellow-billed cuckoo because there is no suitable habitat in the project vicinity. The Environmental Assessment for the Yampa River Management Plan (FWS, 2004) concluded that water depletions on the Yampa River should not have a significant effect on riparian vegetation because the highest spring flows would be reduced by no more than 2.4 percent relative to current conditions. The licensee's proposed action would result in an additional reduction of spring flows of less than 2 percent, and is therefore not likely to have an adverse affect on these riparian forests. As part of its agreement with Colorado DOW, the licensee also would salvage mature willows from the inundated shoreline for use in onsite wetland mitigation and would provide any excess trees to Colorado DOW to use in other wetlands and/or streambank restoration efforts. Therefore, the proposed action is not likely to adversely affect the yellow-billed cuckoo or its potential habitat.

Status of Consultation under the Endangered Species Act

By letter dated August 1, 2006, the licensee was designated by the Commission as a non-federal representative for the purpose of preparing a draft biological assessment (BA) to determine the potential effects of increasing the storage level of the reservoir on listed species and their critical habitat. The draft BA was included with the licensee's application filed with the Commission December 4, 2008. On March 25, 2009, the licensee filed an errata letter, providing language it wished to have included in the BA.

Commission staff adopted the BA without modification as a final BA. Based on its analysis, Commission staff concluded that effects of the proposal to increase the reservoir would be mitigated by the measures included in the application and described in

this EA. Staff concluded that approval of the proposal would not be likely to jeopardize the continued existence of the listed fish species, or cause destruction or adverse modification of critical habitat. Staff also found that approval of the proposal would not be likely to jeopardize the continued existence of the yellow-billed cuckoo.

Commission staff submitted the BA to the FWS, and requested initiation of formal consultation, by letter dated April 7, 2009. A biological Opinion (BO) is due to be filed with the Commission in the near future. Any mandatory conditions identified by the FWS in the BO would be made requirements of the Stagecoach Project license.

6.2.6.3 Effects of No-action Alternative

The no-action alternative would deny the licensee's proposal to raise the spillway crest elevation at the project dam by 4 feet and raise the reservoir's maximum storage elevation by 4 feet. A denial of the proposal would have no adverse effects on the existing environment. Therefore, the downstream flow regime would not be altered. The rate of spilling in the spring/early summer would not change. No additional flow would be provided downstream during summer/late fall to benefit listed species. The escapement of northern pike downstream from the reservoir would not be affected.

6.2.7 Cultural and Historic Resources

6.2.6.1 Affected Environment

The Area of Potential Effect (APE) for the proposed license amendment encompasses the reservoir shoreline up to the proposed maximum reservoir operating elevation of 7,204 feet msl, plus all locations where ground disturbance associated with construction and operation under the amendment could affect historic properties, should any such resources be found to exist. Historic properties are buildings, structures, objects, sites or districts that are listed in or eligible for inclusion in the National Register of Historic Places (National Register).

Archaeological investigations conducted in 1984 in association with the project's original licensing identified 14 archaeological sites within the area subsequently included in the licensed project. The State Historic Preservation Officer (SHPO) issued an opinion that none of those sites were eligible for the National Register. A review of pertinent information from the SHPO, commissioned by the licensee in 2004, found that no additional archaeological sites or any other potential historic properties had been recorded in the project as of that date.

The licensee consulted with the SHPO concerning the proposed action. By letter dated August 2, 2006, the SHPO informed the licensee that no additional archaeological investigations were necessary prior to the proposed action.

6.2.7.2 Environmental Effects and Recommendations

Construction

Construction activities associated with the proposed 4-foot increase in the height of the dam spillway would not affect any known historic properties in the APE. The SHPO agrees with this opinion, as stated in its August 6, 2006 letter. The SHPO recommended that, in the event that unidentified archaeological resources were discovered in the course of construction, the licensee should stop work and consult with the SHPO regarding evaluation of the significance of the resources. The Southern Ute Indian Tribe responded to the licensee on August 2, 2006, indicating that the proposed action would not affect any historic properties of religious or cultural significance to the Tribe.

Operation

Operating the Stagecoach Project with a 4-foot increase in maximum reservoir elevation level would not affect any known historic properties within the identified APE. The SHPO and Southern Ute Indian Tribe have agreed with this conclusion through their letters to the licensee.

No historic properties are currently known to exist within the APE. However, it is possible that heretofore unidentified historic properties could be encountered in the course of the proposed construction or operation under the proposal. Article 407 of the project license provides for this possibility by requiring the licensee to halt work at the location of any discovered cultural resource, and consult with the SHPO regarding the eligibility of the resource for inclusion in the National Register. If the discovered resource is determined to be a historic property, article 407 requires the licensee to file a Cultural Resource Management Plan with the Commission, which the licensee is to prepare in consultation with the SHPO, regarding effects on the resource, avoidance or mitigation measures to resolve any adverse effects, and a schedule for completing those measures. The licensee would be permitted to resume work only upon being informed by the Commission that the requirements of article 407 have been fulfilled.

The licensee's consultation with the SHPO and the Southern Ute Tribe, and compliance with license article 407, should ensure that the licensee's proposal would not have any adverse effects on cultural or historic resources in the project area.

6.2.7.3 Effects of No-action Alternative

Selection of the no-action alternative would result in no effects to cultural or historic properties in the project area. Any effects under continued project operation at

the existing maximum reservoir elevation would be addressed through compliance with license article 407.

6.2.8 Recreation

6.2.8.1 Affected Environment

The project is located in Routt County, Colorado, which offers a diverse environment of mountain vistas and picturesque ranch lands. About 50 percent of the land in Routt County is publicly owned. The Medicine Bow-Routt National Forest makes up a large portion of the county, and includes the Mt. Zirkel and Sarvis Creek Wilderness areas. Local state parks include Stagecoach Reservoir, Steamboat Lake, Elkhead Reservoir, and Pearl Lake. The area is well-known for its winter skiing, and is also becoming a major summer recreational destination. Other opportunities include biking, hiking, fishing, picnicking, wildlife watching, hunting, swimming, boating, water-skiing, sailing and sail-boarding, jet skiing, snowshoeing, cross country skiing, and snowmobiling (UYWCD, 2008).

Article 403 of the project license required the licensee to develop the following facilities: (a) 100-unit campground on the north shore; (b) three picnic areas with parking areas; (c) a convenience center with parking areas; (d) a swimming area; (e) potable water and sanitary facilities; (f) a hiking trail along the south shore; (g) a marina on the north shore; (h) a site for self-contained recreational vehicles; and (i) a day-use park near the west end of the reservoir. The licensee has arranged for the lease of the lake and the recreation facilities to the state of Colorado, to be operated and maintained by Colorado State Parks as Stagecoach State Park. The entire shoreline of Stagecoach Reservoir lies within Stagecoach State Park (UYWCD, 2008).

The Master Plan developed for Stagecoach State Park goes beyond the facilities required by license article 403. Currently, Stagecoach Reservoir has the following facilities (UYWCD, 2008).

- Two boat ramps - one on the north shore of the lake, and the other in the Morrison Cove area on the south shore of the lake. The north shore ramp is serviced by a marina with a gas dock and basic fishing and camping supplies. The marina rents boats, canoes, and paddle boats and is open Memorial weekend through Labor Day weekend. The Morrison Cove ramp offers picnic areas and restrooms.
- Four campgrounds - Junction City and Pinnacle campgrounds border the reservoir and feature electrical hookups, water, showers, flush toilets, and a dump station. The Harding Spur Campground is a basic campground with water and the McKindley campground has primitive sites with restrooms.

- Picnic tables are located throughout the park. Sites with both picnic tables and grills can be found at the Keystone and Haybro Day-Use areas. The Arrowhead Group Picnic Area is available on a reservation basis.
- Coin-operated showers are available through the summer at the marina next to the Pinnacle Campground.
- Swim Beach, located at the marina, has picnic tables and a sand volleyball court.
- 11 miles of trails, as summarized below.
 - The Wetlands Trail is located on the western end of the reservoir within the Wetland Habitat Preserve, and utilizes a fine gravel pathway and floating walkways. It showcases a riparian-type wetland that is driven by the rise and fall of the Yampa River. This includes two waterfowl viewing blinds, two fishing areas accessible to the physically challenged, and interpretive signs for guidance.
 - Pinnacle Peak Trail is adjacent to the marina and Pinnacle Campground and is a fine gravel pathway located in the heart of Stagecoach State Park. A one-quarter-mile ascent up Pinnacle Peak offers a 360-degree view of the surrounding valley.
 - The Lakeview Trail is located around the Northern part of the lake. This 1-mile gravel trail provides hiking and biking in the summer. It is groomed in the winter for snowshoeing and cross country skiing.
 - The Elk Run Trail is a gravel surface trail which traverses the entire southern shore of the reservoir. The trail contains picnic tables and cuts in and out of coves, and is used for mountain biking, running, hiking and horseback riding. Access to the Elk Run Trail is from the western end of the reservoir, the Wetland Habitat Preserve parking lot, the Morrison Cove parking lot/boat ramp area, and the eastern end of the reservoir by crossing the dam from the upper dam parking area.
 - The 11-mile-loop "Grand Traverse" trail links the Elk Run Trail with CR 18, 14, and 16.
 - The Tail Waters Trail is a one-quarter-mile trail linking the parking area at the Tail Waters Area to the Yampa River downstream of the dam. Visitors can use the trail to access the river for fly-fishing and scenery.

In 1988, use of Stagecoach Reservoir was projected to equal 71,000 recreation-use-days annually. According to records obtained from Colorado State Parks, annual use from 1989 through June 2006 has averaged 205,357 visitor days per year (UYWCD, 2008). The licensee last filed a Licensed Hydropower Development Recreation Report (FERC Form 80) with the Commission on March 11, 1998.¹¹ According the report, the project received 198,000 total recreation-days in the 1997 calendar year.

The licensee consulted with Colorado State Parks prior to filing its proposal with the Commission, and the agency provided a July 29, 2008 letter to the licensee indicating that it is comfortable with the licensee's plans for mitigating effects on recreation facilities, and that it supports the water elevation raise.

6.2.8.2 Environmental Effects and Recommendations

Construction

During the proposed construction, visitors to the dam would not be permitted to walk across a portion of the dam, as is normally allowed. Visitors to Stagecoach State Park and local residents would be affected to some degree by construction traffic, including construction vehicles and machinery, transportation of materials (e.g., concrete) and workers commuting to the job site. Noise from traffic and construction could disturb residents and recreationists in the project area.

Concurrent with the construction at the dam, the licensee would perform the following mitigation measures that were planned in consultation with Colorado State Parks to ensure that Stagecoach State Park's recreation facilities are protected and enhanced as a result of the proposed reservoir elevation raise.

- Relocation of vault restrooms to higher elevations
- Upland extension of the swim beach with imported sand, maintaining its existing slope for safety, and replacing two retaining walls.
- Reconstruction of concrete picnic pad near swim beach at higher elevation.
- Extension of Morrison Creek boat ramp using gravel fill.
- Extension of concrete portion of marina boat ramp.
- Raising the Little Morrison Creek bridge and the trail.

¹¹ To evaluate recreational resources at the project, the Commission requires the licensee to prepare and submit a FERC Form 80 every 6 years.

- Raising the handicap fishing access and parking near Keystone Day-Use Area if necessary, and ensuring compliance with federal Americans with Disabilities Act standards.
- Riprap along the shoreline as needed to avoid erosion issues.
- Revegetation of all disturbed areas.
- Replanting trees and relocating irrigation systems within the area of inundation.
- Install signage to notify float fishermen of limited headroom under the CR No. 14 Bridge when reservoir levels increase above 7,200 feet.

In the long run, these measures would ultimately mitigate and enhance recreation at the state park and the reservoir once the work at the dam and the maximum reservoir level was increased to the proposed elevation. In the short term, the work would add to the local impacts caused by the construction at the dam, and temporarily affect use of specific park recreation areas. For example, mitigative construction to move the beach and other facilities, such as concrete picnic pads, associated signs, and the fuel stand at the marina would create short-term impacts to late-season recreation. The licensee therefore proposes the following measures.

- Commencement of all construction activities after Labor Day in the fall, after the peak summer recreation season.
- Implementation of appropriate erosion control measures near recreation areas.
- Use of existing access sites where practicable.
- Watering of construction areas to minimize dust if necessary.

Recreation access areas, boat ramps and launching lanes that are proposed to be modified would be unavailable for public use during the construction periods, such as during drawdowns that could make boat launching unsafe or impossible, or when mitigative measures would be performed in recreation areas. In addition, objects or terrain that is normally well submerged could become boating safety hazards. The licensee's proposal does not include a plan for posting warning signs at formal reservoir access areas concerning reduced reservoir elevations and the possible creation of underwater obstructions. Therefore, to ensure public safety, we recommend that, prior to the drawdown of the reservoir, the licensee consult with Colorado State Parks and develop an Informational Signage and Underwater Hazard Survey Plan. The plan should

include: (1) identification of the formal access areas around Stagecoach Reservoir that would be posted with informational signs concerning affected access; (2) information to be provided on the signs, to include identification of recreation areas, ramps or launching lanes that would be significantly affected by construction or reduced water levels, an approximate schedule for any unseasonal low water levels that should be expected, the potential for underwater boating obstructions, and identification of alternate access areas; and (3) contact information which park visitors could use to obtain further information. The plan should include a proposal for implementing an underwater hazard survey. The survey should identify all boating hazards to a depth of three feet below the expected lowest drawdown elevation. The plan should also include a description of how underwater hazards would be conspicuously marked to adequately warn boaters of their presence. The plan should include copies of comments from Colorado State Parks with indications of how the report accommodates the comments.

The proposed construction work at the dam after Labor Day, along with the mitigative measures involving work at recreation areas used to ensure recreation opportunities continue and are improved after construction, should cause only short-term, intermittent, minor disturbances to park visitors and local residents. Development of the recommended Informational Signage and Underwater Hazard Survey Plan Effects would help park visitors by providing information needed to best use the facilities during periods of disruption, and aid in ensuring boating safety during reduced reservoir levels.

Operation

Following the completion of the proposed construction, during periods when the reservoir is above the previous maximum operating elevation, there would be minor increases in water surface area of up to 6.2 percent. Because this increased surface area would be the result of newly-inundated shoreline, there would be some changes in contour and character of the shoreline and shallow areas. Combined with the licensee's mitigation at reservoir access areas, the area should be attractive to boaters and anglers and should experience recreational use levels equal to or greater than before the proposed action was implemented. However, it is noted that, under average or higher spring runoff conditions, spring filling of the reservoir would typically take an extra 2 to 3 weeks. The extra time necessary for filling to the new maximum reservoir elevation would likely occur in April, May, or June. Therefore, spring anglers could experience a daily reservoir increase of several inches, but the effect on fishing should not be generally significant.

There would be some effect to float fishermen who wish to pass under the CR No. 14 Bridge. During periods of increased reservoir elevation above 7,200 feet msl, there may not be sufficient headroom to float beneath the bridge. The licensee's proposal to install signage to notify float fishermen of limited headroom would partly mitigate this situation during the periods when reservoir levels are above 7,200 feet. Since the proposed change in reservoir storage capacity would not significantly affect the timing of

ice formation on the reservoir, it is not anticipated that winter ice fishing activities would be negatively affected.

Proposed changes and improvements to recreation areas and visitor facilities near the reservoir, such as hiking trails, wetland and wildlife observation areas, and other elements, as noted elsewhere in this EA, should ensure continuance of the park's attraction, or create greater interest, for park visitors.

With the implementation of the licensee's mitigation measures, there should be no significant adverse effects to recreation in the project area following completion of the proposed construction.

As noted above, an increased reservoir surface area and changes to the reservoir shoreline could add interest for boaters, anglers, and other recreationists. Elkhead Reservoir, located downstream of the Stagecoach Project on the Yampa River, was recently enlarged from 13,800 acre-feet to a 25,550 acre-feet. Elkhead Reservoir is also a component of the Yampa River State Park System, and is open for boating and fishing. Colorado State Parks is working to add other recreation facilities, including two swim beaches, at Elkhead Reservoir. Therefore, the licensee's proposal, with its recreation measures, would be part of a cumulative increase in recreational opportunities within the Yampa River Basin.

6.2.8.3 Effects of No-action Alternative

Under the no-action alternative, the maximum reservoir elevation at Stagecoach Reservoir would not be raised. The possible benefits of added interest to Stagecoach Reservoir from increased reservoir elevations and surface area, or the licensee's mitigation work, would not occur. Any effects on recreation resources arising from project operation under the no-action alternative would be addressed pursuant to article 403 of project license.

6.2.9 Land Use and Aesthetics

6.2.9.1 Affected Environment

Land use within a one-mile radius of the project is broadly agricultural in nature, and includes dry land pasture for livestock grazing. The primary exceptions are approximately 200 residential units located on the south side of the reservoir, in areas zoned for low-density and high-density development. There is a sewage treatment plant on the southern shore of the reservoir, which discharges treated water into the reservoir. All neighboring farmlands and all government lands are zoned Agricultural and Forestry. An active gravel pit is located about 0.5 miles west of the upper end of the reservoir (UYWCD, 2008).

All project lands are zoned for Outdoor Recreation by the Routt County Planning Department, and all lands and recreation facilities immediately surrounding the reservoir and dam are owned by the licensee and leased to Stagecoach State Park. A corner of U.S. Bureau of Land Management (BLM) property is located within 50 feet of the current maximum reservoir operating elevation. No Tribal lands or reservations are located within, or adjacent to, the project boundary (UYWCD, 2008).

Stagecoach Reservoir and the surrounding area have high aesthetic quality, which is important to the recreational and aesthetic values of the site. Comparatively low mountains surround the reservoir, and elevations range from about 7,065 feet msl at the streambed below the dam to 8,971 feet msl atop Woodchuck Hill, two miles southeast of the dam site. Blacktail Mountain, located 1 mile north of the dam site, is at elevation 8,892 feet and the non-operational Stagecoach ski facilities are located two miles south of the reservoir at an elevation of 9,200 feet (UYWCD, 2008).

6.2.9.2 Environmental Effects and Recommendations

Construction

During the proposed construction, local land use, including recreation, as discussed in the previous section, would be interrupted by short-term, intermittent disturbances. Construction would not involve BLM property in the vicinity of the reservoir, or any Tribal lands.

Local aesthetics would be affected by the presence of the heavy construction equipment and construction activity, and noise would be generated during construction activities at the dam and mitigation areas around the reservoir. In order to mitigate these effects, project construction would not start until the fall, when fewer visitors are likely to be present.

Negative effects to land use and aesthetics during the proposed construction should be localized and generally minor to moderate in intensity. These effects would be temporary, and would cease after construction activities have been completed.

Operation

The proposed action would slightly modify the local view-shed by raising the dam spillway and by inundating approximately 48 additional acres around the 771-acre reservoir. A portion of the wetlands upstream of the reservoir is within the wetland habitat preserve and is used as a wildlife observation area. Following the proposed construction, there should be no significant change to local land use. There would be no changes to area roads or recreational access for aesthetic enjoyment of the reservoir and

surrounding area, once the proposed work is complete, as discussed in the previous section.

Generally, the proposed modifications to the dam spillway would have different effects on aesthetics based on the time of year and how the project would be operated. The dam would not appear significantly altered from upstream, or the reservoir and shoreline, because most of the time that visitors would be present water levels would be closer to the elevation of the spillway. During periods of lower water in the winter, snow would continue to cover mudflats in the area. Some of the completed modification would be visible from immediately downstream, but should alter area aesthetics. During winter, the presence of downstream fog should not be affected because there should be little or no change in discharge temperatures. Overall, the licensee's proposal should not result in any long-term effects to land use or aesthetics in the project area.

6.2.9.3 Effects of No-action Alternative

Under the no-action alternative, the maximum reservoir elevation at Stagecoach Reservoir would not change, and there would be no construction at the dam or mitigative construction at access areas around the reservoir, therefore creating no effects to land use or aesthetics.

6.2.10 Socioeconomics

6.2.10.1 Affected Environment

The socioeconomic environment for the Stagecoach Project includes the following adjacent counties: Carbon County, Wyoming (north); Jackson County, Colorado (east); Eagle County, Colorado (southeast); Grand County, Colorado (southeast); Garfield County, Colorado (southwest); Rio Blanco County, Colorado (southwest); and 7) Moffat County, Colorado (west). According to the 2000 U.S. Census, the land area within Routt County is approximately 2,362 square miles and there are approximately 8.3 persons per square mile. The county seat is Steamboat Springs, located approximately 16 miles south of the project. Other cities and towns in Routt County include Hayden, Oak Creek, Steamboat Springs, and Yampa.

According to the 2008 U.S. Census, Routt County had a population of approximately 22,980, which amounts to an increase of approximately 17 percent within the period of April 1, 2000, to July 1, 2008. This is slightly above the 15 percent increase in population estimated for the state of Colorado within the same time period. According to the 2000 U.S. Census, there were 7,953 households with 2.44 persons per household residing in the county. There were 14,205 housing units, with a median value of owner-occupied housing units of \$268,500.

According to the 2007 U.S. Census, Routt County had a median household income of \$63,797 which is higher than the Colorado state median household income of \$55,517. According to the 1999 U.S. Census data, the per capita income for the county was \$28,792. According to the 2007 U.S. Census, approximately 6.2 percent of persons living in the county were living below the poverty line.

6.2.10.2 Environmental Effects and Recommendations

Construction

The local tourism/recreational economy may be temporarily adversely affected by the proposed dam and mitigation construction. Recreation-oriented businesses that rely on project resources could be temporarily impacted to differing degrees, as some potential visitors may avoid the area during the construction period. This would be temporary, and should be mitigated by the licensee's proposal to perform the construction after the primary summer recreation season. Any effects would likely cease after the proposed construction is completed and recreation resource mitigation measures are fully implemented.

Temporary local jobs would be created by the proposed work at the dam and mitigation areas. There may also be a slight increase in local sales during the proposed construction.

Operation

Once the proposed construction ceases, there should be a small but long-term positive effect on local recreation and outdoor activity resulting from the increase in recreational capacity of Stagecoach Park, and changes in the reservoir shoreline and wetland areas. Increased visitation should boost the local summer economy.

6.2.10.3 Effects of No-action Alternative

Under the no-action alternative, the high water line at Stagecoach Reservoir would not change, and there would not be any changes to local recreation and outdoor activity that could affect the local economy.

6.2.11 Cumulatively Affected Resources

Cumulative effects are defined as the effects on the environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR §1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time, including hydropower and other water and land development activities.

The licensee identified several resources that could potentially be cumulatively affected through actions including the licensee's proposal. These are (1) wildlife habitat, (2) northern pike, (3) federally-listed fish species, (4) watershed water supply, (5) recreation, and (6) hydroelectric power generation. Commission staff agrees with the licensee's review of possible cumulative effects, and they are consistent with the findings in this EA. Possible cumulative affects linked to the licensee's proposal are summarized below.

Wildlife Habitat

The proposed amendment would permanently reduce the amount of sagebrush habitat available for wildlife, for example small mammals and nesting migratory birds that utilize sagebrush habitat in the project area. The licensee indicates that the Colorado DOW is particularly concerned with the needs of sagebrush-dependent wildlife, but notes that no sagebrush-dependent species of concern have been identified in the project area.

Northern Pike

Reduction in the numbers of northern pike, which are not native to the Yampa River and are highly predaceous, is an aim of the Upper Colorado River Endangered Fish Recovery Program. By increasing the storage capacity of the reservoir, the amount of stillwater habitat available for northern pike would also increase. Increases in northern pike habitat could be cumulative with other reservoir storage work in the Yampa Basin, and would not correlate with the endangered fish program's objectives. However, the licensee's proposed mitigative measures to reduce the creation of new pike habitat, particularly spawning habitat, and to manage reservoir operations to reduce pike escapement from the reservoir, should minimize any contribution to cumulative effects to pike predation on endangered fish.

Federally-Listed Fish Species

The FWS has completed extensive studies of factors limiting the recovery of the humpback chub, bonytail chub, Colorado pikeminnow, and razorback sucker, the four federally-listed fish species that occur approximately 65 miles downstream of the project in the Yampa River. Modeling by the FWS suggests that an additional 7,000 acre-feet of storage in the Yampa River Basin would significantly improve the critical habitats of these fishes, and the program favorably reviewed the proposed 3,185 acre-foot increase in Stagecoach Reservoir storage.

Consumptive use of water, including evaporation, could cause depletions in downstream flows, affecting the listed fishes. Such depletions could contribute cumulatively to impacts to the fishes' critical habitats, for example by reducing peak

flows. Depletions of any amount are considered by the FWS to be adverse effects. However, the anticipated benefit of the proposed enlargement would be that base flows during late summer and fall could be augmented through increased storage of inflows in the spring. Assuming flow augmentations reach the fishes' critical habitats downstream, they should provide a benefit to the listed species.

Watershed Water Supply

As reviewed earlier in this EA, the existing storage capacity of the Yampa River Basin is inadequate to meet existing and future human needs in the region, especially given inevitable population growth. Although conservation is an important tool in addressing future water demands, additional storage projects will have to be constructed in order to meet water supply needs. Enlargement of the Stagecoach Reservoir would help by creating additional water resources that could be allocated to uses such as municipal, recreational, and irrigation needs.

Although increasing the storage capacity of Stagecoach Reservoir would not solve the larger problem of inadequate storage capacity in the basin, it would be part of the necessarily cumulative solution.

Recreation

The licensee's proposal would enlarge the surface area of Stagecoach Reservoir and help ensure or improve suitable recreation access, thereby increasing Stagecoach State Park's recreational capacity. This would, in turn, help to address the goal of increasing opportunities for summer recreation in the Yampa Valley.

Hydroelectric Power Generation

Increasing the storage capacity of Stagecoach Reservoir would not affect the Stagecoach Project's peak generation capacity. However, the proposal would provide the ability to produce power over a longer period of time. The licensee's calculations indicate that the reservoir enlargement could result in a increase in generation capacity of 300,000 kilowatt/hours, or 6 percent.

7.0 FINDING OF NO SIGNIFICANT IMPACT

On the basis of our independent analysis, raising the height of the spillway at the Stagecoach Project, and increasing the maximum reservoir elevation by 4 feet, as proposed by the licensee, with the implementation of the proposed mitigation measures, and use of the additional mitigation measures recommended by staff, would cause at most minor, primarily temporary adverse impacts to environmental resources, and would have no material adverse impacts to water quality. Therefore, we find that approval of the

licensee's amendment request, with inclusion of the mitigation measures recommended by staff, would not constitute a major federal action significantly affecting the quality of the human environment.

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