Upper Yampa Water Conservancy District

JUL 20 2006

July 17, 2006

Notice of Proposal to Increase the Capacity of the Stagecoach Reservoir

The Upper Yampa Water Conservancy District is proposing to increase the reservoir elevation by 4 feet. This increase will require an amendment to the District's Hydroelectric permit and license with the Federal Energy Regulatory Commission (FERC) project numbers 9202-CO.

This increase will allow the District to provide for future water demands, and would increase slightly the recreational capacity of the reservoir. The District would continue to implement the terms of its current license, including release of minimum flows to the Yampa River, water quality monitoring implementation of wildlife habitat measures and operation with the Division of Parks of the recreational facilities. The District proposes to mitigate the impact on existing wetlands and recreation features.

The District will hold a meeting with the resource agencies and the public on Wednesday, 16th August, 2006 at the Yampa Town Hall. We wish to schedule the resource agencies from 3:30 to 5:30 and the public from 7 to 9pm.

The Initial Information Report (IIR) will be sent to the resource agencies in advance of the meeting, which will include a presentation of the project, mitigation measures and construction schedule. Written comments on the IIR and public meeting will be due no later than 15th of October, 2006 and should be directed to the Secretary of District.

Questions concerning the meeting should be directed to the District Secretary at 970/879-2424.

John R. Fetcher, Secretary
Upper Yampa Water Conservation District

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INITIAL INFORMATION REPORT FOR THE PROPOSED LICENSE AMENDMENT FOR MODIFICATIONS TO STAGECOACH DAM AND RESERVOIR

FEDERAL ENERGY REGULATORY COMMISSION PROJECT P-9202-CO

Prepared for
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July 17, 2006

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and

MWH Americas

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Upper Yampa Water Conservancy District (UYWCD), the licensee for the constructed and operating Stagecoach Dam and Reservoir Hydroelectric Project, proposes to amend the project's existing license issued by the Federal Energy Regulatory Commission (FERC)[1] to raise the storage level of Stagecoach Reservoir by 4 feet.

1.1 PROJECT BACKGROUND

Stagecoach Reservoir is located on the Yampa River in Routt County, Colorado, approximately 16-miles south of Steamboat Springs, Colorado. The location of the dam and reservoir is shown on Figure 1. Stagecoach Dam and Reservoir is owned and operated by UYWCD and provides water storage for municipal, agricultural, recreation, and for hydroelectric power generation. It was originally licensed by the FERC in 1987 as FERC No. 9202-CO. Stagecoach Dam and its appurtenances were constructed between 1987 and 1988 and consist of a roller compacted concrete (RCC) gravity dam, uncontrolled overflow spillway, embedded steel pressure pipe outlet works, and a hydroelectric power plant. Stagecoach Reservoir has a surface area of about 771 acres and storage capacity of 33,275 acre-feet at water surface elevation 7,200 feet.

The reservoir permits storage of snowmelt runoff in the late spring and early summer. Water is released from the reservoir through the outlet works, consisting of a penstock and powerhouse, or spills over the uncontrolled spillway. Stagecoach Reservoir is the only storage facility in the Yampa River basin capable of winter storage (Roehm 2004).

Stagecoach Dam has a structural height of about 150 feet and a hydraulic height of 132 feet above the original streambed elevation. The dam has a crest length of 390 feet and a crest width of 24 feet at elevation 7,210 feet. The spillway is an uncontrolled overflow chute structure located near the central part of the dam. The ogee shaped crest is 55 feet long at elevation 7,200. Figure 2 provides a photograph if the existing and proposed reservoir. Figure 3 shows a cross-section and Figure 4 a plan view of the current dam and the proposed modifications.

The outlet works consist of a reinforced concrete intake tower, concrete encased welded steel pipe located at the base of the dam, and a bifurcation to the turbine and to the jet-flowgate.

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. 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 trashrack protected and operated from the crest. The intake tower can be dewatered by closing the three intake gates and draining the outlet pipe.

The multi-level reinforced concrete power plant is located adjacent to the left wall of the stilling basin. The ground level contains the operator's offices and controls. A lower level contains an 800-kilowatt capacity horizontal mounted Francis turbine/generator unit, jet-flow gate and butterfly valve.

[1] In the first stage of consultation, an applicant provides information on the project and its environment and develops study plans in consultation with resource agencies, Indian tribes, and other stakeholders. In the second stage of consultation, the applicant conducts studies, prepares a draft application and attempts to resolve outstanding issues with participants. The third stage involves the filing of the application with the Federal Energy Regulatory Commission and the Commission processing of the application.

UYWCD leases the operation and management of the lake and recreation facilities to Stagecoach State Park. The park operates the campgrounds, hiking trail, and other recreation attractions at the reservoir.

1.2 CURRENT OPERATION

The Stagecoach Hydropower Project is generally operated as a run-of–the-river facility with power generated by the planned and required reservoir releases. Commitments to provide water for irrigation, municipal and industrial purposes, and to provide flows to protect the downstream fishery are permitted to be stored and released. Typically, the reservoir is filled with snowmelt and runoff in the late spring and early summer, with the reservoir reaching its peak storage generally 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. Nearly all of the drawdown occurs after September 1. Historic data show yearly drawdowns of about 8 to 10 feet. A plot of the reservoir levels is shown on Figure 5.

As part of their FERC license, UYWCD is required to release a minimum flow, determined by the time of year. A minimum flow of 40 cfs or the flow into the reservoir (whichever is less) between December 1 and July 30, and a minimum flow of 20 cfs from August 1 to November 30. The flow in and out of the reservoir is measured at USGS gauging stations upstream and downstream of the reservoir. Generally, the minimum flows are exceeded substantially to meet water commitments and to generate power. During droughts, power generation is reduced and downstream water commitments and minimum flow requirements determine the discharge.

The discharge water quality is monitored by UYWCD for temperature and dissolved oxygen (DO). Section 2.1 discusses the current water quality monitoring operation.

1.3 PURPOSE AND NEED

When the Stagecoach Reservoir was originally built, "industrial and municipal uses, irrigation, recreation, hydroelectric power generation, and fish and wildlife" were identified as reasons for constructing this project. The population of Routt County as documented from the 1980 Census was 13,604 persons. The proposed storage capacity of the Stagecoach Reservoir was projected to be 33,275 AF. This water was allocated to recreation (15,000 AF), industrial (7,000 AF), irrigation (4,000 AF), dead storage (3,275 AF), municipal (2,000 AF) and uncommitted (2,000 AF) (Bureau of Reclamation 1986),

As a consequence of the severe statewide drought of 2002, in 2003 the Colorado General Assembly commissioned the "Colorado Statewide Water Supply Initiative" (SWSI) to document the "existing supplies and existing and projected demands" for water through the year 2030. This study documents that by 2030 population of Colorado will increase by 2.82 million, and that for the Yampa/White/Green River basins, the population growth will increase faster than the State as a whole, with the 2000 population estimated to increase from 39,300 to 61,400 persons or at a rate of 56-percent or at an annual rate of 2.24 percent. Due to population growth, increased irrigation acreage, and increased demands from recreational and environmental uses, it is estimated that there will be a projected increase in water demand of 22,300 AF. While this report acknowledges that conservation is an important tool in meeting future demands, it concludes that "conservation alone cannot meet" all of Colorado future water needs, and that to

supply the needed water additional storage projects will have to be constructed. Among the projects listed for the Yampa/White/Green Basins are the enlargements of Elkhead and Stagecoach Reservoirs (Colorado Water Conservation Board 2004).

In efforts to aid the recovery of the threatened and endangered fisheries in the Yampa River Basin, the U.S. Fish and Wildlife Service (USFWS) has completed extensive studies of the factors limiting the recovery of the humpback chub (*Gilia cypha*), bonytail (*G. elegans*), razorback sucker (*Xyrauchen texanus*), and the Colorado pikeminnow (*Ptychocheilus lucius*). These studies documented that a critical component in the life cycle of these species are very low base flows which typically occur during the spawning period of late summer and early fall, primarily from August through October. Flows at Maybell as low as 2 cfs have been recorded as recently as 2001, and it is imperative that base flows during this critical period be augmented. Their modeling suggests that an additional 7,000 AF of storage would significantly improve the critical habitat of these species in the lower stem of the Yampa River Basin and generally keep flows above the calculated critical 93 cfs threshold. This evaluation considered 14 different alternatives, and concluded that the enlargement of Elkhead Reservoir would most reasonably accomplish these immediate goals. However, Stagecoach Reservoir was extensively considered in this evaluation and many favorable findings were found relative to the proposed enlargement of this reservoir and the proposed fisheries recovery program (Roehm 2004).

The 3,185 AF of additional storage that would be generated by the proposed four foot raise in Stagecoach Reservoir would be tentatively allocated as follows: municipal (1,500 AF); recreation (1,000 AF); irrigation (525 AF); and uncommitted (160 AF). The justification for this additional storage is associated with five primary areas: 1) water supply, 2) recreational use, 3) threatened and endangered fisheries, 4) increased power generation, and 5) compliance with Colorado law.

Water Supply

The existing storage capacity of the Yampa River basin water supply is inadequate to meet both existing and future human needs of the region. The inevitable population growth, as documented in various studies, projects a deficit of water unless additional storage and/or supplies are obtained. Historically, the waters in Stagecoach Reservoir have been leased by both the City of Steamboat Springs and the Mount Werner Water and Sanitation District as a backup water supply for the City of Steamboat Springs. The SWSI estimates that by 2020, the Yampa/White/Green Basin will need an additional 22,300 AF of water simply to supply existing and proposed municipal and industrial demands (Colorado Water Conservation Board 2004). The USFWS (Roehm 2004) calculates that given only limited growth, by 2045 the Yampa River Basin will need an additional 25,291 AF of water. Both the Colorado Water Conservation Board (2004) and the USFWS (Roehm 2004) discuss the prospects of raising Stagecoach Reservoir, without mentioning any significant negative aspects. The need for additional storage is well documented and the proposal to enlarge Stagecoach Reservoir is one of the least environmentally damaging alternatives available.

Recreation Use

Routt County has historically been, and continues to serve as, a major recreational destination. Best known for its winter skiing, it is rapidly becoming a major summer recreational destination,

as evidenced by the news reports that over the July 4, 2006 holiday, Steamboat Springs was the number one vacation destination in Colorado according to AAA Colorado. In recent years, numerous efforts have been initiated by the local business community to promote summer recreational use and smooth out the great imbalance which historically has many businesses in the Yampa Valley being filled close to capacity during the winter months, but being significantly under utilized during the summer months. Stagecoach Reservoir is one of the major summer use recreational use areas in the Yampa Valley.

The original development plan contained the commitment to construct campgrounds containing 100 campsites, a total of 50 parking spaces, hiking trails and numerous other amenities. The use of Stagecoach Reservoir in 1988 was projected to equal 71,000 recreation use days annually (Bureau of Reclamation 1986). The recreational facilities associated with the Stagecoach Reservoir have been operated by Colorado State Parks as the Stagecoach State Park. According to records obtained from Colorado State Parks, annual use from 1989 through June 2006 averages 205,357 visitor days per year. The enlargement of Stagecoach Reservoir, with a surface area currently containing 771 acres to one containing 818 acres, would allow this visitor use to continue if not to slightly increase, which is consistent with documented recreation trends. This proposed change is also consistent with the declared local objective of increasing opportunities for summer recreation in the Yampa Valley.

Threatened and Endangered Fisheries

The USFWS (Roehm 2004) has documented that the four threatened and endangered fisheries in the Yampa River basin require minimum base flows during the late summer and early fall months for maintenance of the existing populations, and for recovery to suitable sustainable population levels. The terms and conditions of the existing FERC permit require that water drawdown levels at Stagecoach Reservoir typically not exceed 2.4-feet during the months of June, July, August or during the recreation season (Bureau of Reclamation 1986). This operating condition results in a situation almost identical to that associated with the significant financial participation of the USFWS in the current enlargement of Elkhead Reservoir, where one of the major reasons for modifying that site was to augment base flows during the late summer and fall months. Although designed and operated for slightly different reasons, the anticipated result of enlarging Stagecoach Reservoir would be that the base flows during the late summer and fall months would be augmented as a result of greater water storage capacity. This positive benefit of increased base flows is particularly important for the section of the Yampa River above Elkhead Creek, where there is no current long-term provision for increased base flows, except for the lease on Steamboat Lake water, which is expected to end as soon as Elkhead Reservoir is completed. Raising the water level of Stagecoach Reservoir would have a primary positive effect of increasing base flows above Elkhead Creek and secondarily from that point downstream in the lower reaches of the Yampa, which have been deemed critical habitat for the four threatened and endangered fisheries in the Yampa River basin.

Hydroelectric Power Generation

The 1986 Environmental Impact Statement (EIS) originally projected that approximately 4.4 million kilowatt hours of electricity would be obtained from the construction of Stagecoach Dam and the associated 800-kilowatt generator (Bureau of Reclamation 1986). In actuality, the

average amount of power generated by the Stagecoach Dam power plant has averaged closer to 5 million kilowatt hours of electricity. The proposal to enlarge Stagecoach Reservoir would not affect the peak generation capacity as it is limited to 800 kilowatt capacity of the existing generator, but the additional head of water would result in power being generated over a longer period of time and more efficiently. Calculations by the UYWCD indicate that the enlargement of Stagecoach Reservoir would result in the generation capacity being increased by approximately six percent, or by approximately 300,000-kilowatt hours. This power is "Green Certified Power" by the Low Impact Hydropower Institute as a producer of renewable energy.

Compliance with Colorado State Law

As passed by the 2005 legislature, House Bill 05-1177 entitled the "Colorado Water Supply for the 21st Century Act" requires State and local water districts to assemble the data collected in connection with the SWSI requirements passed by the 2003 legislature, and to "develop a basin-wide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters with the basin, and … propose projects or methods for meeting those needs." The proposed enlargement of Stagecoach Reservoir by raising the water level four feet puts the UYWCD in compliance with these State laws.

1.4 PROPOSED LICENSE AMENDMENT

The proposed amendment would authorize UYWCD to increase the normal maximum pool level of Stagecoach Reservoir by increasing the height of the ogee crest in the spillway of the dam by four feet. Three alternatives were considered: 2-feet, 4-feet, and 6-feet raise. The four-foot raise was determined to provide the best balance among environmental, storage, and cost factors. The spillway crest raise would be accomplished by constructing a cast-in-place concrete reinforced ogee spillway on top of the existing spillway crest. Figure 3 shows a cross section through the dam spillway with both the existing crest and the 4-foot crest raise shown, and Figure 4 shows a plan view of the dam and proposed modifications. The storage capacity, operating water level, and the surface area would all increase as a result of increasing the height of the crest. Table 1 contains a summary of the results of increasing the crest height on the surface area, volume, and operating level of the reservoir. Figure 2 shows the increase to the reservoir surface area.

Table 1
Crest Raise Volume and Area Impact

Raise Height (ft)	Operating Water Level (ft)	Approx. Surface Area (acres)	Approx. Storage Capacity (acre-ft)	Change in Surface Area (acres)	Change in Storage Capacity (acre-ft)
Existing	7,200	771	33,275	0	0
4-foot	7,204	818	36,460	47	3,185

1.5 PROPOSED MODIFICATIONS TO CURRENT OPERATION

Stagecoach Dam and Reservoir would continue to generally be operated as a run-of–the-river facility. Commitments to provide water for irrigation, municipal and industrial purposes, and to provide flows to protect downstream fisheries would be unchanged. No changes to current

minimum flow requirements are proposed. The discharge water quality would continue to be monitored for temperature and DO. The additional storage would be collected in the reservoir during times of high flow into the reservoir, generally late spring or early summer. Therefore, the reservoir would have more water to release during low flow periods.

The potentially affected environmental resources include:

- Water use and quality;
- Fish and aquatic resources;
- Wildlife and botanical resources;
- Wetlands and riparian habitat;
- Rare, threatened, and endangered species;
- Geological and soil resources;
- Recreational resources;
- Land use;
- Aesthetic resource; and
- Cultural resources.

Each resource section describes the existing environment and identifies potential environmental impacts to the resource.

2.1 WATER USE AND QUALITY

Existing Conditions

Stagecoach Reservoir is located on the Yampa River, a major tributary of the Green River, which in turn is a major tributary of the Colorado River. Major tributaries of the Yampa River above Stagecoach Reservoir include Bear River and Hunt Creek, which originate on the Flattop Mountains to the southwest. The watershed at U.S. Geological Survey (USGS) gauging station 09237500 located just below Stagecoach Dam is 228 square miles. Average discharge from 1989 to 2004 was 72 cfs, or 52,126 acre-feet per year (USGS 2006). Historic average discharge recorded from a previous USGS gauging station located near the dam was 86.2 cfs or 62,380 acre-feet/year, for the period 1939 to 1944 and 1947 to 1972 (Bureau of Reclamation 1986).

Water Use

Stagecoach Reservoir provides water supply for municipal, agricultural, recreation, hydroelectric generation and storage for flood control. Table 2 presents the allocation of water storage to the specific uses. The project is operated to fulfill these uses and generate hydroelectric power with the water released. In addition, the reservoir provides minimum flows to the river for maintaining habitat.

Table 2
Stagecoach Reservoir Water Usage

Water Usage	Current Usage (ac-ft/yr)
Irrigation	4,000
Municipal	2,000
Industrial	7,000
Recreation	15,000
Dead Storage	3,275
Uncommitted	2,000
Total	**33,275**

The reservoir does not fill every year. Figure 5 provides the reservoir stage versus time, indicating that in the period of 1993 to 2004 the reservoir did not fill in 1994 or 2000. The reservoir could have filled, but did not because of an emphasis on hydropower generation at that time (the reservoir is now operated with an emphasis on storage). The users do not take their full water right allotment each year and, therefore, in addition to the uses described in Table 2, the reservoir also operates to benefit the river in accordance with the interests of the State Water Division. Releases are made to provide flushing flows and to reduce the impacts of significant water rights calls from the river downstream of the project under informal agreements with the reservoir operator. These additional releases are documented, but not required. Peak storage is predicted based on snow pack and can be controlled by the amount of hydropower generation. For example, if a dry year is predicted in December, power output is reduced to favor water storage. Average annual drawdown is about 8 feet vertically, with the greatest drawdown occurring during the winter and early spring. Average drawdown during the recreation season of June, July and August is typically 2.4 feet.

The existing reservoir operates as a run-of-river, storage-from-inflow and release-to-river during various periods of the year. Table 3 provides the criteria for the operation of the reservoir for a one-year period. Multiple year periods involve carry-over criteria that have little impact on reservoir operations. The flood storage capacity is not a defined benefit or use, but is an added benefit the operator provides by lowering the reservoir prior to spring runoff.

Table 3
Minimum Outlet Flow Requirements

Dates	Minimum Flows Required
December 1 to July 31	40 cfs or inflow - whichever is less
August 1 to November 30	20 cfs

The raise would not involve any immediate changes to the water use, but would result in more storage (up to the new spillway crest) for benefit of the State for use in sustaining downstream flows during drought and other periods of low water. In addition, the raise would provide for storage of excess water during wet seasons or years and greater utilization of existing water rights as desired by the owners.

Water Quality

Stagecoach Dam was initially filled to a capacity of 33,275 acre-feet in spring 1991. Physical, chemical and biological data were collected at sites upstream and downstream, and at two sites within the reservoir, to assess the effect of the reservoir on the hydrology of the Yampa River. Changes in the water quality were evaluated and compared to the baseline data for the Yampa River. The impacts of the reservoir were summarized in 1995 in Water-Resources Investigation Report 95-4101 issued by the USGS (USGS 1995). The report indicates that the reservoir had a moderating effect on temperature and locally decreased the DO in the Yampa River.

Discharge water temperature is monitored daily immediately downstream of the stilling basin and dissolved oxygen (DO) is checked weekly at a station 1,000-feet downstream. There are two downstream USGS monitoring stations. One is located immediately downstream of the stilling basin. At this station, flowrate, temperature and DO are recorded. UYWCD attempts to maintain the DO above 4.0 mg/l at the first monitoring station. The second station is about 1,000 feet downstream and only the flow rate and the DO are measured. DO is required to be at least 6.0 mg/l at the second station. Temperature is generally not recorded at the second station because it changes little between the two stations.

There are no minimum or maximum temperature requirements. The operation of the multilevel intake gates can affect the temperature of water released. UYWCD works with the Colorado Department of Wildlife (CDOW) to provide the best temperature water practicable for the downstream fishery in winter and summer. During the winter months, the intake gates are adjusted to provide maximum discharge temperature (approximately 4° Celsius). The stream remains free of ice from the dam to Lake Catamount.

USGS 1995 contains reservoir temperature and DO profile data taken from 1990 to 1992. Table 4 shows a sample of the water quality data presented in USGS 1995. Table 4 shows that in the April to November period, the temperature and DO concentration in the reservoir typically decrease with depth, but the gradients and depth of stratified zones are variable. These data show the temperature decreases in the upper 50-feet, about 5 to 10 degrees Celsius during warm months and 1 to 3 degrees Celsius during colder months. The water temperature profiles in the warmer months show stratification. Water quality measurements are periodically reported to FERC.

Table 4
Sample Water Quality Data

Depth (feet)	Apr-92		May-92		Jun-92		Jul-92		Aug-92		Sep-92		Nov-92	
	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)
0	5.7	10.0	13.8	9.7	19.8	8.0	19.1	7.3	16.5	5.6	14.0	8.1	6.8	4.7
2	5.0	10.2	13.8	9.7	19.8	8.1	19.0	7.3	16.5	5.5	14.0	8.1	6.8	4.7

Table 4
Sample Water Quality Data

Depth (feet)	Apr-92		May-92		Jun-92		Jul-92		Aug-92		Sep-92		Nov-92	
	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)
4	5.0	10.0	13.8	9.7	19.5	8.1	19.0	7.2	16.5	5.5	14.0	8.0	6.8	4.7
7	4.9	10.0	13.8	9.7	19.5	8.1	18.9	7.2	16.5	5.5	14.0	8.0	6.8	4.5
10	4.9	10.1	13.8	9.7	17.1	8.7	18.8	7.2	16.0	5.3	14.0	8.0	6.8	4.4
15	4.8	9.9	13.8	9.7	15.5	6.7	18.2	6.1	16.0	5.4	14.0	7.9	6.8	4.5
20	4.6	9.8	10.9	6.8	13.5	2.9	16.7	3.4	16.0	4.9	14.0	7.9	6.8	4.5
25	4.1	9.7	9.6	6.0	10.8	0.7	14.0	0.3	15.6	0.1	14.0	7.9	6.8	4.5
30	3.9	6.8	7.9	5.4	9.8	0.5	12.6	0.0	13.0	0.0	13.8	7.5	6.8	4.6
40	3.5	5.4	6.2	4.7	8.6	1.2	10.4	0.0	10.8	0.0	10.6	0.0	6.8	4.4
50	3.5	2.8	5.8	4.4	7.5	1.1	9.5	0.0	9.0	0.0	8.6	0.0	6.8	4.9
75	3.5	2.9	5.2	3.0	6.9	1.0	7.8	0.0	8.0	0.0	7.5	0.0	6.5	3.4
100	3.5	0.0	5.0	1.0	6.0	0.0	7.4	0.0	7.5	0.0	6.8	0.0	6.4	0.0

Source: USGS 1995

Impacts from Proposed Modifications

Water Use

The increased reservoir capacity would enable storage of water from several sources including: storms, wetter seasons, wetter years and other stream flows that are identified in the basin. These water sources cannot be stored now. The impact on the downstream flow would be to reduce the peak flows that currently exist, and to provide additional releases for existing uses and uses determined to be of benefit in the future.

As of now the outflows from the additional storage have not been finalized, but are considered to be as follows: storage of storm and excess runoff in the April through June time period, and release of flows from July through November. The actual storage and release hydrographs would be determined by the operations for each year. The existing operation is variable, depending on the amount of fill in the spring and the timing of required and negotiated releases. The outflow from the proposed modification would be similar and would likely result in increased stream flows during low flow periods. Vertical drawdown during the recreation season would remain about the same.

Water Quality

The DO profiles observed in Table 4 show decreasing DO with depth. The inverts of the gates on the intake tower are fixed; therefore water released from the reservoir may show a decrease in DO at the stilling basin at some times of year because of the increased water depth. UYWCD

would continue to monitor discharge water DO and to maintain DO at required levels. After leaving the stilling basin, the DO is expected to rapidly increase to saturated levels due to the natural aeration of the shallow stream. The DO levels at the monitoring station (about 1,000-feet downstream) are not expected to be impacted from the proposed modifications.

Similar to DO, the temperatures generally decrease with depth, but the change in temperature within the top 7 feet is typically 0.5 degrees C or less (See Table 4 and USGS 1995). The higher water level may cause a small decrease in water temperature released from the dam. This decrease in water temperature is expected to have a positive or negligible effect on the fishery of the river downstream.

2.2 FISH AND AQUATIC RESOURCES

Existing Conditions

Stagecoach Reservoir

Stagecoach Reservoir provides cold-water recreational fishing opportunities for northern pike, rainbow trout and white suckers. Reservoir fishing regulations allow a 4 fish limit, except for unlimited catch on northern pike, a non-native predatory fish (Atkinson 2004). Fish species known to occur in Stagecoach Reservoir and downstream are listed in Table 5.

Table 5
Fish Present in Stagecoach Reservoir and Yampa River

Name	Species	Stagecoach Reservoir	Downstream Yampa River	Game Fish?	Native?
Rainbow trout	*Oncorhynchus mykiss*	Present	Present	Yes	No
Splake (hybridized lake and brook trout	*Salvelinus namaycush X S. fontinalis*	Present		Yes	No
Kokanee	*Oncorhynchus nerka*	Present?		Yes	No
Snake River trout	*Oncorhynchus clarki*	Present		Yes	No
Northern pike	*Esox lucius*	Present		Yes	No
Brook trout	*Salvelinus fontinalis*	Present	Present	Yes	No
Brown trout	*Salmo trutta*	Present	Present	Yes	No
Mountain whitefish	*Prosopium williamsoni*	Present	Present	Yes	Yes
Mottled sculpin	*Cottus bairdi*		Present	No	Yes
Speckled dace	*Rhinichthys osculus*		Present	No	Yes
Red-sided shiner	*Richarsonius balteatus*	Present	Present	No	Yes
White sucker	*Catostomus commersoni*	Present	Present	No	No
Bluehead sucker	*Catostomus discobolus*	Present		No	Yes
Fathead minnow	*Pimapheles promelas*		Present	No	No

CDOW stocks Stagecoach Reservoir annually with rainbow trout 12 inches in length. CDOW stocked 48,000 rainbow trout in Stagecoach Reservoir in 2005, 45,000 in 2004 and 2003, and just under 45,000 in 2002. While no other fish species are currently stocked in the reservoir, 7,000 splake (hybridized lake and brook trout) and 50,000 kokanee were stocked in 2000. Prior to 2000, annual stocking of kokanee, splake and Snake River cutthroat trout occurred from 1994 through 1996, though very few of these stocked fish survived to catcheable size due to predation by northern pike. Kokanee probably no longer occur in the reservoir since they have not been stocked for several years; splake and Snake River cutthroat are rare. In the future, CDOW may increase the number of rainbow trout stocked, depending on northern pike densities. Trends in density are monitored through gillnetting.

Northern pike were discovered in Stagecoach Reservoir in 1994, and were probably introduced by fishermen. The introduction of northern pike decimated populations of trout and suckers, especially those living along the shoreline. CDOW is currently managing fish populations by stocking larger rainbow trout. Twelve-inch rainbows are stocked in November when northern pike are wintering in deep waters, and the rainbows have 7 months in which they generally grow 2 inches before pike emerge from spawning and start to prey. Generally, a pike can consume prey up to 45 percent of its body mass, therefore it would require a 31-inch pike to prey on a 14-inch rainbow. Since pike winter in cool, deep water, and spawn in the shallows over vegetation in spring and fall, rainbows are generally not preyed upon until June or July (CDOW 2004). This promotes larger sized northern pike and rainbow trout for recreational fishing. Northern pike populations are estimated at 17,000 fish from a study conducted in 2003 (CDOW 2004). Densities of northern pike greater than 35 cm in length were 5.9 fish per hectare.

Except for northern pike, there is little successful natural recruitment of fish in the reservoir because of predation by pike. Rainbow trout move up the inlet to spawn in the spring. Mountain whitefish and small populations of brook and brown trout may also move upstream to spawn on riffles in the fall. White suckers spawn over riffles or on wind-swept shores in the spring. The CDOW manages the fishery by stocking of rainbow trout and considers natural recruitment to be a minor factor because of heavy predation on young fish (Atkinson 2005).

Stagecoach Reservoir is operated as a cold-water fishery. Optimum conditions for rainbow trout growth are 13-21° C., pH of 7-8, and DO concentrations of >7 ppm at temperatures <15° C. and >9 ppm at temperatures above 15° C. (New Mexico Game and Fish 2005). Temperatures were within this range, to a depth of 30 or more feet, from early June through September but sometimes exceeded 21° at shallow depths (0-2 feet) in summer during monitoring by the USGS in 1990-1992 (Tobin 1996). DO was at optimum levels in the upper portions (0 to 8 or 10 feet) of the deeper parts of the reservoir throughout the summer, but was less than optimum in the shallower upper end of the reservoir. DO levels too low to support rainbow trout typically occurred below 15 to 20-foot depth in shallow water and 20 to 40-foot depth in deeper water. Low DO occurred throughout the depth profile in late fall after reservoir turnover. In addition to depth and location, temperature and DO also varied by month and year. Water pH values within the portion of the water column used by fish were typically in the range of 8.0 to 8.7.

Yampa River

Morrison and Service creeks flow into the Yampa River below Stagecoach Reservoir. Downstream of Stagecoach Reservoir, the Yampa River meanders through meadows used for hay production and livestock grazing, and averages 40 feet wide at its confluence with Morrison

Creek. For approximately a mile downstream from its confluence with Service Creek, the Yampa River passes through a narrow valley with thick riparian vegetation on both sides of the river. Discharge in the Yampa River is primarily from snowmelt between spring and early summer. Additionally, summer rainstorms can temporarily increase water flow and sediment loads in the Yampa River (USGS 1995).

The project tailwater is open year-round, so habitat for fish is available in all seasons. Anglers may use artificial flies and lures only. From Stagecoach Dam to 0.6 miles downstream, all fishing is catch and release; below 0.6 miles including near the confluence with Service Creek, there is a two fish bag limit.

Fish species inhabiting waters downstream from the Stagecoach Dam include rainbow, brook, and brown trout, mountain whitefish, mottled sculpin, speckled dace, red-sided shiner, white suckers and fathead minnow. Northern pike are not considered abundant in this reach of the Yampa River, as the water is not typical pike habitat. At the confluence of the Yampa River with Service Creek, fish species are similar to those found below the dam, though speckled dace and red-sided shiners have not been caught.

Rainbow trout were annually stocked in this reach of the Yampa River from 1991 to 1996 with catcheables (9-10 inches long) and subcatcheables (3-5 inches long). Since 1996, stocking occurred one-time in 2001. Currently, no stocking occurs in the river due to natural recruitment of rainbows as a result of catch and release regulations as well as cooperative flow management from the reservoir (CDOW 2004). CDOW is currently monitoring natural recruitment in this reach due to its high year-round recreational fishing use. Colorado State Parks manages the property located just below Stagecoach Dam; the area around Service Creek is a State Wildlife Area, and portions of the river are within private lands.

CDOW conducts regular electroshock surveys at two stations along the Yampa River. For the reach of the Yampa River right below the dam, rainbow trout are considered the most abundant fish in the river. Rainbow densities were 4,437 per mile in 2000, 6,577 per mile in 2001 (85 percent of total catch), 4,199 per mile in 2002 (92 percent of total catch) and 1,028 per mile in 2003 (78 percent of total catch). The reason for declines in rainbows per mile for 2003 is unclear; surveys for 2004 have not been conducted (CDOW 2004). Six age classes of rainbow trout occur in this reach.

Near Service Creek, five age classes of rainbows have been found. Rainbow trout accounted for 20 percent of the catch in 2002 and 30 percent of the catch in 2003 during electroshock surveys. Higher densities of mountain whitefish occur at this location as compared to the reach below the dam. Brook trout and fathead minnows are found in very low densities at this location.

Rainbow trout spawn in this reach of the Yampa River in June and July, coinciding with high releases of water down the river. Spawning occurs right below the Stagecoach Dam. Rainbows spawn over gravel substrate and hatchlings emerge from gravel in August. The Yampa River tailwaters also provide wintering habitat for the species, as flows are sufficient to support the fish. Mountain whitefish also spawn in this reach of the Yampa River and spawning for this species occurs in October.

Whirling disease has affected fish near the confluence with Service Creek (CDOW 2004). Additionally, CDOW is concerned with hybridization between white suckers with bluehead and flannelmouth suckers occurring downstream.

Impacts to Fisheries from Proposed Modifications

Stagecoach Reservoir

The increased area of the reservoir may expand habitat for reservoir fisheries. The area of the reservoir would increase by about 47 acres (6 percent). However, increased storage capacity in Stagecoach Reservoir could increase availability of shallow water along the perimeter of the reservoir, and could increase natural recruitment of northern pike as these fish spawn in shallow waters over vegetation. CDOW is currently managing fisheries in the reservoir to keep northern pike numbers low and sizes high to promote rainbow trout numbers and accommodate fishing. Management is not expected to change from the proposed modifications.

Yampa River

Fish inhabiting the Yampa River below Stagecoach Reservoir would not be significantly impacted by alteration of stream flows during project operation. Stream flows would not be reduced except during times of high flow into the reservoir when the reservoir is filling from snowmelt and runoff in late spring and early summer. Stream flows may increase at other times of year, depending on the uses of the additional storage water and the timing and location of withdrawals. Water supplied from the reservoir would typically be released downstream for some distance to a diversion point. Minimum stream flow requirements from reservoir releases would remain unchanged. Current requirements are 40 cfs or inflow (whichever is less) for the period of December 1 to November 30, and 20 cfs from August 1 to November 30 (Table 3). Rainbow trout spawning normally occurs in June and July and coincides with high releases from the reservoir (Atkinson 2004). The added water storage in the reservoir could increase downstream flows in low water years, and rainbow trout and other fish would benefit from these increased flows. Currently, wintering habitat is sufficient as the reservoir provides good flow and operators coordinate with CDOW biologists to accommodate spawning or wintering fish activity.

2.3 WILDLIFE AND BOTANICAL RESOURCES

Existing Conditions

Vegetation

The Stagecoach Reservoir area is comprised of several vegetation communities (Table 6). Wetlands occur along the portions of the shoreline at the upstream end of the reservoir and along some tributaries (IME 2004). 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.

Table 6
Vegetation Communities at Stagecoach Reservoir

Vegetative Community	Dominant Plant Species	Other Common Plants
Wetlands	Sandbar willow (*Salix exigua*), Geyer willow (*S. geyeriana*), Bebb willow (S. bebbiana), mountain willow (*S. monticola*), blue willow, bog birch (*Betula pumila*), and mountain alder (*Alnus tenuifolia*). **Artificial wetlands:** Reed canarygrass (*Phalaris arundinacea*), spreading bentgrass (*Agrostis stolonifera*), various sedges, mint (*Mentha arvensis*), and curley dock (*Rumex crispus*). **Natural wetlands**: riparian shrubs listed above, plus spreading bentgrass, various sedges, Baltic rush (*Juncus balticus*), spikerush (*Eleocharis rostellata*), and mint.	Various rushes and grasses.
Sagebrush	Big sagebrush (*Artemisia tridenta*), mountain snowberry (*Symphoricarpos oreophilus*), and green rabbitbrush (*Chrysothamnus viscidiflorus*).	Wild buckwheat (*Eriogonum* sp.), giant hyssop (*Agastache* sp.), lupine (*Lupinus* sp.), and Hood's phlox (*Phlox hoodii*).
Agricultural Meadows	Irrigated and dryland pasture and hayland meadows (smooth brome [*Bromus inermis]*, alfalfa *[Medicago* sp.], and bluegrass [*Poa* spp.]), as well as big sagebrush in abandoned or fallow areas.	Dandelion (*Taraxacum officinale*), thistle, field pennycress (*Thlaspi arvense*), lupine, timothy *Phleum pratense*, orchardgrass (*Dactylis glomerata*), meadow barley (*Hordeum brachyantherum*), and wildrye (*Elymus/Leymus sp*).
Montane shrubland	Mountain snowberry, serviceberry (*Amelanchier alnifolia*), antelope bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus nauseosus*), chokecherry (*Prunus virginiana*), and Gambel oak (*Quercus gambelii*).	Kentucky bluegrass (*Poa pratensis*), dryland sedges (*Carex* spp.), American vetch (*Vicia americana*), aspen peavine (*Lathyrus leucanthus*), and meadowrue (*Thalictrum* sp.).
Montane forest	Quaking aspen (*Populus tremuloides*), Colorado blue spruce (*Picea pungens*), lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), buffaloberry *(Shepherdia* sp.), serviceberry, chokecherry, and snowberry.	Gambel oak, rose (Rosa woodsii), pachistima (*Pachistima myrsinites*), *Arnica* sp., red osier dogwood (*Cornus sericea*), sedges (*Carex* spp.), clematis (*Clematis ligusticifolia*), sweet cicely (*Osmorhiza spp.*), wintergreen (*Pyrola* sp.), dwarf bilberry (*Vaccinium caespitosum*), and meadowrue.

No specific information on occurrence of noxious weeds at Stagecoach Reservoir was identified. State-listed noxious weeds that may be present include Canada thistle, bull thistle and oxeye daisy (Colorado Department of Agriculture 2004).

Wildlife

A variety of wildlife species inhabits the study area in one or more of the available vegetation communities. Small game and bird hunting is allowed in season at the Stagecoach Reservoir. Game species include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), grouse and various species of ducks.

Suitable habitat for nesting raptors does not occur near the shoreline of the reservoir, though raptors may nest in the adjacent cliff and woodland habitats. Raptors likely utilize the entire study area for hunting or foraging. Present raptor species include turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*) (may nest in cliffs in vicinity), American kestrel (*Falco sparverius*) and Northern harrier (*Circus cyaneus*). Bald eagles (*Haliaeetus leucocephalus*) also occur and are discussed in the "Rare, Threatened and Endangered Species" section of this document.

Wildlife expected to occur in each of the vegetation communities are discussed below.

Wetlands and Aquatic Habitat

Wetlands in the project area support a variety of wildlife. Amphibians likely to inhabit suitable habitats around the reservoir include tiger salamander (*Ambystoma tigrinum*), northern leopard frog (*Rana pipiens*), and western chorus frog (*Pseudacris triseriata*). Small mammals occurring in wetland habitats include montane shrews (*Sorex monticolus*), pocket gopher (*Thomomys* sp.), voles (*Microtus* spp.), beaver, muskrat, western jumping mouse (*Zapus princeps*), deer mice (*Peromyscus maniculatus*), and least chipmunk (*Tamias minimus*).

Wetlands and ponds at the southern inlet provide nesting habitat for waterfowl including cinnamon teal (*Anas cyanoptera*), mallard (*Anas platyrhynchos*), and Canada goose (*Branta canadensis*). Many other ducks forage on the reservoir in all seasons, including winter and migration. Additionally, ducks are likely to nest in any suitable habitat around reservoir shore and in associated riparian streamside habitat.

Shorebirds nest and forage in wetlands and shallows around the reservoir. Killdeer (*Charadrius montanus*) and spotted sandpiper (*Actitis macularia*) are common species that may nest in suitable areas around the perimeter of reservoir.

Many passerine (songbirds) nest or forage in wetlands and open water. Some of the more common nesting species foraging or nesting in or near wetlands include yellow warbler (*Dendroica petechia*), tree swallows (*Tachycineta bicolor*), song sparrows (*Melospiza melodia),* Lincoln's sparrows (*Melospiza lincolnii*), and red-winged black birds (*Agelaius phoeniceus*).

Sagebrush

The sagebrush community is the predominant vegetative type in the study area and provides habitat for small mammals and nesting migratory birds, as well as foraging habitat for American elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus*). Elk severe winter range and winter concentration areas, which occur on the south facing slopes of Blacktail Mountain in the northern portion of the study area, are comprised of sagebrush habitat.

According to CDOW (2004), an estimated 500 elk winter in the vicinity of Stagecoach Reservoir, particularly the steep, south-facing slopes in oak and aspen habitat, which includes

Woodchuck Hill, Blacktail Mountain, and Thorpe Mountain (Figure 1). Additionally, the northern and southwestern portions of Stagecoach Reservoir are classified as severe winter range. The northern portion and area to the southwest are classified as winter concentration area and severe winter range 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 (CDOW 2004, NDIS 2004).

Other animal species inhabiting the sagebrush community in the project area includes white-tailed jackrabbit (*Lepus townsendii townsendii*), mountain cottontail (*Sylvilagus nuttallii*), golden-mantled ground squirrel (*Spermophilus lateralis*), and deer mouse (*Peromyscus maniculatus*).

Agricultural Meadows

Agricultural land is not generally considered high quality wildlife habitat as it does not support native plant species and is seasonally disturbed by mowing or plowing. However, agricultural areas do provide habitat for some wildlife species including game and migratory birds, raptors, and small mammals, such as ground squirrels.

Montane Shrub

Montane shrub occurs on slopes above the floodplain and is browsed by elk and deer. Gambel oak stands likely provide an occasional food source for black bears in years of abundant acorn production. Various bird species nest in montane shrub including green-tailed towees (*Pipilo chlorurus*) and blue grouse (*Dendragapus obscurus*).

Montane Forest

Montane Forest supports roosting locations for a variety of bats, including various *Myotis* species. Additionally, the forest community supports small mammals including Nuttall's cottontails, least and Colorado chipmunks, pine squirrels, porcupines, and American marten. Vegetation in this community provide browse for elk and deer, and is utilized by livestock. Bird species include blue grouse, dark-eyed juncos (*Junco hyemialis caniceps*), chickadees (*Poecile* sp.), red-naped sapsucker (*Sphyrapicus nuchalis*), and hummingbirds.

Impacts to Wildlife and Vegetation from the Proposed Modifications

Increasing the storage capacity of Stagecoach Reservoir would inundate approximately 47 acres of existing habitats along the edge of the reservoir and cause an increase in open water, and decrease in some other habitats. Habitats that would be inundated primarily include wetlands and sagebrush (Table 7). Wetlands effects are discussed in more detail below. Reservoir expansion is not likely to have adverse effects in terms of noxious weeds, because construction would be limited to the existing dam.

Table 7
Area of Impact to Vegetation and Wildlife Habitats

Height of Dam Raise	Reservoir Elevation (ft)	Total Area of Reservoir (acres)	Acres of New Impact			
			Sagebrush & Meadow	Wetland Habitat*	Stream and Pond Habitats	Total Area of New Impact
Existing shoreline	7,200	771	NA	NA	NA	NA
4-foot raise	7,204	818	33.5	12.5	1.0	47

Animals inhabiting wetlands and other habitats along the shoreline of the reservoir may be displaced from these areas as they become inundated. This may impact small, terrestrial species. However, adjacent areas of suitable habitat would be available or would become available with the creation of new fringe wetlands. None of the affected habitats in the vicinity of Stagecoach Reservoir are rare.

Inundation of new habitats adjacent to the reservoir may displace nesting birds, since reservoir filling in the spring and early summer overlaps with the nesting season for many bird species. This would not be a change from existing conditions for birds nesting in wetlands and along the shoreline. Species that nest in sagebrush may be affected during the first time the reservoir fills to its new maximum elevation. There would be minimal direct adverse effects in subsequent years because the habitat within the new inundation area would no longer be suitable. However, the amount of available sagebrush nesting habitat would be permanently reduced.

Reservoir expansion would not adversely affect wintering elk and mule deer at Blacktail Mountain and other severe winter range and winter concentration areas. The reservoir shoreline is relatively steep along the northeast side and there would be minimal loss of habitat.

2.4 WETLANDS AND RIPARIAN HABITAT

Existing Conditions

The jurisdictional 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. Figure 6 shows the wetlands, ponds, and streams in the project area.

Reservoir fringe wetlands, which have established along the shoreline of Stagecoach Reservoir since its original construction, were created from impoundment of water at a relatively constant water level (IME 2004). These wetlands are considered to be artificial and are supported by snowmelt surface runoff waters as well as other waters collected in Stagecoach Reservoir. Dominant herbaceous plant species in these wetlands include reed canarygrass, spreading bentgrass, sedges, field mint, and curly dock (IME 2004).

Natural wetlands are located adjacent to water in stream and drainage channels as well as groundwater weeps and seeps. The vegetation in natural wetlands is characterized as scrub-

shrub wetlands and is dominated by Geyer's willow and sandbar willow. Some of the wetlands in the project area support stands of thinleaf alder, which grows along the drainage channels. Understory species in these natural wetlands include sedges, spreading bentgrass, Baltic rush, 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 (IME 2004). This "wetland habitat preserve" (Figure 2) was developed as part of wetland mitigation for permitting of Stagecoach Reservoir in the 1980s, and is used for education and wildlife observation.

A total of four post-construction wetland delineations have been completed for Stagecoach Reservoir. The most recent wetland delineation for the Stagecoach Reservoir was completed in June 2004, and was formally approved by the U.S. Army Corps of Engineers (USACE) on July 2, 2004. This delineation included wetlands located at the normal water line (7,200 feet), as well as those wetlands that would be impacted if the water level were raised. Six features in the study area are considered jurisdictional "waters of the U.S.". These are five types of open water that include the reservoir, ponds, intermittent and perennial streams, and drainage ditches, as well as jurisdictional wetlands.

Approximately 16.5 acres of new wetlands have established above the normal high water level (7,200 feet) of Stagecoach Reservoir since its construction (IME 2004). This is an increase from 1994, when only 2.9acres were established above the high water mark. In 1998, 5.1 acres of wetlands were mapped below the high water mark and the water level at that time (7,197 feet), for a total of 19.6 acres of jurisdictional wetlands at or near the normal water level. An additional 16.7 acres of wetlands and 4.4 acres of waters of the U.S. are located in the reservoir expansion area south of CR 16. In addition, 2.0acres of open water associated with the reservoir are located south of CR 16.

Generally, wetlands have established where the topography around the shore is relatively flat, with soils high in clay and moisture holding capacity (IME 2004). Wetlands generally were not located in the portions of shoreline that are flat with coarse or rocky soils or areas of eroding, steep slopes (IME 2004).

Other than scrub-shrub wetlands, there are no riparian habitats in the study area.

Impacts from Proposed Modifications

Wetlands and other waters of the U.S. are protected under the Clean Water Act, and permanent impacts to wetlands and other waters requires a Section 404 permit from the USACE. Wetlands and other waters of the U.S. located at or below the projected water elevation after the dam raise would be affected by being inundated as water storage levels increase. Wetlands within the new inundation area may be destroyed by higher water levels, or may have their structure or composition altered by changes in water regime. The portion of the Yampa River within the new inundation area would be converted from a stream to a lake for at least part of the year. Ponds within the new inundation area would become deeper. The type and extent of impacts from the new maximum storage levels would vary depending on the extent and timing of high water.

Impacts to wetlands and other waters of the U.S. were assessed based on the wetland delineation approved by the USACE, and on a proposed water elevation raise of 4 feet from the existing 7,200 feet water elevation. Table 8 shows the predicted impacts to wetlands and waters of the U.S.

Table 8
Impacts to Wetlands and Other Waters of the U.S.

Reservoir Modification	Area Affected (acres)			
	Wetlands	Other Waters of the U.S.		Total
		Yampa River	Open Water (Ponds)	
4-foot raise	12.5	0.2	0.8	13.5

The 4-foot raise would cover nearly all of the existing fringe wetlands at Stagecoach Reservoir and 3.1 acres of wetlands within the wetland habitat preserve at the head of the reservoir (Table 9). The 4-foot raise would also inundate about 500 feet of the Yampa River (about 0.2 acre), and about 0.8 acre of ponds (Table 8), mostly within the wetland habitat preserve.

Table 9
Location of Impacted Wetlands

Wetland Elevation	Wetland Habitat Preserve	Other Wetlands	Total
7202-7204 ft	3.1	9.4	12.5

UYWCD will apply for an individual Section 404 Permit from the USACE, in compliance with requirements of the Clean Water Act. Impacts to wetlands would be mitigated by creation or enhancement of wetlands to provide equivalent functions to the wetlands that would be impacted. Fringe wetlands along the shoreline are likely to redevelop along the new shoreline. Additional mitigation wetlands would be developed, if needed, on the shore of the reservoir, by recontouring low areas adjacent to the reservoir to convert them from sagebrush and pasture grasses to wetland habitat. UYWCD plans to work with resource agencies to develop a plan for protecting existing wetlands, and creating any new wetlands that would be required for mitigation.

2.5 RARE, THREATENED AND ENDANGERED SPECIES

Existing Conditions

Threatened or endangered species are plants or animals that are protected under the federal Endangered Species Act (ESA) or State law. Additionally, the Colorado Division of Wildlife (CDOW) has a list of other species of special concern, which are not legally protected, but are considered when assessing impacts.

Table 10 lists Federal and State listed threatened and endangered, as well as species of special concern in the State of Colorado. No plant species are listed by the USFWS in Routt County. No rare or sensitive plant species are potentially present in the project area.

Table 10
Threatened, Endangered and Other Sensitive Species
Potentially Present at Stagecoach Reservoir

Common Name	Scientific Name	Federal Status	State Status	Habitat	Occurrence
Canada lynx	*Lynx Canadensis*	FT	SE	Subalpine and montane forest between 8,000 and 12,000 feet in elevation.	Not present, potential habitat in mountainous areas in vicinity of reservoir but no habitat in study area.
Black-footed ferret	*Mustela nigripes*	FE	SE	Prairie dog towns	Not present, no suitable habitat in area.
Bald eagle	*Haliaeetus leucocephalus*	FT	ST	Lakes, reservoirs, and riparian corridors.	Present; no nests or roosts within a mile.
Greater sandhill crane	*Grus canadensis tabida*		SC	Mudflats around reservoirs, wet meadows, and agricultural areas. Breed in parks with grassy hummocks and watercourses, beaver ponds, and natural ponds lined with willows or aspens. They nest in wetlands and shallow marshes.	Present: observed in wetlands at southern end of project area. May nest in vicinity of Stagecoach Reservoir and fall staging along Yampa River.
Yellow-billed cuckoo	*Coccyzus americanus*	FC	SC	Lowland riparian forests and urban areas with tall trees.	Not present, no suitable habitat in vicinity of reservoir
Boreal toad	*Bufo boreas boreas*		SE	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	*Rana pipiens*		SC	Banks and shallows of marshes, ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches, as well as wet meadows.	Potentially present at reservoir; suitable habitat within project area.
Bonytail	*Gila elegans*	FE	SE	River eddies and pools, not swift currents.	Present downstream in Green River in Utah and Mohave Reservoir on Colorado River along the Arizona-Nevada border
Colorado pikeminnow	*Ptychocheilus lucius*	FE	ST	Swift flowing muddy rivers with quiet, warm backwaters.	Present in Yampa and Green Rivers downstream of project area and in other mainstream rivers of Colorado River system. Spawn in whitewater canyons of the Yampa and Green Rivers.

Table 10
Threatened, Endangered and Other Sensitive Species
Potentially Present at Stagecoach Reservoir

Common Name	Scientific Name	Federal Status	State Status	Habitat	Occurrence
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*		SC	Clean, cool mountain streams, preferably of moderate (6% or less) gradient.	Not present. Remaining populations occur mostly in headwater streams and lakes of the Colorado River drainage.
Humpback chub	*Gila cypha*	FE	ST	Occurs in river canyons, in deep, fast-moving, turbid waters often associated with large boulders and steep cliffs, as well as slower eddies and pools.	Present downstream in Yampa and Green Rivers. Also occurs in Colorado River.
Razorback sucker	*Xyrauchen texanus*	FE	SE	Adults occur in areas of strong current and backwaters, but may also be occur in eddies and backwaters away from the mainstream and river currents.	Present downstream in lower Yampa and Green Rivers, and occurs in mainstem Colorado River near Grand Junction.

Status:
FT = Federally Threatened, FE = Federally Endangered, FC= Federal Candidate, SC = Special Concern, SE = State Endangered, ST = State Threatened

Of the species listed in Table 10, only those species that are considered present in the project area and fish in downstream waters are discussed further. Several species are known to occur in the Stagecoach Reservoir study area, including bald eagle, greater sandhill crane, and northern leopard frog. Four fish species—bonytail, Colorado pikeminnow, humpback chub and razorback sucker—occur in downstream waters and could potentially be affected by the project.

Bald Eagle

The bald eagle occupies the upper Yampa River basin in winter, but is a rare summer resident known to nest in the area. Bald eagles forage on rivers, large lakes, large reservoirs, estuaries, and coastal habitats. Individuals require large trees or cliffs for roosting and perching. Bald eagles mainly subsist on fish and carrion, but also prey on waterfowl and mammals opportunistically (Andrews and Righter 1992).

Bald eagles frequent Stagecoach Reservoir before winter freezing to forage at the southern end of the reservoir near the inlet (Miller 2004). No nests or roosts are known to occur within a mile of the Stagecoach Reservoir study area.

Greater Sandhill Crane

Pastures and meadows along the Yampa River are staging sites where cranes gather and prepare for their fall migration to the San Juan Valley and New Mexico (Kingery 1998). Migrants leave the area between February and May (Kingery 1998). Fall staging habitat in the Yampa River Valley has been developed, threatening populations in Routt County (Kingery 1998).

While no nests are known to occur in the direct vicinity of the project, greater sandhill cranes are observed at the reservoir (Kingery 1998, Miller CDOW 2004), foraging in suitable habitats including the wetlands, mudflats, and the ponds at the southern inlet. These birds eat roots, seeds, small mammals and reptiles, eggs of other birds, and invertebrates, such as worms, clams, insects and crayfish (CDOW 2004).

Northern Leopard Frog

The northern leopard frog typically inhabits the banks and shallow areas of marshes, ponds and streams, but may also occur in irrigation ditches and wet meadows (Hammerson 1999). Leopard frogs are usually observed near permanent water; however, they can and do, at times, roam far from water on rainy nights (Hammerson 1999). Emergent or submergent vegetation such as bulrushes (*Scirpus* spp.) or cattails (*Typha* spp.) are typical components of occupied habitat and are probably necessary for cover and egg placement. Adjacent moist upland or wetland soils with a dense cover of grass or forbs and a canopy of cottonwoods (*Populus* spp.) or willows (*Salix* spp.) are also important components of leopard frog habitat. Northern leopard frogs may inhabit suitable habitats along the reservoir.

Bonytail

Bonytail chubs historically occurred throughout the Colorado River Drainage, but are now nearly extinct upstream of Lake Powell. Bonytails are considered extinct in the State of Colorado; they were last collected in 1984 at the Black Rock area of the Colorado River west of Grand Junction, Colorado (NDIS 2004; CDOW 2004). Bonytails spawn during late June and early July, though wild spawning is rare and no wild reproducing populations are known (USFWS 2001).

Recovery programs are aiming to restore bonytail in the Upper Colorado Basin by restoration stocking of bonytail to develop adult populations. The species are currently raised in fish hatcheries with offspring released into the Green River in Utah and the Green and Yampa rivers in Dinosaur National Monument in Colorado (CDOW 2004). Dinosaur National Monument is approximately 140 miles downstream on the Yampa River from Stagecoach Reservoir.

Colorado Pikeminnow

Colorado pikeminnow (formerly Colorado squawfish) are long-lived, large-river fish that inhabit Upper Colorado basin waters that have a variety of substrates, depths, and velocities. During spring and early summer, adult fish use areas inundated by spring flooding. Adults of the species can migrate 200 miles to spawn between late June and early September at age 5 to 6 years old.

Presently, Colorado pikeminnow occur primarily in the Green River below the confluence with the Yampa River; the Yampa River south of Craig, Colorado; as well as the Gunnison River and Colorado rivers in Colorado.

The main recovery strategies for Colorado pikeminnow are to maintain more natural river flow patterns by releasing more water from dams in the spring, stabilize flows in late summer for young fish, ensure that stocking of non-native fish does not conflict with endangered fish recovery, and build passageways and "ladders" around certain dams and barriers to allow endangered fish to migrate up and down the river.

Humpback Chub

In Colorado, humpback chubs occur in the Yampa, Gunnison, Green, and Colorado rivers in deep, canyon-bound portions of the Colorado River system. Spawning occurs between April and July during high flows from snowmelt. Humpback populations appear to be recovering in Yampa Canyon in Dinosaur National Park, as well as in Westwater and Cataract canyons, and in Black Rocks in the Upper Colorado River basin (CDOW 2004). Humpback chub are recovering through boosting and protecting river flows in the spring, monitoring fish population numbers and managing stocking of non-native fish to avoid conflict with endangered fish recovery.

Razorback Sucker

Adult razorback sucker habitat use varies depending on season and location. Adult razorback suckers are adapted for swimming in swift currents, but they may also be found in eddies and backwaters away from the mainstream and river currents (Allan and Roden 1978). In the upper Colorado River basin, razorbacks spawn generally between mid-April and mid-June.

The current distribution of razorback suckers in the upper basin is confined to small groups of fish in several widely distributed locations. Most fish occur in the lower 4 miles of the Yampa River in Colorado, and the Green River from the mouth of the Yampa River downstream to the confluence of the Duchesne River (USFWS 1997, 2001). Small populations may also occur in the Colorado River at Grand Valley, and in the San Juan River upstream from Lake Powell to its confluence with the Animas River.

Reproducing populations remain only in the middle Green River in Utah and in an off-channel pond in the Colorado River near Grand Junction (Schrader-Gillette 2004).

Restoration stocking of razorback is occurring in the Green, Colorado, Gunnison, and San Juan rivers to develop and augment adult populations.

Impacts from Proposed Modifications

For the original Stagecoach Project, the USFWS submitted a Biological Opinion to the U.S. Bureau of Reclamation in August 1986 which concluded that the project would not jeopardize any listed threatened or endangered species, and that it would have a beneficial impact on endangered Colorado River fish due to increased flows in the Yampa and Green River during the critical spawning period. Impacts associated with the proposed reservoir raise are evaluated below.

Bald Eagle

The proposed dam modification and reservoir enlargement is not expected to adversely affect bald eagles, but would involve modification of fall foraging habitat at the reservoir inlet. Depending on the elevation and seasonal duration of the reservoir raise, fall fish spawning may also be altered or reduced. Changes in habitat and food supply could cause displacement to other areas. Construction activity at the dam is not likely to adversely affect bald eagles because of its limited area and short duration.

Greater Sandhill Crane

The proposed project may affect sandhill crane by destruction or modification of wetlands that are used as foraging habitat at the upper end of the reservoir. Greater sandhill crane may be experiencing cumulative impacts from conversion of agricultural meadows to developed areas in Routt County (Kingery 1998).

Northern Leopard Frog

If present, northern leopard frog may be affected by loss of wetland habitat at the upper end of the reservoir.

Colorado River Fish

The proposed project may have an incremental effect on the four endangered Colorado River fish (Colorado pikeminnow, bonytail, humpback chub, and razorback sucker) and their critical habitat downstream in the Yampa and Green Rivers. Raising the elevation of the Stagecoach Dam would result in more water storage by capturing of additional stream flows in the Upper Yampa. Stream flows are not expected to be reduced except during times of high flow into the reservoir. The additional reservoir filling would reduce flows during high flow times and would allow increased flows during dry periods.

Depending on the use of the water, the project could affect the seasonality of Yampa River flows and may affect overall flow amounts. Consumptive use of the water, including evaporation, could cause depletions in downstream flows, depending on where and when the water is taken from the river. The depletions could contribute cumulatively to reductions in the availability, extent and utility of critical habitat features, such as reduced peak flows and backwater flooding. Depletions of any amount are considered by USFWS to be an adverse affect (Shrader-Gillett 2004), because water depletions may adversely affect the species and/or their critical habitat in downstream reaches in Colorado and adjacent states. Formal Section 7 consultation will be required for this project because it involves a Federal action (issuance of permits) and water depletions for endangered Colorado River fish.

USFWS has recently prepared a Programmatic Biological Opinion (USFWS 2005) for implementation of the *Management Plan for Endangered Fishes in the Yampa River Basin* (Roehm 2004), which addresses all existing depletions (estimated annual average 168,000 acre-feet per year) and 53,000 acre-feet per year of new depletions. Individual Section 7 consultation is required for all Federal actions to determine whether they fit under the umbrella of the Programmatic Biological Opinion. Projects involving depletions of more than 100 acre-feet year require signing of a Recovery Agreement in order to complete Section 7 consultation, which stipulates that the water user will not interfere with implementation of recovery actions. In addition, a one-time fee to fund recovery actions would be required. The current fee (through September 30, 2006) is $16.67 per acre-foot. The specific amount of depletion for the Stagecoach reservoir raise has not been determined and would depend in part on the end use of the water. The additional water storage would be 3,185 acre-feet with a 4-foot raise. Some or all of this may be considered depletion.

2.6 GEOLOGY AND SOILS

Existing Conditions

Geology

The dam and reservoir site is located on the western flank of the Park Range and on the southeastern flank of the Washakie sedimentary basin, thus 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, entrenched as it eroded its way downward through the relatively soft sandstones of the Browns Park Formation, was unable to deviate out of its valley and thus was forced to 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 north 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-degrees 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.

Two faults are located in the vicinity of the Stagecoach Dam site. The Martini-Morrison Creek fault has been inferred about ¾ mile upstream of the dam site. Activity along the Martin-Morrison Creek fault probably occurred last in early Tertiary Age (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 near Thorpe Mountain. A seismic study of these faults and others 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.

Rock core from the dam site indicates that the 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.

Design of the dam and appurtenant facilities has included foundation treatment for the bedrock conditions at the site and the theoretical seismic impact of movement along the identified regional faults.

Soils

IME 2004 includes a summary of soils information for the project area. The soils along both sides of the reservoir consist largely of alluvial sands and gravels containing a large percentage of silts and clay sized material. The soil has been eroded by wave action along the normal water

level in areas where the banks are steep. This erosion generally has not cut into the soil more than a few feet.

A small landslide was mapped on the north shore about ½-mile upstream of the dam during the design of the dam. The toe of the slide had been cut by the river indicating that the slide took place a considerable time ago. After construction of the dam and filling of the reservoir, the toe of the slide was inundated. No movement or cracking has been observed.

Impacts from Proposed Modifications

Minor soil erosion, similar to the current condition, is expected to take place along the steeper banks of the reservoir. Based on the inspection of the topography (Figure 2), the extent of erosion is expected on a similar scale and extent as currently exists. The toe of the landslide would be further inundated if the dam is raised. Due to the nature of the soils and the gentle slope of the ground, catastrophic failure of the slide is not expected. If movement occurs, incremental movement causing tension cracking along the ground is expected. Therefore observations of this slope should be performed by the dam operators periodically and qualified engineers contacted if cracks are observed.

The geological investigations did not discover any other hazard upon which the project would have an impact nor would any other geologic condition have an impact on the project.

2.7 RECREATIONAL RESOURCES

Existing Conditions

Stagecoach Reservoir is an important recreation resource in the area. UYWCD leases the lake and recreation facilities to Stagecoach State Park. The park operates the campgrounds, a hiking trail, and other recreation attractions at the reservoir. Recreation facilities at the reservoir include: biking, boating, cross country skiing, fishing, hiking, hunting, ice fishing, jet skiing, picnicking, sailing and sailboarding, snow shoeing, snowmobiling, swimming, water skiing, and wildlife watching. The hiking trail and the wetlands trail provide great opportunities for nature observation. There is fishing access to the Yampa River below the dam from both the park and non-park properties.

The facilities at the reservoir include 100 campsites, picnic areas, a swimming beach and a boat ramp. Upstream of the reservoir is a wetlands/wildlife observation trail in the wetland habitat preserve. Stagecoach State Park had 123,000 visits in their fiscal year ending in June 2003, 85,481 visits in 200, and 162,687 visits in 2005.

Impacts from Proposed Modifications

The proposed modifications would increase the surface area of the reservoir and making it more attractive to boaters. Small game hunting, camping, hiking and backpacking, picnicking, sailing, windsurfing, horseback riding, snowmobiling, or sightseeing are not expected to be impacted by the proposed modifications. Recreational fishing impacts would be directly related to the impacts on fishery, discussed in Section 2.2.

The boat ramp, wildlife observation area (wetland habitat preserve), swim beach, and hiking trail around the reservoir would be modified as part of this project, if necessary, to mitigate any effect the increase in water level may have on their usability. Mitigation for the boat ramp, swim beach, and hiking trial is expected to include adding to or raising portions of the facilities that are affected by the water level change. A portion of the previously approved wetland mitigation area in the wetland habitat preserve would be impacted by the increase in water level.

Stagecoach State Park has also raised concerns about the following:

- Impacts to restroom storage vaults in the Wetland Habitat Preserve parking lot, the parking lot north of the inlet, and the Little Morrison Creek boat ramp;
- Impacts to a concrete picnic pad near the swim beach;
- Impacts to the concessionaire's fuel stand;
- Impacts to the main Martin Creek boat ramp and to the Morrison Creek boat ramp and likely need to reconstruct the upper end; and,
- Impacts to planted trees and irrigation systems where they are present within the 4-foot raise.

The UYWCD has commissioned Emerald Mountain Surveys to survey the elevations of these facilities, and has engaged the services of Civil Design Consultants Inc., to conduct an engineering analysis of the effects of the spillway raise on these facilities.

A corner of U.S. Bureau of Land Management (BLM) property is within 50 feet of the current reservoir. However, a 4-foot raise would not inundate BLM property. BLM land is outside the project limits and would not be altered by this proposed modification.

2.8 LAND USES

Existing Conditions

The existing land use in the project vicinity is primarily agricultural and residential within a mile around the reservoir. The primary exception is approximately 200 residential units south of the reservoir site together with a sewage treatment plant and a non-operational ski area. The wastewater treatment plant discharges treated water into the reservoir. The agricultural uses are dryland pasture for livestock grazing. A private gravel pit is located about 0.5 miles west of the upper end of the reservoir. A wildlife observation area immediately upstream of the reservoir is a popular recreation site.

All project lands are zoned by Routt County as Agricultural and Forestry (AF). All neighboring farmlands and all government lands are also zoned AF. The South Shore Subdivision, containing undeveloped lots, is zoned Low Density Residential (LR). The condominium area and the Meadow Green Subdivision are both zoned High Density Residential (HR).

All the land immediately surrounding the reservoir and dam that would be affected by this action is owned by UYWCD. UYWCD leases the lake and recreation facilities to Stagecoach State Park. The recreation uses and facilities of the reservoir are discussed in Section 2.7.

As discussed in Section 2.7, a corner of BLM land is located within 50 feet of the current reservoir. This land is outside the project limits and would not be altered by this proposed modification. No other Federal lands are adjacent to the project boundary.

Impacts from Proposed Modifications

The spillway raise would inundate approximately 47 additional acres of land (Table 1). All the land to be inundated is zoned AF. This land is not currently being used for livestock grazing. Some of the inundated land consists of jurisdictional wetlands. A portion of the wetlands upstream of the reservoir consists of the wetland habitat preserve and is used as a wildlife observation area (Figure 2). The dam raise would inundate approximately 3.1 acres of wetlands in the wetland habitat preserve, increase the depth of 0.6 acres of ponds and the Yampa River, and would inundate about 2.3 acres of other habitats. This area would be modified as part of this project if necessary to mitigate any effect the increase in water level may have on its usability (see Section 2.4 for more discussion).

The wastewater treatment plant discharge pipe is located about 5 to 6-feet below the current water level. It may be necessary to raise one of the manholes located on this discharge pipe in order to mitigate any negative effects the water level raise may have on its operation. This would involve very limited construction.

The water level raise may impact a portion of the county road, along the far upstream end of the reservoir. Raising the road or improving the system to pass water beneath it (i.e., additional culverts) may be needed to mitigate impacts.

2.9 AESTHETIC RESOURCES

Existing Conditions

Stagecoach Reservoir has high aesthetic quality, which is important to the recreation value of the site. Comparatively low mountains surround the reservoir. Elevations range from about 7,065 feet at the streambed downstream of the dam and 7,200 feet at the normal high water level to 8,971 feet on Woodchuck Hill, 2 miles southeast of the damsite. Blacktail Mountain, 1 mile north of the damsite, is at elevation 8,892 feet. The northern end of Green Ridge, located approximately 2 miles south of the reservoir on which the Stagecoach ski facilities are located, is over 9,200-feet.

Impacts from Proposed Modifications

Modifications to the existing dam would have different impacts on the aesthetics of the reservoir and surrounding area based on how the reservoir is operated. The dam would not appear significantly altered as the modification would increase the height of the spillway face slightly (4 feet) and would only be visible from immediately downstream. The impacts to the aesthetics of the reservoir would be minimal because water levels are kept high during the warm months and snow covers mudflats during the winter drawdown.

No additional environmental studies are proposed at this time. UYWCD will meet with resource agencies to discuss potential studies after agency review of the IIP.

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Figures

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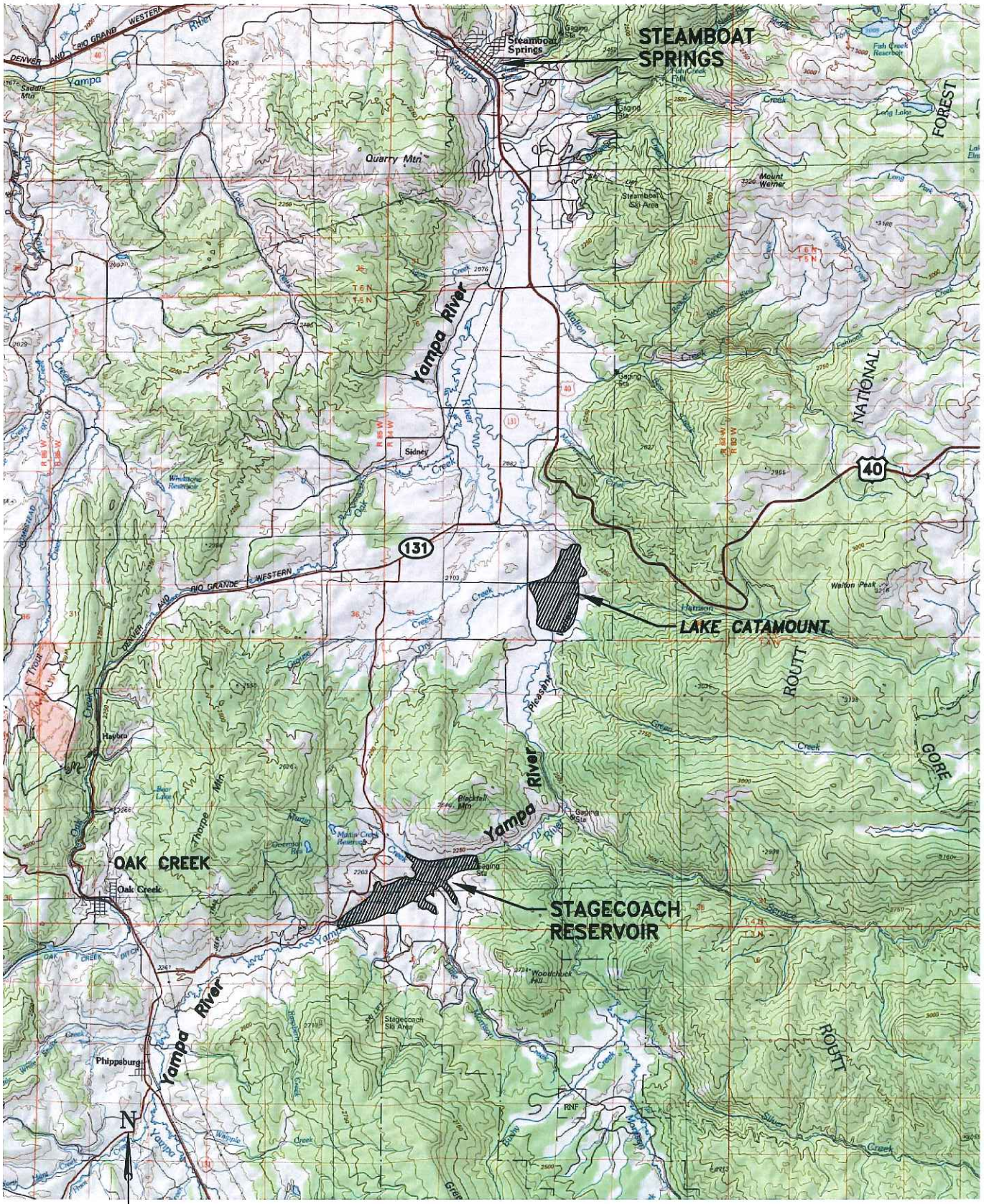

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Prepared by :	JLD
Date :	6/29/06

STAGECOACH DAM

LOCATION MAP

FIG. 1

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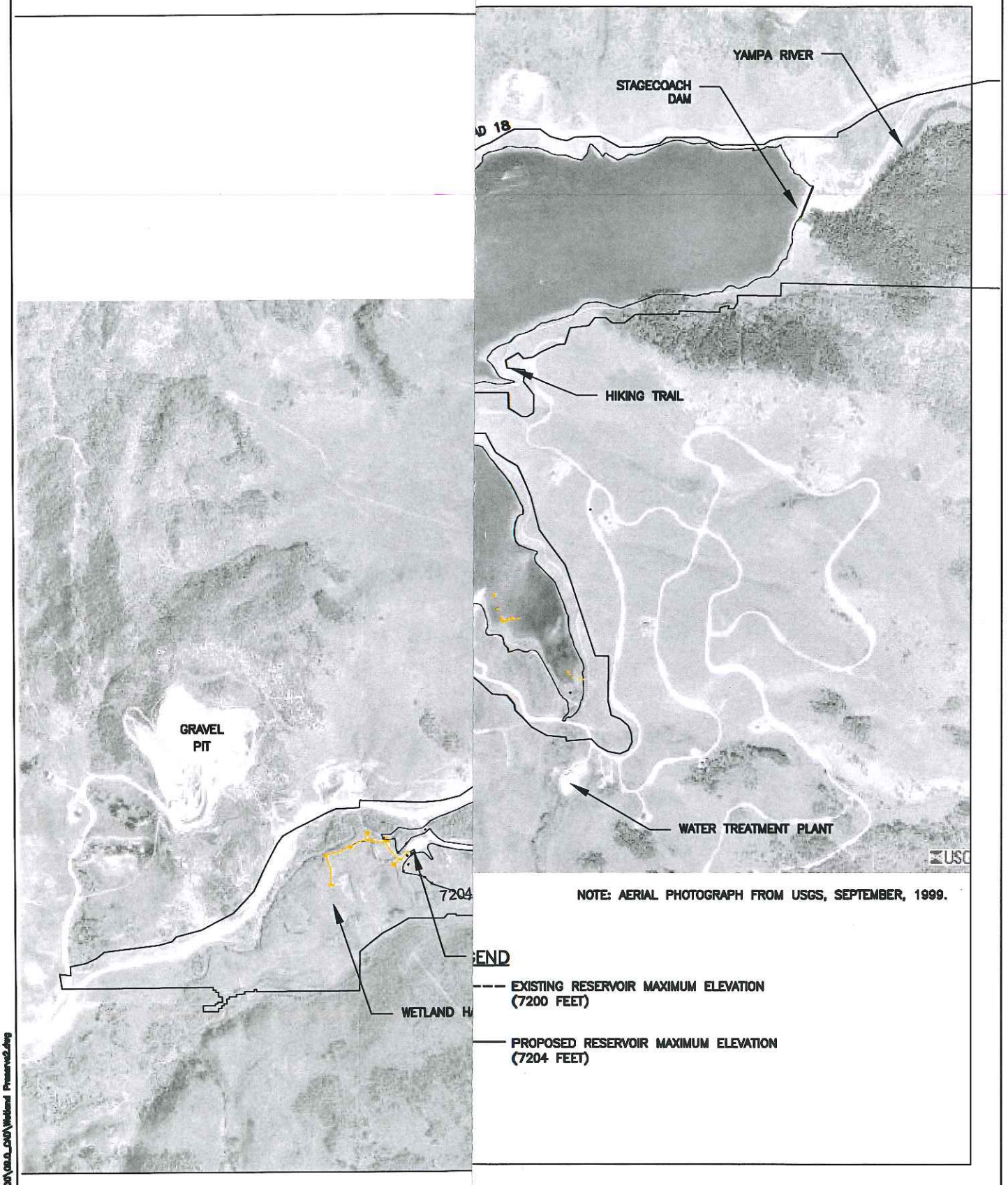

NOTE: AERIAL PHOTOGRAPH FROM USGS, SEPTEMBER, 1999.

END

--- EXISTING RESERVOIR MAXIMUM ELEVATION (7200 FEET)

— PROPOSED RESERVOIR MAXIMUM ELEVATION (7204 FEET)

ADAPTED FROM DRAWING PROVIDED BY MWH.

REV	DESCRIPTION OF REVISION	BY	DATE
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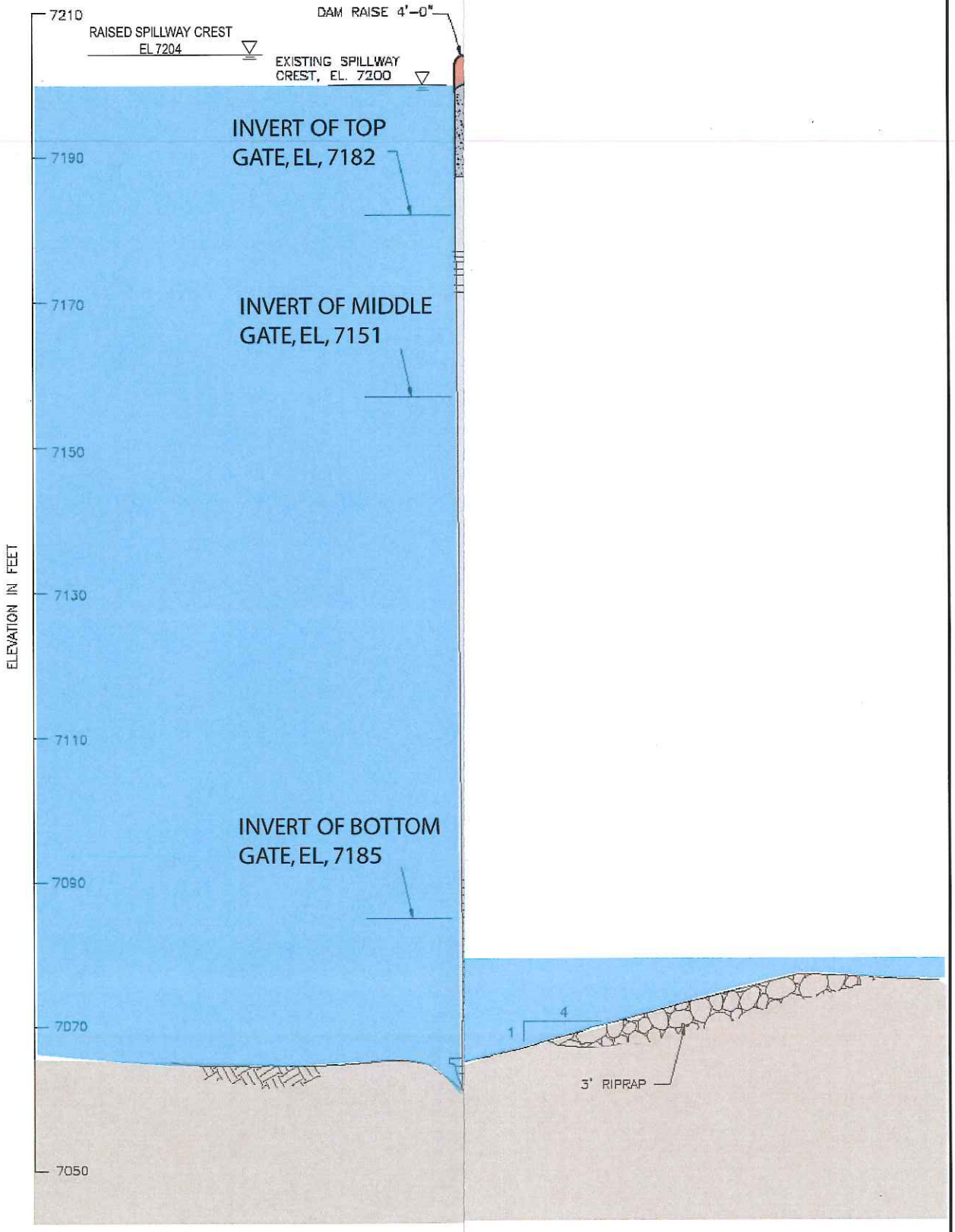
STAGECOACH DAM	STEAMBOAT SPRINGS, CO	REVISION △
AIR PHOTO WITH PLAN VIEW OF EXISTING AND PROPOSED RESERVIOR		PROJECT 22237403
		FIGURE 2



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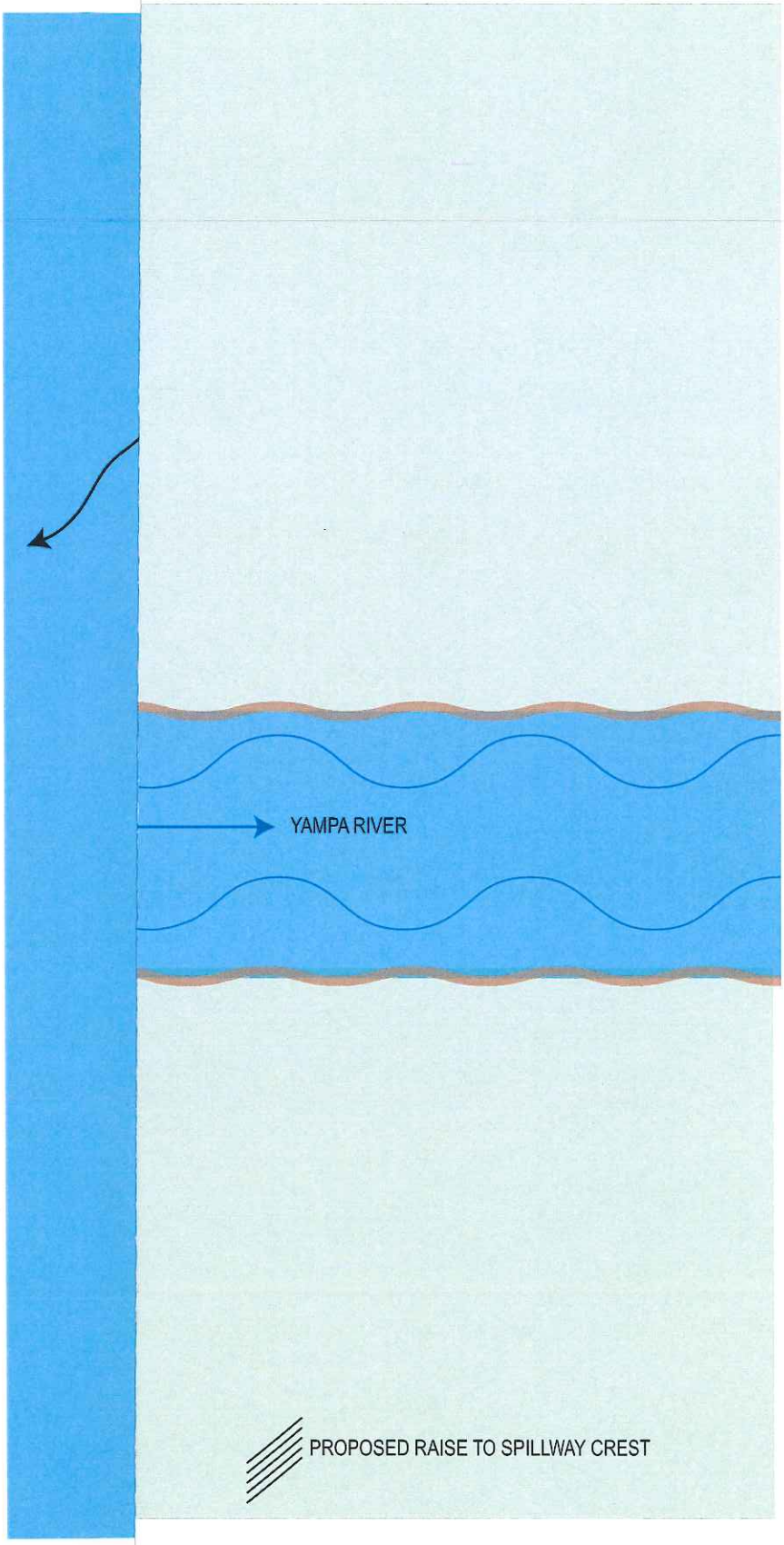
DAM STEAMBOAT SPRINGS, CO

REVISION △

PROJECT 22237403

FIGURE 3

oss - Section of Existing Dam
nd Proposed Modification



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CH DAM STEAMBOAT SPRINGS, CO

REVISION

PROJECT 22237403

FIGURE 4

LAN VIEW OF EXISTING DAM
AND PROPOSED MODIFICATION

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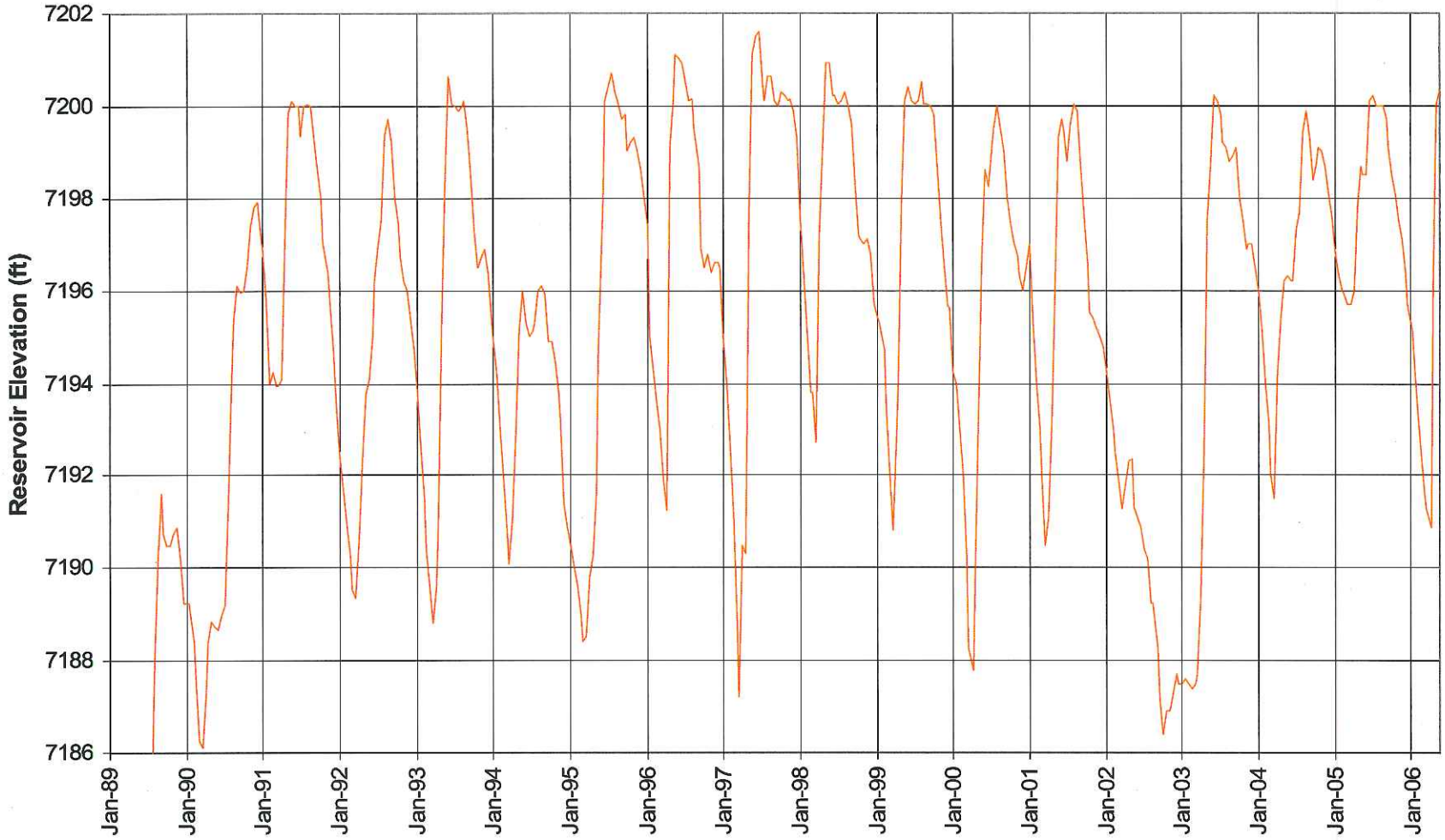
Stagecoach Reservoir Elevation
1989 thru May 2006

Full = 7,200 ft



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STAGECOACH RESERVOIR
SURFACE ELEVATIONS

FIG. 5

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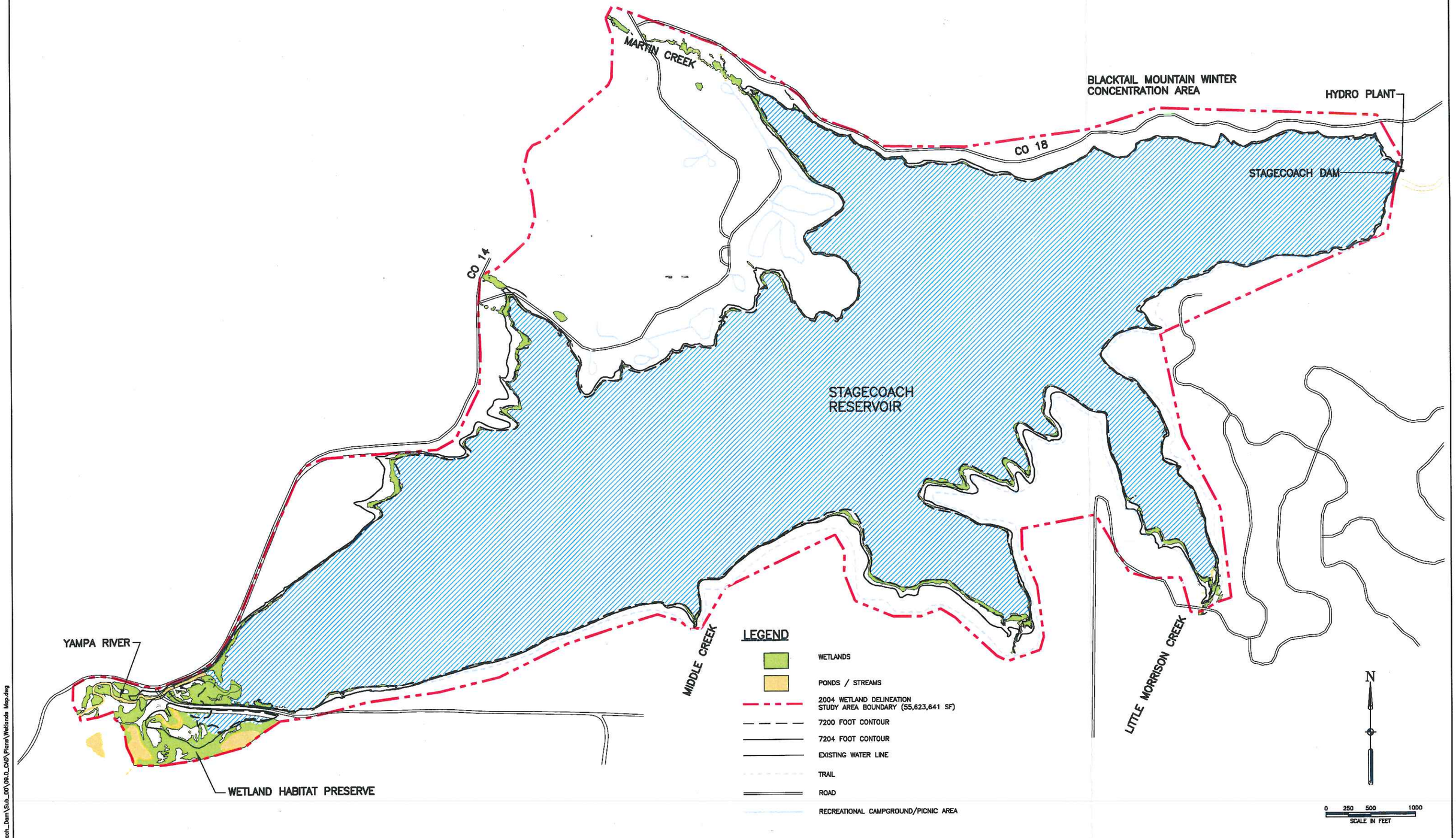

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DESIGNED:	KLS
DRAWN:	RAM
CHECKED:	–
PEER REVIEWED:	–
PROJECT MANAGER:	–
DATE:	10/14/04

STAGECOACH DAM STEAMBOAT SPRINGS, CO

MAP OF WETLANDS, PONDS & STREAMS

REVISION △
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FIGURE 6

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