

Chapter 3 - Affected Environment and Environmental Effects

3.1 Introduction

This chapter describes the environment potentially affected by the no action alternative and the action alternative and the predicted impacts of the alternatives. These impacts are discussed under the following resource issues: water resources; Weber Basin Project operations; water rights; water quality; public safety, access, and transportation; recreation; visual resources; socioeconomics; cultural resources; paleontological resources; wetlands and vegetation; wildlife resources; and threatened and endangered species. The present condition or characteristics of each resource is discussed first, followed by a discussion of the predicted impacts under the no action and action alternative. The environmental effects are summarized in Table 3.8 at the end of this chapter.

3.2 Affected Environment

3.2.1 Water Resources

East Canyon Reservoir is one of the features of the Weber Basin Project located in Northern Utah. As a multi-purpose storage reservoir, East Canyon provides irrigation, municipal and industrial water for DWCCC and the Weber Basin Project. The water is primarily delivered to areas on East Canyon Creek, the Weber River, and through the Gateway Canal to the Weber and Davis Canals and Aqueducts for lands and communities in Morgan, Weber and Davis Counties in the Great Salt Lake Valley.

Coordinated releases from Lost Creek, Rockport, A.V. Watkins Reservoirs, Causey, and Pineview Reservoirs from the Weber Basin Project, Smith and Morehouse Reservoir owned by the WBWCD, and Echo Reservoir from the Weber River Project provide irrigation and domestic water to lands along the Upper Weber and Ogden River Valleys and eastern slopes and lower valley lands of Weber, Davis, Morgan, Summit and Box Elder Counties. Table 3.1 depicts the average annual water quantities for the Weber Basin Project.

East Canyon Reservoir is operated in conjunction with the 7 other reservoirs listed above and in addition to the dams, there are seven project well sources that were drilled and equipped by Reclamation to be used by WBWCD as backup for M&I

demand in the system. The maximum flow through the wells is 46.64 cfs (cubic feet per second) with an annual capacity of 33,761 acre-feet (see Table 3.2).

In full operation, the Weber Basin Project provides an average of 206,900 acre-feet of water annually for irrigation and M&I use in heavily populated and industrialized areas. This water is supplied from WBWCD system storage capacity of 385,000 acre-feet. Additionally, there is 33,760 acre-feet capacity available from project wells that can be utilized to meet project demands.

Table 3.1: Weber Basin Project Average Annual Water Quantities

	Active Capacity (Acre-feet)	WBWCD Capacity (Acre-feet)	April-July Inflow (Acre-feet)
Weber River Basin	408,720	312,028	371,600
East Canyon	48,110	20,110	32,000
Echo	73,940	6,288	180,000
Lost Creek	20,010	20,010	17,200
Rockport	60,860	60,860	138,000
Smith & Morehouse	7,600	6,560	4,400
Willard Bay	198,200	198,200	off-stream dam
Ogden River Basin	117,020	73,098	135,300
Causey	6,870	6,870	2,300
Pineview	110,150	66,228	133,000
Total	525,740	385,126	506,900

Table 3.2: Weber Basin Project Wells

Well Name	Capacity (cfs)
Riverdale	6.64
S. Weber #1	10
S. Weber #2	10
Laytona	5
Clearfield #1	5
Clearfield #2	5
Bountiful 500 West	5
Total	46.64

3.2.2 Weber Basin Project Operations

East Canyon Reservoir is a multiple purpose storage unit of the Weber Basin Project. Filling and release procedures conform with the downstream water requirements, serving needs for irrigation, municipal, industrial, power, and flood control. Storage and distribution of project waters are regulated in accordance with the Weber Basin Project Operating Criteria. Water exchange agreements have been executed between the Davis and Weber Counties Canal Company and the downstream direct flow users.

Releases are generally determined in the following manner:

1. The Davis and Weber Counties Canal Company and the Weber Basin Water Conservancy District provide authorization for water deliveries of their respective storage rights prior to the irrigation season or whenever changes are required pursuant to their contract obligations.
2. The Weber River Water Commissioner, through his authorized Deputy Water Commissioner, takes delivery orders on a demand basis.
3. The Water Commissioner ascertains the maximum anticipated needs, including minimum fish and wildlife requirement, on a demand basis, and either personally makes or orders these releases to be made accordingly.

Most of the water is stored in East Canyon Reservoir from October 16 to April 15. During this period, low releases are generally restricted to 5 cfs or inflows, whichever is lower. The remainder of the year, releases generally equal inflows plus storage releases. The reservoir stores water under the priority of the water rights (no time limits are associated with the water rights).

Forecasts of inflow to East Canyon Reservoir are made jointly by the National Weather Service and The Natural Resources Conservation Service. The forecasts are published as of the first of each month from January to June. The forecast numbers provide a basis for planning reservoir and project operations prior to and during the flood season and permit optimization and coordination of water supply and other reservoir functions.

Flood control regulations for East Canyon Reservoir have been developed by Reclamation and approved and issued by the Corps of Engineers, as a comprehensive plan for flood control operations of the Weber Basin Reservoirs. The regulations provide that when water is stored within the flood control reservation of the reservoir, releases will be made as fast as possible without exceeding non-damaging capacities of the downstream channels. East Canyon Creek has a safe capacity of 200 cfs below the dam and 450 cfs at the mouth of East Canyon Creek.

Figure 3.1: East Canyon Reservoir Water Elevation

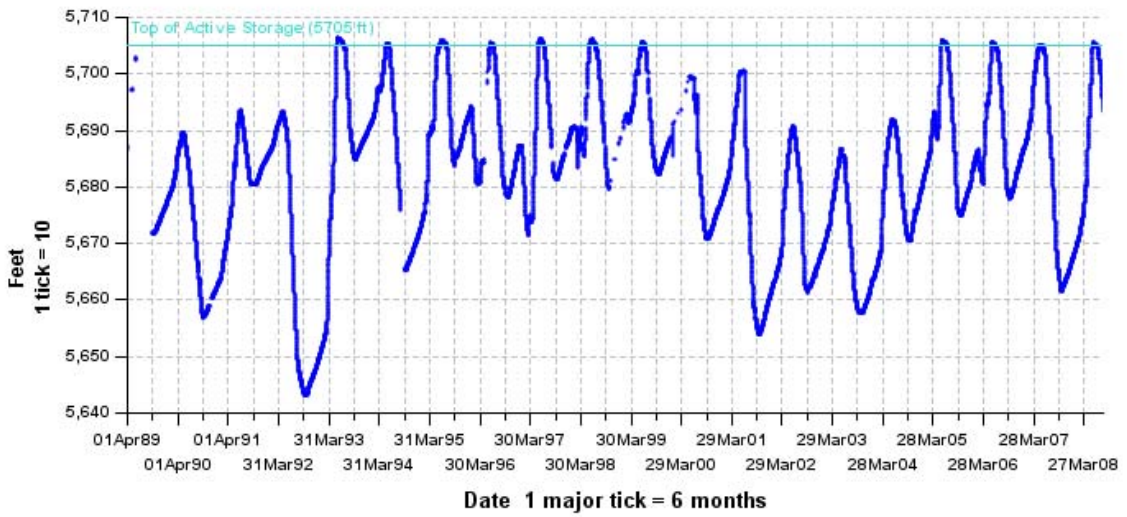


Figure 3.2: East Canyon Reservoir Total Water Storage

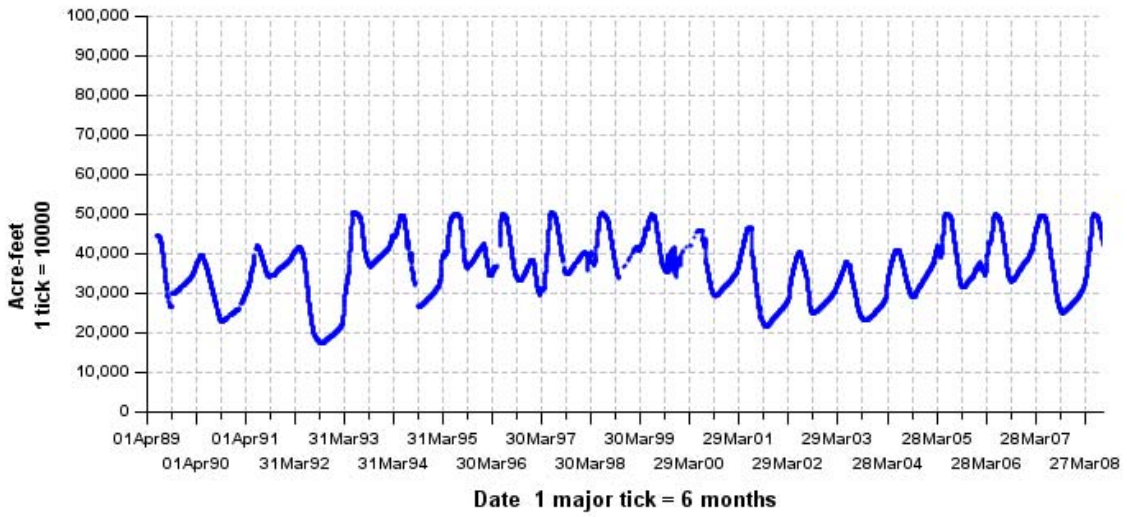


Figure 3.3: East Canyon Reservoir Inflows

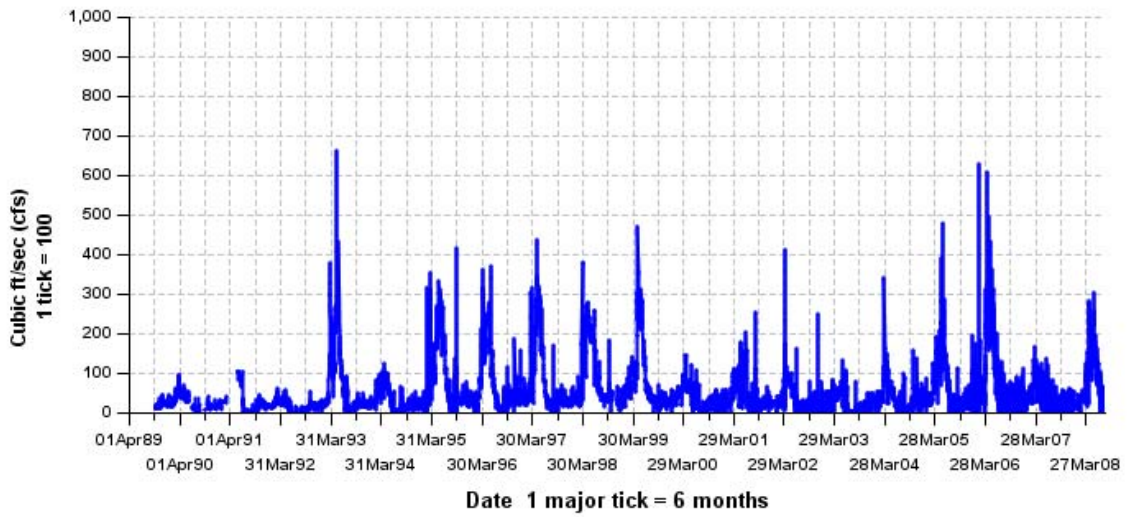
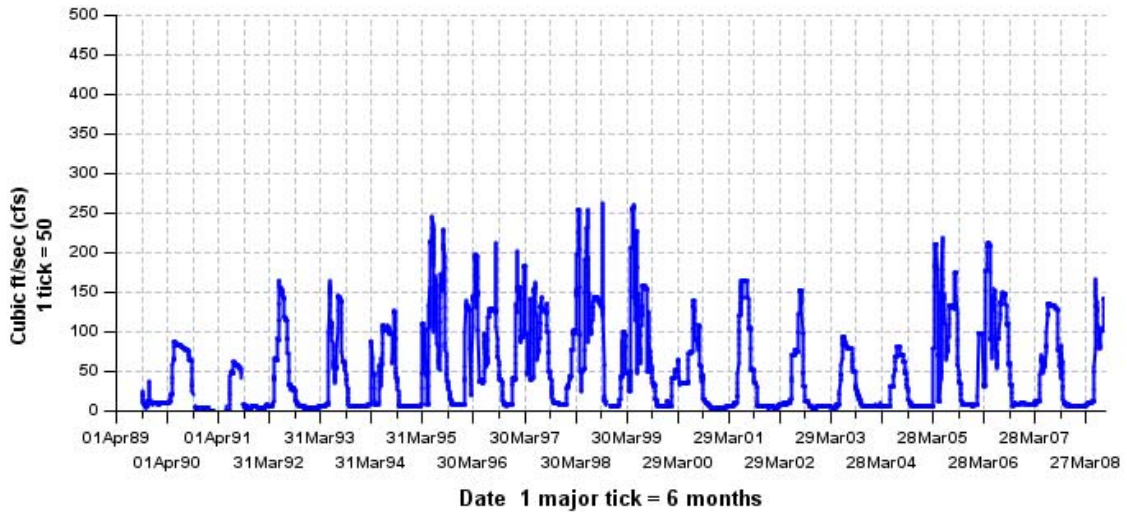


Figure 3.4: East Canyon Reservoir Releases



Historically, East Canyon Reservoir fills half of the years, and storage drawdown typically does not go below elevation 5660 which is 83 ft above the bottom of active storage at 5577.

3.2.2.1 East Canyon Fish Flow Water

In 1998, Summit Water Distribution Company entered into an Agreement with the Utah Division of Wildlife Resources (UDWR) to increase stream flows in

East Canyon Creek and improve the fishery and natural stream environment of the creek. One of the significant provisions of the Agreement was the voluntary dedication by SWDC of 2.0 cfs of pipeline capacity in the East Canyon Pipeline Project to UDWR, which allows UDWR to pump up to 2 cfs of water from East Canyon Reservoir to East Canyon Creek, in the Jeremy Ranch area of Summit County. Water from the dedicated capacity of the pipeline for non-consumptive flow of water would be released to East Canyon Creek near the SWDC East Canyon Water Treatment Plant to augment stream flows during periods of low flow and reduce water temperatures in the creek. Water used by UDWR for flow augmentation would be diverted under a separate water right held by UDWR for instream flow purposes and would be released at the discretion of UDWR. It is anticipated that flow augmentation would primarily occur during the late irrigation season when natural flows in East Canyon Creek are at their lowest.

Under another significant provision of the Agreement, SWDC has also agreed to establish minimum instream flows in East Canyon Creek under all of its water rights in the Snyderville Basin. Under the terms of the Agreement, SWDC will not divert water from East Canyon Creek when flows in the creek are below 3.5 cfs, as measured at the East Canyon Water Treatment Plant. Following completion of the East Canyon Pipeline Project, the minimum instream flow limitation would be increased to 6.0 cfs, which is the minimum stream flow determined necessary to sustain a viable fishery in East Canyon Creek,

Because UDWR flow augmentation water would be pumped from the reservoir and released directly back into East Canyon Creek (which in turn flows directly back to East Canyon Reservoir), this water was not considered in the hydrology and water quality modeling for the East Canyon Pipeline Project.

3.2.3 Water Rights

Water is stored in East Canyon Reservoir under water rights held by Reclamation and by DWCCC. Table 3.3 below summarizes these water rights. Because East Canyon Reservoir was enlarged several times since it was originally built, these water rights span a wide range of priority dates. These rights are allowed to store water in the reservoir only when all downstream senior water rights are satisfied.

Table 3.3: Summary of East Canyon Reservoir Storage Water Rights

WR Number	Owner	Priority Date	Annual Diversion Limit (acre-feet)
35-8389 (Decree)	D&WCCC	1896	13,000
35-8400 (Decree)	D&WCCC	8/16/1912	15,000
35-830 (A27611)	Reclamation	10/08/1955	17,000
35-1213 (A32372)	Reclamation	9/29/1960	6,200
		Total	51,200

During the non-irrigation season, East Canyon Reservoir is able to store the entire inflow, minus a 5 cfs minimum release for downstream fishery purposes in East Canyon Creek. During the irrigation season, the reservoir is able to store a significant portion of the peak spring runoff, minus 35-50 cfs needed to satisfy irrigation water rights along East Canyon Creek downstream of the dam.

Currently East Canyon Reservoir fills when runoff is at or above normal. During times of multiyear drought, the reservoir does not completely fill. The reservoir is operated in a manner to ensure sufficient water deliveries are made from the reservoir and to bring the water storage below 35,000 acre-feet in the fall to allow adequate room in the reservoir for the incoming spring inflows.

Water stored in East Canyon Reservoir is used by DWCCC and WBWCD shareholders, in conjunction with other water rights and storage reservoirs. Table 3.4 lists the water rights DWCCC holds for the direct diversion from the Weber River into the Davis and Weber Counties Canal. DWCCC is able to meet their full water demand under these water rights until mid-June during drought years and mid-July during wet years. DWCCC calls for their storage water when they can't meet their full demand with the direct flow rights. In addition to their 28,000 acre-feet in East Canyon Reservoir, DWCCC is entitled to 40 percent (or 29,600 acre-feet) of the storage in Echo Reservoir on the Weber River. DWCCC has the right and can use water from either reservoir to supplement their water needs. Historically DWCCC water uses from these two reservoirs has generally followed the ratio of two-thirds Echo water to one-third East Canyon water.

Table 3.4: Summary of DWCCC Direct Flow Water Rights

WR Number	Priority Date	Annual Diversion Limit (cfs)
35-8044 (Decree)	1881	46.15
35-8048 (Decree)	1889	36.923
35-8058 (Decree)	1902	46.15
35-8068 (Decree)	10/06/1909	215.0

WBWCD uses its portion of the stored water in East Canyon Reservoir in conjunction with the stored water at six other Weber Basin Project and WBWCD reservoirs. Additionally, WBWCD can use high Weber River flows under Water Right No. 35-835, which allows up to an 825.0 cfs diversion at the Slaterville Diversion Dam and has a September 8, 1955 priority date.

In addition to the flexibility, WBWCD and DWCCC have under the current operation procedures in how they individually meet their water demands, they may soon have additional flexibility to trade water between them. In 2006, DWCCC filed Change Application No. a31535 to allow their water rights to be diverted into Weber Basin Project facilities and used within the WBWCD service area. Likewise, at the same time, WBWCD and Reclamation filed Change

Application No. a31534 to allow Weber Basin Project water rights to be diverted into the Davis and Weber Counties Canal. Although neither of these change applications have been approved, the Utah Division of Water Rights has advertised both of them and they were not protested. WBWCD currently has the necessary pumps installed to deliver water from the Slaterville Diversion Dam to the Davis and Weber Counties Canal. If these change applications become approved, WBWCD can exchange project water at the Slaterville Diversion Dam for water stored in East Canyon Reservoir under the DWCCC water rights.

East Canyon Reservoir water supply does not appear to be fully utilized at this time. DWCCC records show that during the past ten years a significant portion of their rental shares have not been fully used. Reclamation estimates that in any given year there are a significant number of shares in the DWCCC system not being fully used. Additionally, WBWCD has not sold all the water available under the Weber Basin Project. WBWCD has indicated that they may have at least 5,000 acre-feet of additional water they could sell out of East Canyon Reservoir. Given the population growth along the Wasatch front and in the Weber River Valleys, Reclamation anticipates that in the next 50 years WBWCD will sell all the water available under the Weber Basin Project and that DWCCC water will be nearly fully used.

3.2.4 Water Quality

East Canyon Reservoir is classified and protected by the State of Utah for the following beneficial uses:

- Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
- Class 2A - Protected for primary contact recreation such as swimming.
- Class 2B - Protected for secondary contact recreation such as boating, wading, or similar uses.
- Class 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.

The Weber River and tributaries, from Stoddard Diversion to headwaters, is classified for the following beneficial uses: Classes 1C, 2B, 3A, and 4. The Utah Division of Water Quality's "Utah 2006 Integrated Report Volume I:305(b) Assessment" dated June 15, 2006, states: "The major concern for the main stem of the Weber River is the possible impairment by total phosphorus. The

periphyton community is changing to nutrient tolerant species which may cause a shift in the fisheries.¹ The Report also states regarding East Canyon Creek: “Total phosphorus is the major issue on this stream. To reduce the amount of phosphorus loading, the Utah Division of Water Quality (DWQ) required Snyderville Waste Water Treatment Plant implement processing methods to reduce the amount of phosphorus that was being discharged into the creek. A permit limit was set and monitoring is on going to determine if the limit will have a significant impact on the stream’s aquatic vegetation, periphyton, and dissolved oxygen levels”.

The Report also indicates that East Canyon Creek and tributaries from East Canyon Reservoir to the headwaters, do not support their Beneficial Use Class 3A due to organic enrichment and low dissolved oxygen.

East Canyon Reservoir and East Canyon Creek both had Total Maximum Daily Load (TMDL) studies and reports completed in April 2000. Those reports indicate the pollutants of concern for the reservoir are total phosphorus and dissolved oxygen. The goal for total phosphorus in-lake concentration is 0.025 mg/L, and for dissolved oxygen is 4.0 mg/L in >50% of the water column. The pollutants of concern for the creek are also total phosphorus and dissolved oxygen. The goal for total phosphorus is 0.04 mg/L in the stream above the Waste Water Treatment Plant (WWTP), and 0.05 mg/L below the WWTP. The goal for dissolved oxygen is at or above Utah Standards.

The Utah Division of Water Quality is currently in the process of developing new or updated TMDL’s for both the reservoir and the stream. The East Canyon Reservoir and East Canyon Creek TMDL’s-Public Draft was made available in October 2008. The pollutants of concern are the same for East Canyon Reservoir, low dissolved oxygen and excess total phosphorus. The defined targets/endpoints are expanded as follows:

Trophic Status and Algae

- In-reservoir mean seasonal chlorophyll a of 8 µg/L
- Nuisance algal threshold of 30 µg/L not to be exceeded >10% of the season.
- Algal dominance other than blue-green species

Dissolved Oxygen (DO)

- Mixed reservoir periods: 4.0 mg/L DO throughout at least 50% of the water column
- Stratified reservoir periods: 2 meter layer throughout the reservoir in which DO is maintained above 4 mg/ and temperature below 20°C

Phosphorus

- Mean total phosphorus concentration of 0.031 mg/L
- Mean dissolved phosphorus concentration of 0.021 mg/L

¹ Utah 2006 Integrated Report Volume I:305(b) Assessment, Department of Environmental Quality, Division of Water Quality, Salt Lake City, Utah

The pollutant of concern for East Canyon Creek is low dissolved oxygen associated with physical stream characteristics causing light and temperature pollution. The defined targets/endpoints are expanded as follows:

1. Ash-free biomass of 6.3 mg/cm²
2. Minimum dissolved oxygen no less than 4.0 mg/L

In order to understand the targets of the TMDL it is important to understand certain reservoir characteristics described below such as thermal stratification, mixing periods, the distribution of dissolved oxygen, and reservoir productivity.

Thermal Stratification & Mixing

Each year East Canyon Reservoir goes through periods of thermal stratification, turnover, and complete mix. Thermal stratification begins when surface waters of the reservoir are heated by the sun and warmer air, typically in April of each year. Stratification is fully developed when there are three distinct thermal layers in the reservoir. The warm, upper layer is known as the epilimnion, the bottom colder layer is known as the hypolimnion, and the middle layer, known as the metalimnion, is a transition zone between the epilimnion and hypolimnion. Figure 3.5 illustrates these layers in a temperature profile from East Canyon Reservoir. Full development of stratification in the reservoir typically occurs by July. Due to density differences between the stratified layers little wind-driven mixing occurs between the layers. Turnover begins as days become shorter and air temperatures begin to cool, typically in September at East Canyon. As the epilimnion cools it begins to mix with the metalimnion. Eventually there are no distinct thermal layers and the reservoir becomes completely mixed, usually in December. Winds are able to mix the reservoir through the entire water column during this period. During the winter, East Canyon stratifies as surface water cools to less than 4°C and then freezes. Wind-driven mixing does not occur after the reservoir has frozen over. After the spring thaw the reservoir is again completely mixed for a period before the reservoir begins to stratify.

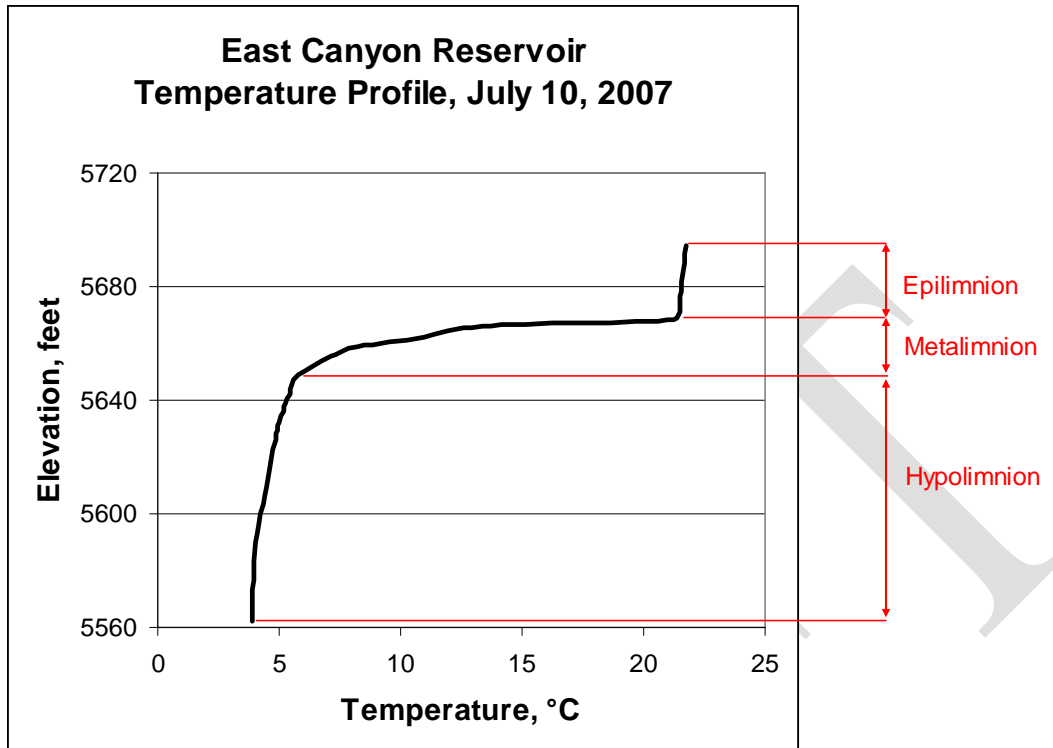


Figure 3.5: East Canyon Reservoir temperature profile illustrating thermal stratification

Dissolved Oxygen Distribution

The distribution of dissolved oxygen in East Canyon Reservoir typically changes along with thermal stratification, turnover, and complete mixing. Before stratification begins to develop and after turnover dissolved oxygen concentrations in the water column are typically above the 4 mg/L threshold. This is because the reservoir is re-aerated from top to bottom by wind-driven mixing. Once stratification develops, re-aeration of surface waters does not mix through the water column. The hypolimnion is not re-aerated and decay processes begin to deplete the dissolved oxygen until the entire hypolimnion becomes anoxic. The anoxic conditions typically begin in June and persist until turnover begins in September.

Productivity

Plankton growth, density, and distribution are important to the DO dynamics within the reservoir. They both produce and consume oxygen through photosynthesis, respiration, and decay. The anoxic conditions which develop in East Canyon following stratification are largely due to the decay of dead algal cells. Phytoplankton are also an important part of the nutrient cycle, as they uptake phosphorus, nitrogen, and other nutrients before returning these nutrients to the water column through excretion or decay of dead algal cells.

3.2.5 Public Safety, Access, and Transportation

The towns and communities of Morgan and Summit Counties are located in high mountain valleys between the Uinta and Wasatch Mountains. In addition to Park City, area towns include Morgan, Henefer, Coalville, Wanship, and other small communities. Major Highways serving the county include I-80, I-84, SR-65, and SR-66. SR-65 extends northerly from I-80 past the proposed project construction site. SR-65 divides into SR-65 and SR-66 which extend northerly to I-84.

3.2.6 Recreation

Recreational facilities at East Canyon State Park are managed by the Utah Division of Parks and Recreation under agreement with Reclamation. The managed season is all year with high use. The most preferred activities include boating, camping, fishing, and day use. The greatest numbers of fish caught are Rainbow Trout, Cutthroat Trout, and Brown Trout, respectively. Recreation facilities include at the more developed north end a boat ramp, boat storage area, day use, camping (including 4 yurt structures) rest rooms (wet and dry), sewage dump station and some facilities for the disabled. At the south end of the reservoir there is located two more smaller campgrounds. Use in 2006-07 totaled 109,446 and use in 2007-08 totaled 70,707. The majority of visitors come from the Wasatch Front.

3.2.7 Visual Resources

Reclamation uses the Forest Service's Visual Management System (VMS) to analyze and classify the existing visual opportunities that may be experienced by East Canyon reservoir visitors.

Visual integrity is the naturalness or, conversely, the state of disturbance created by human activity or alteration. Visual integrity is developed by combining Scenic Quality Ratings assigned to a given use area with the User's Sensitivity Rating. Possible visual levels include the following:

Very High Integrity

Generally management allows for ecological changes only.

High Integrity

Management allows for man-made facilities and disturbances which are not evident to the casual visitor.

Moderate Integrity

Management allows for man-made facilities and disturbance which would appear visually subordinate to the natural landscape and should blend with or complement it.

Low Integrity

Management allows for man-made facilities and disturbances which visually dominate the natural landscape when viewed from up to a five-mile distance. The

result of the activity should, however, blend with or compliment the natural landscape.

Very Low Integrity

Management allows for man-made facilities and disturbances which visually dominate the natural landscape and may not blend with or compliment the natural landscape when viewed from up to a five-mile distance.

In the case of East Canyon Reservoir, the majority of management areas are identified as having a moderate Visual Integrity Level, which indicates that the long-range results of humankind’s activities within the specific area should remain visually subordinate to the natural-appearing landscape and should borrow naturally established line, form, color, and texture. The remaining management areas are classified as having low integrity, meaning that the long-range results of humankind’s activities may dominate the natural-appearing landscape but borrow naturally established line, form, color, and texture. Table 3.5 summarizes the resultant visual integrity levels for the management areas identified at East Canyon Reservoir.

Table 3.5: Management Area Visual Integrity Rating

MANAGEMENT AREA INTEGRITY	RESULTANT VISUAL
Primary Jurisdiction Area	Moderate
North & East Area – above Hwys. 65/66	Moderate
North Park Area	Low
North & East Area – below Hwys. 65/66	Moderate
Big Rock Area	Low
River Edge Area	Moderate
West Side	Moderate
West Beach Area	Moderate
Reservoir Inundation Area (Full Reservoir)	Moderate
Reservoir Inundation Area (Empty Reservoir)	Very Low
State Parks Property	Moderate

3.2.8 Socioeconomics

As a water resource, East Canyon Reservoir has an active capacity of 48,110 acre-feet of project water for use by irrigators, municipalities, and other users in Morgan, Weber, and Davis County and other areas within the Weber Basin Project. As stated in the Special Report, the population of the Park City/Snyderville Basin area is expected to grow from 23,859 to 86,327 by the year 2050. This represents a projected total future demand of approximately

30,600 acre-feet/year of water by the year 2050. The proposed action was one of two water supply options in the February 2006 Special Report, recommended for implementation to meet M&I needs in the immediate and near future.

East Canyon Reservoir serves as a significant source of recreation with the majority of visitors coming from the Wasatch front and from East Canyon Resort, located immediately upstream. Based upon visitation information, provided by the Utah Division of Parks and Recreation, and mean consumer surplus data for camping, fishing, and boating for State Parks in the Intermountain West taken from Kaval (2007), the annual benefit from recreation associated with East Canyon Reservoir over the past 5 years, was estimated to be approximately \$3.8 million per year.

3.2.9 Cultural Resources

Cultural resources are defined as the expressions of human culture and history in the physical environment, including culturally significant landscapes, historic and archaeological sites, Native American and other sacred places and artifacts, and documents of cultural and historic significance.

Section 106 of the National Historic Preservation Act of 1966 (NHPA), stipulates that Reclamation take into account the potential effects of a proposed Federal undertaking on historic properties. Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP). This stipulation falls within the broad requirement to preserve important historic, cultural, and natural aspects of our national heritage under NEPA. Further, according to the Reclamation Manual Directives and Standards related to cultural resources management, all Reclamation NEPA actions will be coordinated with the NHPA Section 106 compliance process. Potential effects of the described alternatives on historic properties are the primary focus of this analysis.

3.2.9.1 Cultural History

Planning of the Weber Basin Project began in 1942 and was discontinued during World War II. It was resumed in 1946 when it became apparent that the marked increase of population drawn to the area by military installations during the war became permanent. An acute demand for M&I and irrigation water precipitated Congressional authorization of the project in August 1949. East Canyon Dam and Reservoir was built between 1964 and 1966.

3.2.9.2 Cultural Resources Status

According to the Section 106 regulations, 36 CFR Part 800 ("Protection of Historic Properties"), of the NHPA, the affected environment for cultural resources is identified as the APE (area of potential effects). The APE is the geographic area or areas within which a Federal undertaking (proposed action) may directly or indirectly cause alterations in the character or use of historic properties.

Known prehistoric properties are located around East Canyon Reservoir. The APE defined in the action alternative analyzed for the proposed action, has been the subject of 100 percent pedestrian Class I and Class III cultural resource inventories by the Provo Area Office archaeologist in July, August, and September 2008. A total of 87.4 acres were inventoried. No historic properties were located. In compliance with 36 CFR 800.11(d), a cultural resource inventory report and determination of effect for the APE would be submitted to the Utah State Historic Preservation Office for consultation and concurrence. In addition, the report and determination of effect would be sent to tribes and additional consulting parties for consultation in compliance with 36 CFR 800.2.

3.2.10 Paleontological Resources

A paleontological file search was conducted for the project area by the Utah Geological Survey (UGS). Martha Hayden, Paleontological Assistant with the UGS, was consulted regarding the potential for encountering previously documented and presently unknown, paleontological resources in the vicinity of the project area.

The UGS reply, dated September 3, 2008, on file at the Provo Area Office, Bureau of Reclamation, stated that the Quaternary and Recent alluvial deposits and the Tertiary Norwood Tuff that are exposed along this project right-of-way have a low potential for yielding significant fossil localities.

3.2.11 Wetlands and Vegetation

Riparian Habitat

Riparian habitat exists along East Canyon Creek, both upstream and downstream of East Canyon Reservoir. This habitat varies from approximately 50 to over 100 feet in width and consists mostly of young willow (*Salix spp*), some Nebraska sedge (*Carex nebrascensis*) and in places an overstory of narrow leaf cottonwood. Smooth brome (*Bromus inermis*), timothy (*Phleum pratense*) as well as several other introduced and native grass species (mostly wheat grasses) exist in and above the riparian corridor. Canada thistle (*Cirsium arvense*) has invaded the area in small patches. The proposed construction would occur along this creek upstream of the reservoir. Most of this habitat occurs along existing roads.

Upland Habitat

Both nonnative and native species of vegetation are found within the project area. Upland habitat consist mainly of big sagebrush (*Artemisia tridentata*), rabbit brush (*Chrysothamnus spp.*), and snowberry (*Symphoricarpos oreophilus*) with an overstory of Gambel oak (*Quercus gambelii*). Other species present include yellow sweet clover (*Melilotus officinalis*), houndstongue (*Cynoglossum officinale*), broom snakeweed (*Gutierrezia sarothrae*), golden currant (*Ribes aureum*), wild rose (*Rosa woodsii*), basin wildrye (*Elymus cinereus*), Rocky Mountain aster (*Aster adscendens*), Indian paintbrush (*Castilleja angustifolia*), field wormwood (*Artemisia campestris*) and curlycup gumweed (*Grindelia squarrosa*). Crested wheatgrass (*Agropyron cristatum*) has been seeded in previously disturbed areas.

Reservoir Habitat

Wetlands occur in limited locations around the perimeter of East Canyon Reservoir where intermittent and perennial creek drainages convey fine-textured sediment to the reservoir. Jurisdictional waters include the area defined by the high waterline of the reservoir and streams feeding the reservoir.

Most of the reservoir's perimeter consists of sagebrush, rock, or bare ground. A few areas of cottonwood trees exist along the shoreline. East Canyon Creek has developed a delta of willow habitat as it enters the reservoir. These areas require relatively stable reservoir levels that provide sufficient hydrology to support these habitats.

Exposed reservoir bottom (existing during seasonally low reservoir levels) consists of muddy and rocky substrates, depending on the topography of the exposed shoreline. Large expanses of muddy exposed reservoir bottom typically occur where perennial creek drainages deposit fine-textured sediment into the reservoir.

Lands immediately surrounding the reservoir are infested with weed species including: broadleaf dock (*Rumex obtusifolius*), houndstongue (*Cynoglossum officinale*), cheatgrass (*Bromus tectorum*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), common sunflower (*Helianthus annuus*), common mallow (*Malva neglecta*), silversheath knotweed (*Polygonum argyrocoleon*), common cocklebur (*Xanthium strumarium*), lambsquarter (*Chenopodium album*), burdock (*Arctium minus*), black henbane (*Hyoscyamus niger*), Russian thistle (*Salsola tragus*), field bindweed (*Convolvulus arvensis*), woolly mullein (*Verbascum thapsu*), prickly lettuce (*Lactuca serriola*), white horehound (*Marrubium vulgare*), broadleaf plantain (*Plantago major*), prostrate vervain (*Verbena bracteata*), and salisfy (*Tragopogon dubius*)

3.2.12 Wildlife Resources

Wildlife resources within the general area of the project include fish, big game, smaller mammals, raptors, water birds, and upland game birds, with a variety of other birds, reptiles, and amphibians.

Fish

East Canyon Creek was formerly a very productive cold-water fishery into the 1980s. However, important habitat parameters have been compromised including: increased water temperatures, decreased dissolved oxygen concentrations, elevated phosphorous levels, and lowered base flow level.

The fishery below East Canyon Reservoir consists mainly of brown trout (*Salmo trutta*) with lower numbers of mountain white fish (*Prosopium williamsoni*), rainbow trout (*Oncorhynchus mykiss*), and Bonneville cutthroat trout (*Oncorhynchus clarkii*). This reach is an important spawning tributary of the

Weber River (UDWR 1998). A 5 cfs minimum flow delivered to this reach from East Canyon Reservoir provides needed water during the critical months of fish egg incubation. Fall and winter flows are critical for successful spawning by brown trout.

East Canyon Creek above the reservoir has very few cutthroat trout. The rainbow trout population has also declined in the last few decades. A small population of brown trout is present in the reach. Kokanee (*Oncorhynchus nerka*) are no longer present. Rainbow trout are stocked annually.

The McLeod Creek fishery relies on continued stocking of juvenile brown trout and catchable sized rainbow trout.

East Canyon Reservoir was the primary put-grow-take trout fishery in northern Utah from the late 1960's to the late 1980's (UDWR 1998). The reservoir also had a self-sustaining Kokanee population. Poor quality water and reduced inflow to the reservoir has reduced trout populations and eliminated the Kokanee population. Currently, catchable-sized rainbow trout are stocked by the UDWR in order to sustain a put-grow-and-take trout fishery.

Non-game fish, including carp (*Cyprinus carpio*), Utah chub (*Gila atraria*) and reddsider shiner (*Richardsonius balteatus*) reproduce in the reservoir and serve as forage fish for game species.

Big Game

The foothills and mountains surrounding the reservoir are covered mostly with sagebrush, grassland, juniper, and Gambel oak (*Quercus gambelii*) communities. This area provides summer and winter habitat for deer (*Odocoileus hemionus*) and elk (*Cervus elaphus nelsoni*). Moose (*Alces alces*) are occasionally observed along stream drainages near the reservoir. Mountain lion (*Felis concolor*), black bear (*Ursus americanus*), and coyote (*Canis latrans*) are present in the area.

Other Mammals

Other mammals common within the area include: yellow-bellied marmot (*Marmota flaviventris*), badger (*Taxidea taxus*), least chipmunk (*Eutamias minimus*), meadow vole (*Microtus montanus*), northern pocket gopher (*Thomomys talpoides*), deer mouse (*Peromyscus maniculatus*), porcupine (*Erethizon dorsatum*), and striped skunk (*Mephitis mephitis*). Furbearers such as beaver (*Castor canadensis*), mink (*Mustela vison*), and muskrat (*Ondatra zibethicus*), and ringtail cat (*Bassariscus astutus*) use the wetland and riparian habitat around the reservoir and embankments of creeks. Bobcat (*Lynx rufus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), Uinta ground squirrel (*Spermophilus armatus*), mountain cottontail (*Sylvilagus nuttallii*), and various species of shrews (*Sorex spp.*), voles (*Microtus spp.*), and bats (*e.g. Myotis spp., Eptesicus fuscus*) occupy the area.

Raptors

Birds of prey (raptors) have been observed within or adjacent to the project area. Cottonwood trees along the river and the edge of the reservoir provide nesting habitat for raptors such as the golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), osprey (*Pandion haliaetus*), and roosting sites for the great horned owl (*Bubo virginianus*) and bald eagle (*Haliaeetus leucocephalus*).

Winter months are the best time to view bald eagles near the reservoir. Other raptors observed in the area are the American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), western screech owl (*Otus kennicottii*), great horned owl (*Bubo virginianus*), and turkey vulture (*Cathartes aura*).

Water Birds

Numerous water birds occur in the project area such as waterfowl, shore birds, and other wading birds typically associated with wetlands and open water. The reservoir provides high quality habitat for water birds due to the prevalence of emergent wetlands near the mouth of small drainages around the reservoir. These areas provide important forage and cover sites for waterfowl and wading birds.

East Canyon Reservoir serves as a migratory stopover for birds in the fall and spring. Emergent vegetation around the reservoir provides nesting habitat for a variety of waterfowl from mid-March to mid-July. Brood rearing begins mid-July to Mid-August. Mud flats exposed in late summer and fall provide foraging areas for shore and wading birds.

Water birds commonly observed include the pied-billed (*Podilymbus podiceps*), eared (*Podiceps caspicus*), and western grebes (*Aechmophorus occidentalis*), gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), northern shoveler (*Spatula clypeata*), lesser scaup (*Aythya affinis*), green-winged teal (*Anas carolinensis*), northern pintail (*Anas acuta*), common loon (*Gavia immer*), American white pelican (*Pelecanus erythrorhynchos*), double crested cormorant (*Phalacrocorax auritus*), American coot (*Fulica Americana*), ring billed gull (*Larus delawarensis*), California gull (*Larus californicus*), great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferous*), and Canada goose (*Branta canadensis*).

Upland Game Birds

Upland game birds occurring in the area include the ring-necked pheasant (*Phasianus colchicus*), mourning dove (*Zenaida macroura*), California quail (*Lophortyx californicus*), and sage grouse (*Centrocercus urophasianus*).

Other Birds

The most common birds found within the project area are songbirds. Western kingbirds (*Tyrannus verticalis*), yellow warbler (*Dendroica petechia*) and mountain bluebird (*Sialia currucoides*) are among the various species of songbirds that use the riparian and wetland habitat.

Corvids, including jays (*Cyanocitta spp.*), the black-billed magpie (*Pica pica*), and the common raven (*Corvus corax*), exist in the area. Tree swallow (*Tachycineta bicolor*), violet-green swallow (*Tachycineta thalassia*), northern rough-winged swallow (*Stelgidopteryx serripennis*), and cliff swallows (*Hirundo pyrrhonota*) all occur within the area. Of these, the most abundant are the cliff swallows. In open, shrub-dominated habitats goldfinch (*Carduelis tristis*), western meadowlark (*Sturnella neglecta*), common nighthawk (*Chordeiles minor*) sage thrasher (*Oreoscoptes montanus*), green-tailed towhee (*Pipilo chlorurus*), and rufous-sided towhee (*P. erythrophthalmus*) occur.

Reptiles and Amphibians

Reptiles and amphibians with potential to occur in the project area include the tiger salamander (*Ambystoma tigrinum*), boreal chorus frog (*Pseudacris triseriata*), great plains toad (*Bufo cognatus*), northern leopard frog (*Rana pipiens*), Great Basin gopher snake (*Pituophis melanoleucus deserticola*), and the Great Basin rattlesnake (*Crotalus viridis*). Historically, boreal toad (*Bufo boreas*) and Columbia spotted frog (*Rana lutieventris*) occurred in the area but have not been documented within the project area recently.

3.2.13 Threatened, Endangered, and Sensitive Species

Federal agencies are required to ensure that any action federally authorized or funded, would not adversely affect a federally listed threatened or endangered species. Several species listed as threatened or endangered occur within Morgan County or within the East Canyon Creek Drainage. These species are discussed below.

The bald eagle (*Haliaeetus leucocephalus*) (Formerly Threatened) is a winter resident of the area and is currently a Utah State species of concern. This species is protected under the Bald Eagle Protection Act. Bald eagles roost primarily in forested canyons or tall cottonwoods along streams and reservoirs. Migration of bald eagles from breeding areas generally takes place between September and December. These eagles use cottonwood trees and snags near open water as winter roosting sites.

Canada Lynx (*Lynx canadensis*) (Threatened), although they have not been seen, could possibly use forested areas and wetlands within or near the project area. The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (Candidate) may use the area during their breeding season.

The State of Utah maintains a list of species of special concern. These species that may occur within the project area and are managed under conservation agreements are the Bonneville cutthroat trout (*Oncorhynchus clarkii utah*), Columbia spotted frog (*Rana luteiventris*), bluehead sucker (*Catostomus discobolus*), and northern goshawk (*Accipiter gentilis*). Other species of special concern that may occur within the area but are not managed under a conservation agreement are: bobolink (*Dolichonyx oryzivorus*), desert mountainsnail (*Oreohelix peripherica*), ferruginous hawk (*Buteo regalis*), grasshopper sparrow

(*Ammodramus savannarum*), greater sage-grouse (*Centrocercus urophasianus*), Lewis's woodpecker (*Melanerpes lewis*), lyrate mountainsnail (*Oreohelix haydeni*), sharp-tailed grouse (*Tympanuchus phasianellus*), western pearlshell (*Margaritifera falcate*), western toad (*Bufo boreas*).

3.3 Environmental Effects of Alternatives

Assumptions applied in analyzing the effects of both the no action and the action alternative in this EA include the following: (a) analysis of the no action alternative assumes existing water rights would be fully used in the future to satisfy the increasing demand for water; and (b) normal dam operations within historic flexibility would continue during construction and after the project is completed.

3.3.1 Water Resources

3.3.1.1 No Action Alternative

The no action alternative would have no effect on water resources, except for lower operating water levels in East Canyon Reservoir resulting from satisfying future downstream demands.

3.3.1.2 Action Alternative

The 12,500 acre-feet of water to be diverted to Park City and Snyderville Basin represents 3% of WBWCD total project storage rights, and 22% of DWCCC total storage rights. The Summit Water Distribution Company has 6,787 acre-feet of DWCCC water and may need up to an additionally 5,713 acre-feet from WBWCD. Due to the number of storage facilities and the flexibility of operations within the project to meet demand, annually redirecting 5,713 acre-feet to the basin above the East Canyon Reservoir would not generate significant shortages for WBWCD and its water users on a project wide basis. Immediate downstream releases may be reduced during dry periods (Figures 3.6-3.7); reservoir elevations may periodically exceed the no action alternative elevations due to return flows (Figure 3.8). Figure 3.8a shows that the proposed action average reservoir elevation is slightly higher than the no action average reservoir elevation. Flows in East Canyon Creek above the reservoir would be augmented by the proposed action. Downstream of East Canyon Dam releases are expected to decrease but will maintain fish flow.

East Canyon Reservoir Downstream Releases Avg Years (1995-1999)

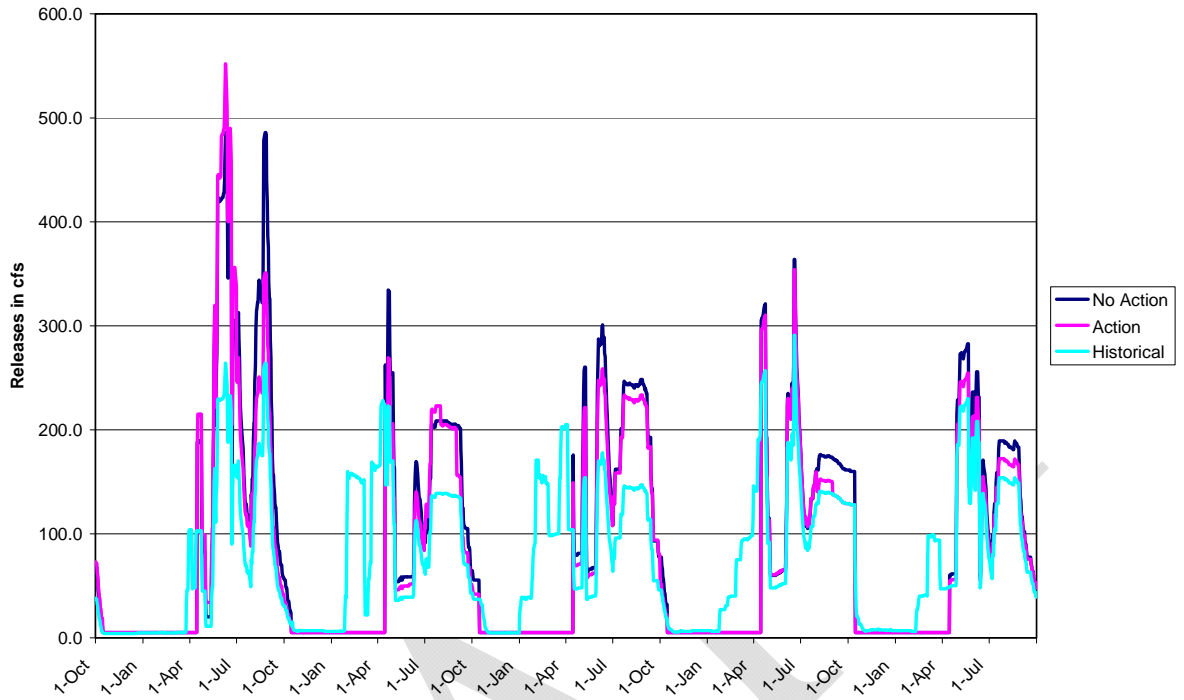


Figure 3.6

East Canyon Reservoir Downstream Releases Dry Years (1988-1992)

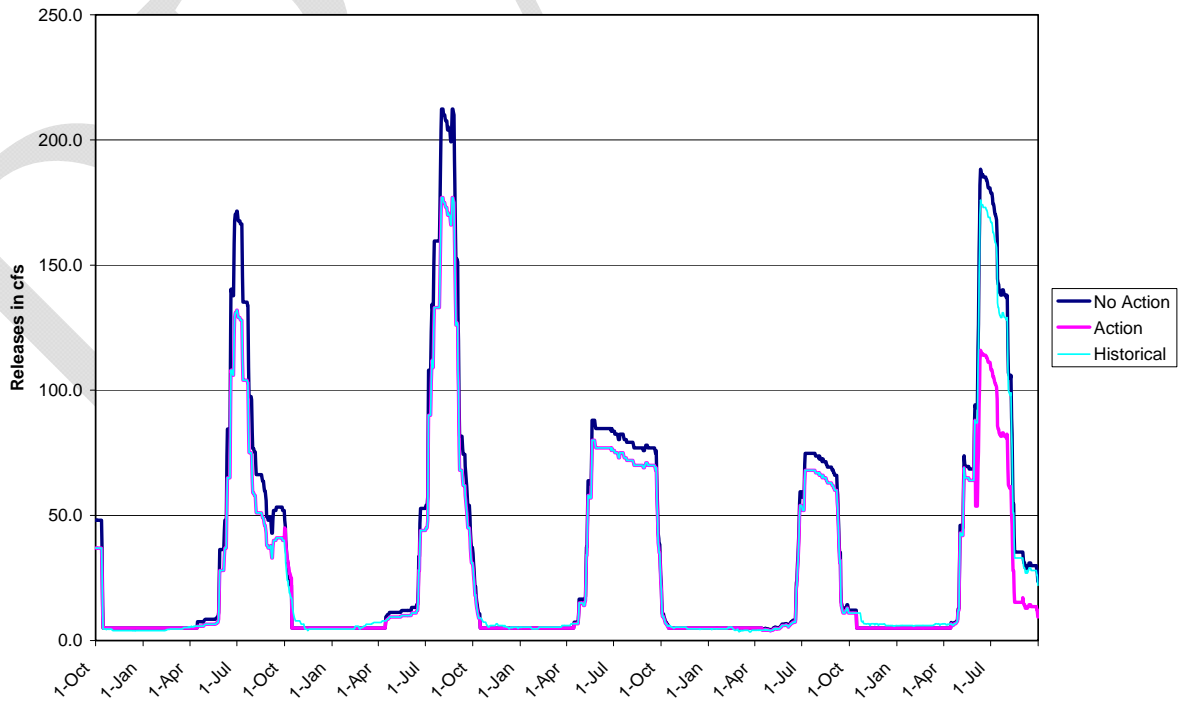


Figure 3.7

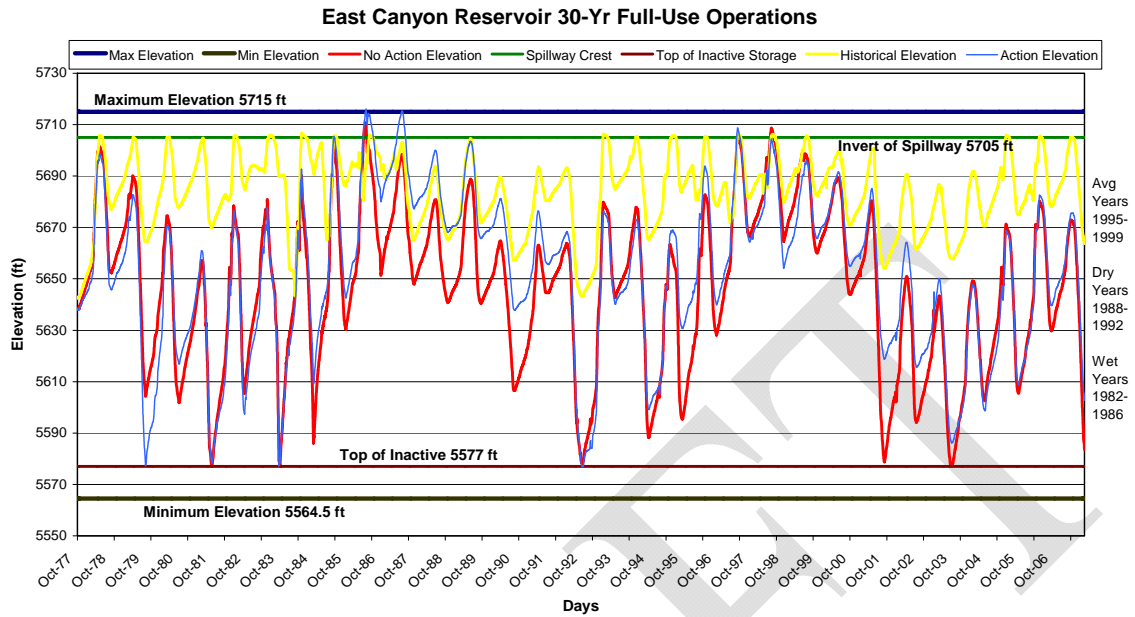


Figure 3.8

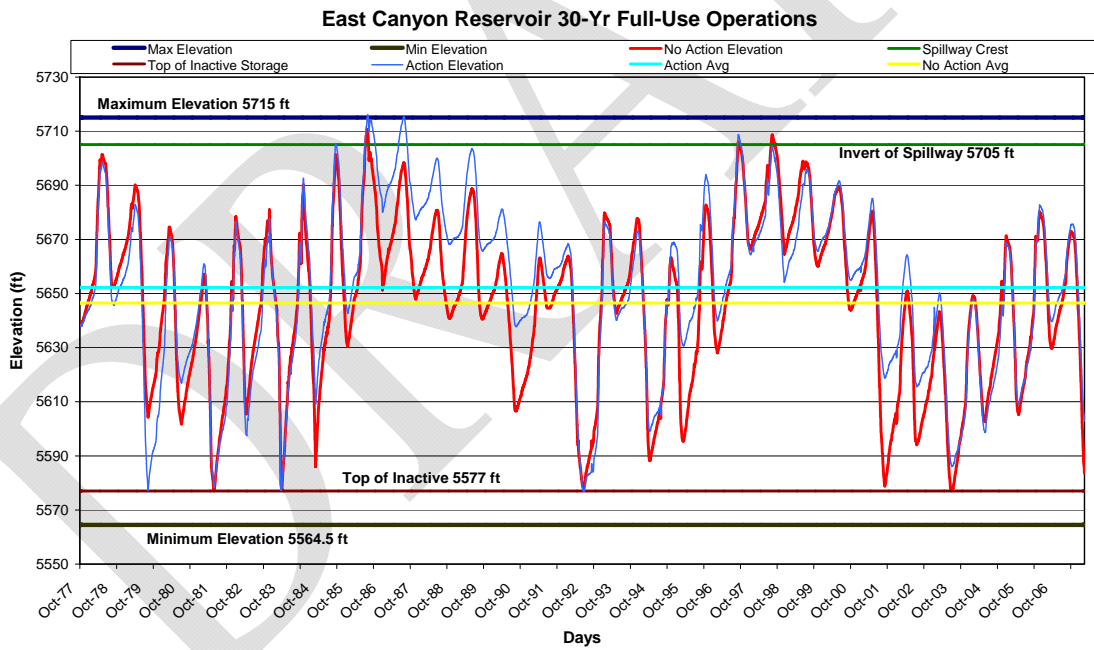


Figure 3.8a

3.3.2 Weber Basin Project Operations

3.3.2.1 No Action Alternative

It is unknown what adjustments would be required as water use increases under the no action alternative. However, the no action alternative would probably not

effect the existing Weber River Project operations, due to the wide range of flexibility in operations.

Historically, East Canyon Reservoir fills about half of the years, and storage drawdown typically does not go below elevation 5660, which is 83 ft above the bottom of active storage at 5577. At full development of Weber Basin Project water, the reservoir would fill less often and storage drawdown may reach the bottom of active storage regularly during dry periods. Average reservoir levels would be lower than historical levels.

3.3.2.2 Action Alternative

The impact to Weber Basin Project operations of either alternative is the same. The total volume of 12,500 acre-feet (3 percent of Weber Basin Project water) that would be diverted annually would not significantly impact the operations of East Canyon Dam.

Stream flows in East Canyon Creek above the reservoir would increase due to return flows of the pipeline water. Releases would increase in the non-storage season to match inflows. Storage season releases should increase in dry years when natural inflows drop below 5 cfs.

3.3.3 Water Rights

3.3.3.1 No Action Alternative

Under this alternative, the proposed project would not be constructed. Therefore, no effects would occur to the existing water rights. The East Canyon Reservoir water right would be more fully used in the future, as WBWCD contracts for all the water available in the Weber Basin Project and as DWCCC shares are committed to the growing municipalities.

3.3.3.2 Action Alternative

Water rights supporting the diversion and use of water under the proposed action would be based on existing storage rights in East Canyon Reservoir. There would be no effect to downstream water right holders. To date, SWDC has entered into a perpetual lease agreement, dated October 13, 1999, with DWCCC for 5,000 acre-feet. Change Application a21859 (35-10539) is based on the decree water rights held by DWCCC and allows the leased water to be diverted from East Canyon Reservoir for use in the Snyderville basin area of Summit County.

In addition to the 5,000 acre-feet committed under the water lease contract, there is the potential for SWDC to acquire up to an additional 7,500 acre-feet of storage rights for the project by dedicating some or all of its DWCCC shares to the

project, acquiring additional DWCCC shares, and/or entering into a contract with WBWCD.

3.3.4 Water Quality

Water quality impacts were evaluated using a two-dimensional hydrodynamic and water quality model, CE-QUAL-W2 of East Canyon Reservoir. This model is best-suited for long, narrow reservoirs such as East Canyon. A calibrated historic model of the reservoir was used to simulate both the no action and action alternative scenarios. Simulating the no action alternative provides baseline conditions with which to compare results from the action alternative. Please refer to Appendix B for more information on the historic, no action, and action CE-QUAL-W2 models used in this analysis.

3.3.4.1 No Action Alternative

Since no construction would occur, there would be no temporary construction-related water quality impacts. However, as development occurs in the Weber River Basin, waters currently unused to meet existing water rights would no longer be stored in the East Canyon Reservoir, but could be used upstream or downstream from East Canyon Reservoir, resulting in future long-term water quality impacts in East Canyon Reservoir and downstream, with or without the proposed action. No impacts to water quality in East Canyon Creek upstream of the reservoir are anticipated.

Results from reservoir water quality modeling of the no action alternative are generated by simulating the no action hydrology scenario from 1991-2007 in the CE-QUAL-W2 model. All other inputs used in the CE-QUAL-W2 no action alternative scenario model are historic 1991-2007 values. These values do not reflect future conditions as it is not possible to anticipate climatic changes or changes in the watershed which may impact water quality or other parameters. Rather, the results provide a baseline condition of water quality in East Canyon Reservoir for the no action alternative hydrology scenario.

3.3.4.2 Action Alternative

Methods

Results from reservoir water quality modeling of the action alternative are generated by simulating the action hydrology scenario from 1991-2007 in the CE-QUAL-W2 model. Water quality of the return flows are based on treatment methods and permit limits and is further explained in the next paragraph. All other inputs used in the CE-QUAL-W2 action alternative scenario model are historic 1991-2007 values. These values do not reflect future conditions as it is not possible to anticipate climatic changes or changes in the watershed which may impact water quality or other parameters.

Impacts to water quality resulting from the action alternative are determined by comparing water quality modeling results of the action alternative scenario model to baseline conditions which were determined from the result of the no action

alternative scenario model. The specific criteria used to determine whether the action resulted in a negative impact are the same targets as the States TMDL. Degradation greater than 10% between the no action and the action alternatives were considered significant. These methods are further explained in Appendix B.

Results

Results presented in this section are qualitative for the purpose of evaluating the impacts to water quality, if any, of the action alternative. The results are based on hydrologic scenarios, historical water quality in the reservoir and creek, and projected water quality of return flows associated with the action alternative. These results are only useful for comparing the water quality of the assumed no action alternative with the water quality of the action alternative. They do not project water quality in any future scenario, with or without the action alternative, as it is not possible to account for other possible changes to variables such as the climate, development in the watershed, etc.

In general, the modeling of the water quality in East Canyon Reservoir and East Canyon Creek indicate that water quality would be improved by the action alternative over the water quality projected under the no action alternative. Daily average phytoplankton results for the action alternative show a decrease in both chlorophyll a concentration and blue-green biomass from the no action alternative. Chlorophyll a concentrations decrease by 15% (an improvement) from the no action to the action alternative. Figure 3.9 displays the daily average chlorophyll a concentrations in the reservoir for the two alternatives. Blue-green algae biomass decrease by 22% (an improvement) from the no action to the action alternative. Figure 3.10 displays the daily average blue-green algae biomass in the reservoir for the two alternatives. Based on the targets for algal production in the TMDL the impacts from the action alternative improve water quality in the reservoir.

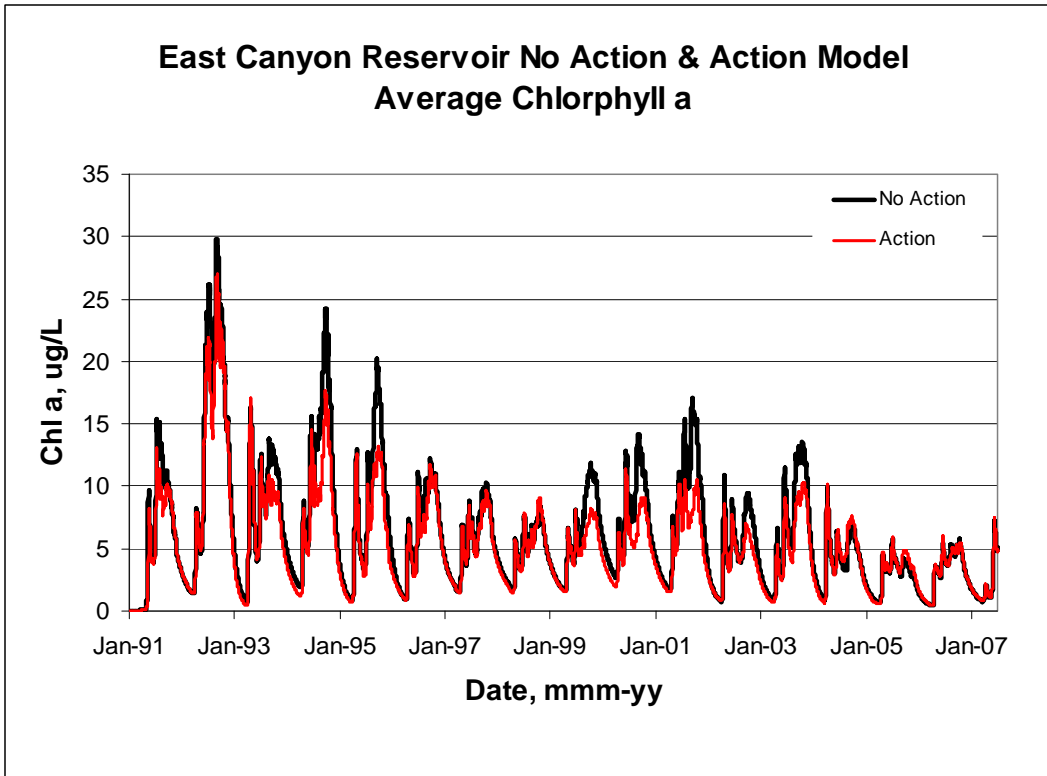


Figure 3.9: East Canyon Reservoir average chlorophyll a, No Action & Action Alternatives

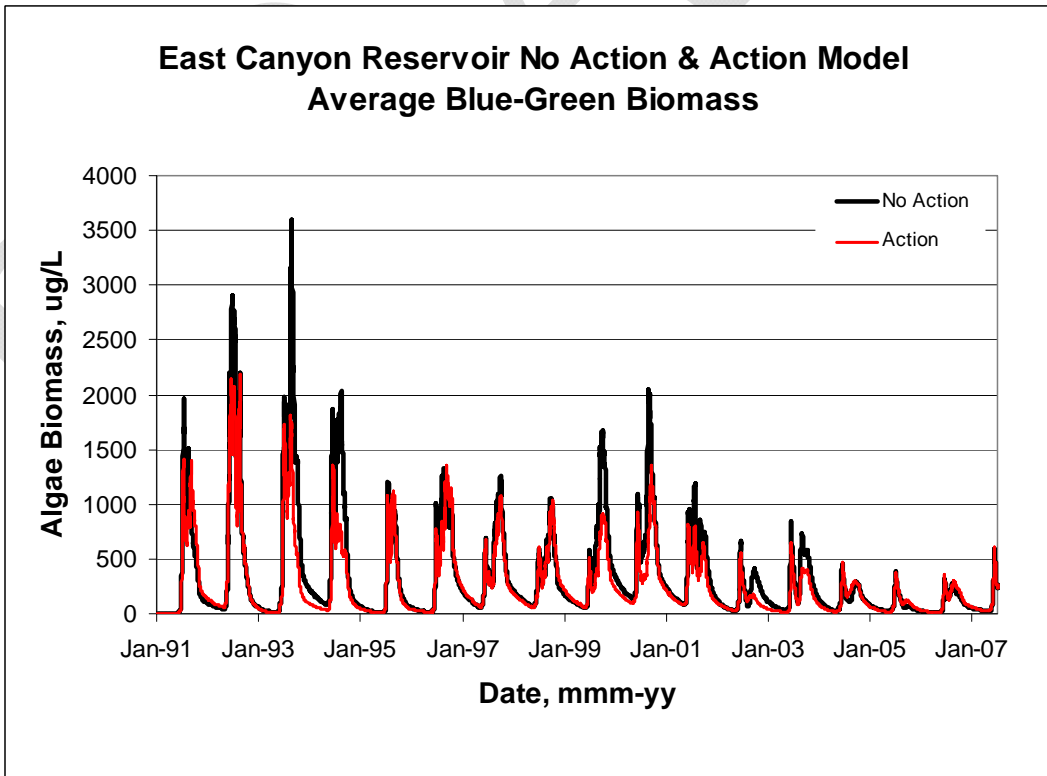


Figure 3.10: East Canyon Reservoir average blue-green algae biomass, No Action & Action Alternatives

During the mixed and stratified periods, the action alternative results in fewer profiles which do not meet the TMDL dissolved oxygen target compared with the no action alternative. Table 3.6 shows the number of profiles from each location and for each alternative which do not meet the TMDL target for dissolved oxygen for the mixing periods. Table 3.7 shows the number of profiles from each location and for each alternative which do not meet the TMDL target of dissolved oxygen and temperature for the stratified periods. Based on the TMDL targets for dissolved oxygen, no significant effects are expected from implementation of the proposed action.

Table 3.6: Number of monthly profiles that fail to meet TMDL dissolved oxygen target for mixed periods (1991-2006)

<i>Location</i>	<i>No Action</i>	<i>Action</i>
Above Dam	2	1
Mid-Lake	0	0
Upper Lake	3	2

Table 3.7: Number of monthly profiles that fail to meet TMDL dissolved oxygen and temperature target for stratified periods (1991-2006)

<i>Location</i>	<i>No Action</i>	<i>Action</i>
Above Dam	6	6
Mid-Lake	8	1
Upper Lake	10	8

The daily average phosphorus results for the action alternative show a slight decrease in dissolved phosphorus from the no action alternative. Dissolved phosphorus decreases by 11% (an improvement) from the no action to the action alternative. Figure 3.11 displays the daily average dissolved phosphorus in the reservoir for the two alternatives. The impact to phosphorus in the reservoir by the action alternative improves water quality. It should be noted that there is minimal difference from 2003 through 2007 between the alternatives. The differences in this period would not be considered significant.

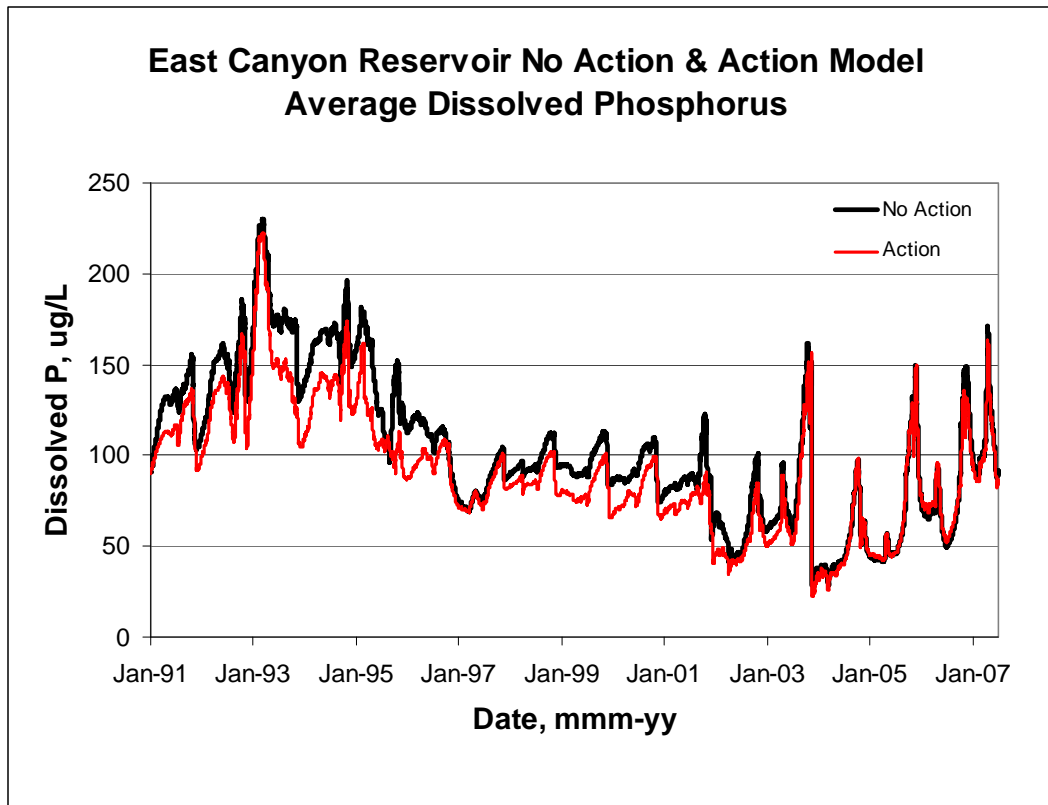


Figure 3.11: East Canyon Reservoir average dissolved phosphorus, no action & action alternatives

Under the action alternative flow in East Canyon Creek would increase from the ECWRF outfall to the reservoir and would decrease below the reservoir. Above the reservoir the increase in flow would actually improve conditions in East Canyon Creek, especially during the low-flow months in the later summer and early fall. Water quality in the creek would not be significantly impacted as the ECWRF would be operating within the limits of its UPDES permit, which are considered in the TMDL. Below the reservoir, the reduction in flow would not affect the minimum in-stream flow required for fish. The water quality below the reservoir is dependent on water quality in the reservoir. Since the reservoir analysis of the action alternative determined there are no negative impacts to water quality, no negative impacts to water quality in East Canyon Creek below the reservoir are expected.

3.3.5 Public Safety, Access, and Transportation

3.3.5.1 No Action Alternative

This alternative would have no effect on access, transportation, or public safety.

3.3.5.2 Action Alternative

This alternative would require the transport of heavy equipment, pipe, and concrete, to construction sites and construction near roadways. Although the intake structure and some of the pipeline alignment are not along major roadways,

some of the proposed pipeline and powerline alignments are along SR-65 and SR-66. For safety reasons, flagmen may be required as trucks enter and exit the construction sites, and for potential lane closures for construction near roadways. Traffic delays would occur creating an inconvenience and constituting a safety concern.

This alternative would create minor public safety, access, and transportation impacts.

3.3.6 Recreation

3.3.6.1 No Action Alternative

The no action alternative, due to the prospects of having water rights eventually fully used, could see the reservoir elevation at certain times of the year 20-25 feet lower than has generally been seen to date. This situation, though minor, would never the less affect recreation. Less surface area would make East Canyon Reservoir less attractive to visitors.

3.3.6.2 Action Alternative

Under the action alternative, it is anticipated that over half of the pumped-out water would find its way back to East Canyon Reservoir. This will affect elevation levels in the positive; as opposed to having the water elevation down 20-25 feet. Thus, with water elevations slightly more stable (than with the no action alternative) recreation would continue at about the same level with or without the proposed action alternative.

3.3.7 Visual Resources

3.3.7.1 No Action Alternative

The no action alternative would remain in the Moderated Integrity Level. Management at Moderate Integrity Level allows for man-made facilities and disturbance which would appear visually subordinate to the natural landscape and should blend with or complement it. Under this alternative, the visual integrity would not change even with the expected lower reservoir levels as water rights are used and more exposed shore line would occur in the future.

3.3.7.2 Action Alternative

Construction impacts on the West Side of the reservoir related to burying the power and pipeline in the existing gravel road would, in themselves, be minimal. However, enlarging the road to two-lanes will mar the hillside and views to the west from Utah State Route 65. Over time the road cut and fills would improve as they revegetate. However, these impacts would lower the Visual Integrity Level from Moderate to Low.

Long term impacts within the North Shore area, if done responsibly, could be absorbed in the existing Low Integrity Level which allows for man-made facilities and disturbances which visually dominate the natural landscape when viewed

from up to a five-mile distance. The result of the activity should, however, blend with or compliment the natural landscape.

3.3.8 Socioeconomics

The potential socioeconomic effects focus upon the changes in water supply, water quality, water use, and recreation.

3.3.8.1 No Action Alternative

This alternative would not significantly affect the existing socioeconomic conditions in the short-run; however, with available water supplies already behind the projected demand curve, the no action alternative would lessen the likelihood of meeting time constraints imposed by rapid growth in the Park City/Snyderville Basin area. Without sufficient water supply, future development may be limited, and in the broad sense may indirectly affect conditions of the regional economy in the long-run.

3.3.8.2 Action Alternative

The action alternative would temporarily increase the economic activity in the area due to construction activities. Without a further extensive economic study, the actual estimates would not be available. It is also suggested, that with the lower reservoir levels, the economic activity stimulated by recreation may be negatively impacted in the future. However, with the future demand for the water downstream without the action alternative, it is expected that the water available will be diminished and the economic activity will eventually be impacted with or without the proposed action alternative.

3.3.9 Cultural Resources

3.3.9.1 No Action Alternative

Under the no action alternative, there would be no effect to historic properties. SWDC would not construct the action alternative, and there would be no need for ground disturbance for any potential borrow or staging areas, spoils deposit areas, or new roads. The existing conditions would remain intact and would not be affected.

3.3.9.2 Action Alternative

For the APE included in the alternatives, a 100 percent cultural resource inventory has been completed by the Provo Area Office archaeologist. Documentation of the APE for the action alternative, including maps and photographs, and a determination of effect to cultural resources will be included in a report which will be sent to the Utah State Historic Preservation Office (SHPO), tribes, and additional consulting parties. There were no historic or archaeological sites located within the boundaries. Therefore, there would be no effect to historic properties from the construction of any of these structures.

3.3.10 Paleontological Resources

3.3.10.1 No Action Alternative

Under the no action alternative, there would be no effect to paleontological resources. SWDC would not construct the action alternative, and there would be no need for ground disturbance for any potential borrow or staging areas, spoils deposit areas, or new roads. The existing conditions would remain intact and would not be affected.

3.3.10.2 Action Alternative

A file search for the APE, as presently designed, of the action alternative by the UGS in Salt Lake City was completed on September 3, 2008. The geological formations present in the proposed APE have a low potential for yielding significant fossil localities. Unless fossils are discovered as a result of construction activities, the UGS determined that this project should have no impact on paleontological resources.

3.3.11 Wetlands and Vegetation

3.3.11.1 No Action Alternative

Under this alternative, the proposed project would not be constructed. Over time as the water rights are fully used to meet future demands, dam releases would be the minimum 5 cfs more often and minor impacts could occur to riparian habitats below the dam.

3.3.11.2 Action Alternative

Riparian Habitat

Under the proposed action alternative, the operation of East Canyon Dam would continue with the historic flexibility. Therefore, riparian and riverine habitats below the dam would have the same impacts as the no action alternative.

The proposed pipeline and powerline would cross 7 small perennial drainages south of the intake structure on the west side of the reservoir. Approximately 4 acres of riparian habitat would be disturbed. The pipeline and powerline would also be placed along East Canyon Creek south of the reservoir. These structures would also cross the creek in several places disturbing 5 acres of riparian habitat.

All disturbed riparian habitats would be recontoured and reseeded with appropriate vegetation during the final stages of construction activities. Over time most disturbed areas would revegetate and provide appropriate habitat again.

Since eventual recovery of all riparian habitats disturbed by this project is expected, no long term detrimental effects from the proposed project are expected.

Upland Habitat

The proposed construction of the water intake structure on the West Side shore would disturb approximately 5 acres of degraded upland habitat. This area currently has a high concentration of weed species.

The proposed powerline would cross approximately 23.6 miles of upland habitat. The proposed pipeline would cross approximately 5.2 miles of upland habitat. All disturbed habitats would be recontoured and reseeded with appropriate vegetation during the final stages of construction activities. Over time disturbed areas would revegetate and provide appropriate habitat again. Therefore, the proposed project would not detrimentally affect upland habitats in the long term.

3.3.12 Wildlife Resources

3.3.12.1 No Action Alternative

Under this alternative, the proposed project would not be constructed. Overtime, as the water rights are fully used to meet future demands, dam releases would be the minimum 5 cfs more often and the reservoir elevation would experience more fluctuations. Minor impacts could occur to wildlife resources using shoreline and downstream habitats.

3.3.12.2 Action Alternative

This alternative may temporarily disturb limited trout spawning beds in East Canyon Creek above the reservoir, as a result of sediment released by construction activities. These beds should be restored naturally to their previous condition after spring runoff, following construction activities. Flows within the creek should remain at levels sufficient to support the current fishery. Fish populations within East Canyon Creek Reservoir, would likely remain at current levels

Wildlife habitats would be temporarily disturbed. Big game would be able to obtain water and any other needs provided by undisturbed riparian habitat in other nearby areas. Big game may be temporarily displaced from small areas during actual construction activities, but would move back in a short period of time. Due to the relatively small extent of disturbance, big game would not be measurably affected. Other mammals existing in riparian areas where construction occurs would be temporarily excluded from these areas.

Osprey use cottonwood trees in the area for roost, nest, and observation perches. Removal of these trees either living or dead should be avoided. However, loss of a tree would only move these birds to other nearby trees and not reduce the capacity of the area to support the current population. Conversely, the construction of power poles in the project area could increase raptor populations above natural levels. Higher raptor populations could negatively impact sage grouse populations. Therefore, power poles should be constructed with appropriate structures to discourage their use as raptor perches or nesting sites.

Construction activities could temporarily disturb other bird species from preferred breeding, nesting, or foraging habitat. These effects would be limited to a relatively small area, and birds would be capable of moving to very similar habitat nearby. This would also be true for any sage grouse that may use the area.

Construction associated with this alternative could disturb reptiles and amphibians from preferred habitat. These effects would be limited to a relatively small area and these animals would be capable of moving to very similar habitat nearby.

After construction, disturbed areas would be contoured and vegetated with native plants. A process of vegetative succession would also begin. This process would eventually establish a vegetative community favorable to native species and provide appropriate wildlife habitat once again. Effects to wildlife would be temporary.

3.3.13 Threatened, Endangered, and Sensitive Species

3.3.13.1 No Action Alternative

Under this alternative, the proposed project would not be constructed. Over time as the water rights are fully used to meet future demands, dam releases would be the minimum 5 cfs more often and the reservoir elevation would experience more fluctuations. No effects are expected to occur to any threatened, endangered, candidate, or state sensitive species.

3.3.13.2 Action Alternative

Bald eagles are winter residents of this area and may be displaced by construction activities (noise and habitat disturbance). Cottonwood trees and dead snags should be avoided during construction. However, loss of one or several trees may occur. This could displace eagles. These effects would be short term or very limited in extent and would have no significant negative effects, since these birds would be able to use very similar roost sites or other habitat elements in the immediate vicinity of the project. All winter construction activities occurring within ½ mile of any bald eagle roost site would be restricted to hours between 9:00 a.m. and 4:00 p.m., from November 1st to March 31st and into April, if necessary, until all bald eagles have left the area.

Canada lynx have been known to occur within the area in the past, but have not regularly been seen in the area for years. Therefore, no effects would occur to them.

Western yellow-billed cuckoo have not been regularly observed within the area affected by this alternative. However, a few individuals may migrate through the area or even possibly use the area for some segment of their life cycle. The extent of disturbance associated by this project would leave a large area of suitable habitat unaffected, allowing any possible use by these birds to occur in these adjacent areas.

Fish species managed under conservation agreements (i.e., bluehead sucker, Bonneville cutthroat trout, Columbia spotted frog, Northern goshawk) may be temporarily disturbed within areas where construction activities affect riparian or riverine habitats. These species would need to migrate to areas unaffected by the proposed project, either upstream or downstream to the reservoir. Sedimentation of the river below constriction areas would disturb spawning and feeding beds until flushing flows restore these habitats.

Spotted frogs have not been found in the area. Any frogs that are present would be displaced by construction activities in riparian and wetland habitats until these areas recover.

Northern goshawk may use habitats within the area of disturbance. The extent of disturbance associated by this project would leave large areas of suitable habitat unaffected, allowing any possible use by these birds to occur in these adjacent areas. Therefore, affects to them would be negligible.

Greater sage-grouse are present within the project area. The proposed construction of an above ground powerline would likely increase the available perching sites for raptors which prey on these birds. All power poles should be constructed with raptor perch-deterrent devices. Sage grouse accomplish breeding and brood rearing activities from March through June. Construction activities in sage grouse habitat (all upland habitats within the project area) would be avoided during this time period.

No Effect determination is made for all species listed under the Endangered Species Act.

3.4 Summary of Environmental Effects

Table 3.8 describes environmental effects under the no action alternative and the action alternative.

Table 3.8: Summary of Environmental Effects

Resource Issue	Alternatives	
	No Action Alternative	Action Alternative
Water Resources	With future full water-right use and no augmented inflow, reservoir elevation is expected to decline.	With future full water-right use and expected return flow of 60-80%, reservoir levels are expected to be higher than the no action alternative. Flow in East Canyon Creek above the reservoir would be augmented by the proposed action. Downstream of East Canyon Dam releases are expected to decrease but will maintain fish flow.
Weber Basin Project Operations	No effect	The effect to Weber Basin Project operations of either alternative is the same. The total volume of 12,500 acre-feet that would be diverted annually would not

		significantly impact the operations of East Canyon Dam.
Water Rights	No effect	No effect to downstream water right holders.
Water Quality	As water rights are fully utilized there are potential effects from future use of this same project water when used elsewhere.	Minimal temporary effects during construction. Potential undetermined long-term effects, similar to the no action alternative will continue. Mitigation would be implemented if necessary to minimize project impacts.
Public Safety, Access, and Transportation	No effect	Minor traffic delays during construction activities.
Recreation	As average reservoir elevation declines impacts could occur to recreation	Minimal effects are expected during construction activities. Long term effects are expected to be less than the no action alternative because reservoir elevation fluctuates less and averages at a higher elevation.
Visual Resources	The reservoir level will fluctuate more frequently as the water rights are fully used. Visual impacts are expected.	There is potential for visual resources impacts as the West Side road is enlarged with cuts and fills. These will heal over time. However, the visual integrity is expected to decrease from Moderate to Low on the West Side of the reservoir. Mitigative actions will be taken to ensure the structures blend in with the existing environment.
Socioeconomics	Potential effects continue to exist in the long term because available water supplies are already behind the projected demand.	Minimal temporary impacts to socioeconomics are expected in the short term. No effect on socioeconomics beyond those described for the no action alternative.
Cultural Resources	No effect	Potential effect to subsurface cultural material during construction.
Paleontological Resources	No effect	No effect to paleontological resources is expected.
Wetlands and Vegetation	Minimal effects	Minimal and temporary effects during construction. Longterm impacts will be mitigated. Similar long term effects as the no action alternative due to lower reservoir elevations.
Wildlife Resources	Minimal effects	Minimal and temporary effects during construction. Same long term effects as the no action alternative.
Threatened and Endangered Species	No effect	No effect.

3.5 Cumulative Effects

In addition to project-specific impacts, Reclamation analyzed the potential for significant cumulative effects to resources affected by the proposed action and by other past, present, and reasonably foreseeable activities in the watershed including the no action alternative. According to the Council on Environmental Quality's regulations for implementing NEPA (50 CFR §1508.7), a "cumulative impact" is an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. It focuses on whether the proposed action, considered together with any known or reasonable foreseeable actions by

Reclamation, other Federal or state agencies, or some other entity combined to cause an effect. There is no defined area for potential cumulative effects.

The no action alternative was analyzed under the assumption that full utilization of Weber Basin Project water rights would be utilized in the future. Based on Reclamation resource specialists' review of the proposed action alternative, Reclamation has determined that this proposed action alternative would not have a significant adverse cumulative affect on any resources.

3.5 Indian Trust Assets

Indian Trust Assets are legal interests in property, held in trust by the United States for Federally recognized Indian tribes or Indian individuals. Assets can be real property, physical assets, or intangible property rights, such as lands, minerals, hunting and fishing rights, and water rights. The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to such tribes or individuals, by treaties, statutes, and executive orders. These rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect trust assets. Reclamation would carry out its activities in a manner which protects these assets and avoids adverse impacts when possible. When impacts cannot be avoided, Reclamation would provide appropriate mitigation or compensation. Implementation of the proposed action would have no foreseeable negative impacts on Indian Trust Assets.

3.6 Environmental Justice

Executive Order 12898, established environmental justice as a Federal agency priority, to ensure that minority and low-income groups are not disproportionately affected by Federal actions. East Canyon Reservoir is located in Morgan County. As of 2006, the population of Morgan County was 8,134, consisting of 374 individuals living below poverty level and 309 individuals belonging to various minority groups. Statistics for the year 2006 are the most recent available (Utah Governor's Office of Planning and Budget).

Implementation of the proposed action would not disproportionately (unequally) affect any low-income or minority communities within the project area. The reason for this is that the proposed project would not involve major facility construction, population relocation, health hazards, hazardous waste, property takings, or substantial economic impacts. This action would therefore have no adverse human health or environmental effects on minority and low-income populations as defined by environmental justice policies and directives.