

RECLAMATION

Managing Water in the West

Environmental Assessment NO. EC-1300-06-06

Carter Lake Supplemental Outlet Project

Colorado-Big Thompson Project, Colorado
Great Plains Region



U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Eastern Colorado Area Office

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CHAPTER ONE

Purpose and Need

INTRODUCTION AND

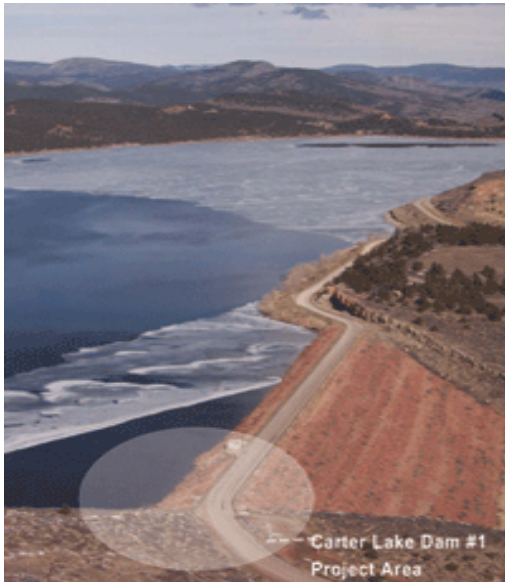


Figure 1. Carter Lake Dam No.1

The Bureau of Reclamation (Reclamation) is proposing to enter into a Memorandum of Understanding (MOU) with the Northern Colorado Water Conservancy District (NCWCD) as a result of their proposal to construct an additional outlet structure at Carter Lake Dam No.1 (Figure 1) to ensure reliable delivery of water from Carter Lake.

This Environmental Assessment (EA), prepared in compliance with the National Environmental Policy Act (NEPA), the Council of Environmental Quality Regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508), and Reclamation NEPA handbook (USDI, 2000). The area of effect (AoE) analyzed under this EA includes areas directly or indirectly impacted by the action such as Reservoir shoreline and nearby waterways. The EA includes background on the matter (Chapter 1),

alternative plans (Chapter 2), the affected environment and effects of the alternatives (Chapters 3), and the environmental commitments (Chapter 4). The EA concludes with a brief description of the consultation and coordination done during the study (Chapter 5).

BACKGROUND

Carter Lake (Reservoir) is located approximately 12 miles west of Loveland, Colorado. The Reservoir lies in a natural basin in the foothills of the Front Range and is enclosed by the 214-foot-high earthfill Dam No.1, and two smaller dams. The Reservoir is flanked on the west side by Chimney Hollow, a north-south trending ridge. Carter Lake has a total storage capacity of 112,230 acre-feet and a surface area of 1,144 acres at maximum elevation of 5,759 feet. The Reservoir surface area is 3,000 to 4,000 feet wide, approximately 3 miles long and the Reservoir reaches a depth of 180 feet. An additional 910 acres around the Reservoir are owned by Reclamation and leased to Larimer County for use as a public recreation area. Dam No.1 is located approximately 210 feet south of the existing outlet structure on Carter Lake's southeast side (NCWCD, 2006).

Carter Lake provides terminal storage for the Windy Gap and Colorado-Big Thompson (CBT) Projects. In addition, Reclamation conveys water to the Town of Berthoud through Carter Lake. The CBT, including Carter Lake, was constructed and is owned by the Bureau of Reclamation. Under an agreement with Reclamation, the NCWCD operates and maintains Carter Lake. The CBT provides water to thousands of acres of agricultural land and approximately 300,000 municipal and industrial (M&I) water users in Larimer, Weld, Morgan, Boulder and Broomfield counties.

The typical annual Reservoir cycle is to keep the Reservoir as has as about elevation 5,760 feet during the winter months, to lower the reservoir to between about elevation 5,710 feet and 5,690 feet during the spring and summer months in response to water usage needs, and to refill Carter Lake during the fall.

The existing outlet structure is located in a tunnel through the right abutment of Dam No.1. It consists of an intake structure with trash racks, an upstream pressure conduit and tunnel, a gate chamber, an access shaft and hoist house, and a free-flow downstream tunnel. The existing outlet structure is inspected yearly, usually in January. The inspections consist of a civil and mechanical examination of the existing outlet and associated structures. Operations and maintenance recommendations are then compiled from those inspections.

PURPOSE AND NEED

The purpose of the Carter Lake Outlet Project (CLOP) is to provide redundancy or alternative methods for maintenance and emergency repairs to the existing outlet structure, which is nearly 60 years old. There is a need for a supplemental outlet due to a shift in water deliveries from primarily agricultural irrigation users toward M&I users. Prior to 1995, water was delivered from Carter Lake only during the irrigation season from April through October. During the winter months crews maintained and repaired the outlet when it was out of service and not needed for water deliveries. In 1995, NCWCD completed the Southern Water Supply Project, a pipeline that carries water from Carter Lake to cities and towns in the central and southern portions of NCWCD. These water users, including the Carter Lake Filter Plant, require nearly constant deliveries, necessitating the need to use the existing Carter Lake outlet year-round. Because of this shift in demand, the existing Carter Lake outlet can be taken out of service for only a short period of time.

The increasing reliance on year-round deliveries through the single existing Carter Lake outlet severely limits the ability to perform necessary maintenance and repairs. In February 2004 an inspection revealed substantial corrosion of the existing outlet structure, which will require rehabilitation or replacement. In addition, the existing outlet was designed to deliver high flows for irrigation purposes. The lower, more constant flows now delivered place additional stress on the outlet structure. If an emergency outage occurs the outlet could be out of service for an extended period of time while repairs are made, impacting the ability to deliver water to hundreds of thousands of people.

ISSUES

Reclamation conducted internal scoping and used the public and agency scoping conducted in the spring 2006 to determine the issues relevant to the CLOP. Below is a summary of the issues Reclamation identified to be included for further evaluation in Chapter 3 – Affected Environment and Environmental Consequences, and those considered but excluded from further evaluation along with a brief explanation. Attachment 3 contains a complete list of issues gathered from the scoping process and addressed in this EA.

Issues Included for Further Evaluation

- Impacts on the fishery and recreational opportunities at Carter Lake;
- Effects on the hydrology and operations of Carter Lake;
- Effects on water quality at Carter Lake;
- Impacts to the aesthetics of Carter Lake;
- Impacts on Federally-listed threatened and endangered species;
- Road closures at Carter Lake;
- Construction timeframe;
- Public Health and Safety

Issues Considered but Excluded from Further Evaluation

- Ensuring construction is completed on time by inserting performance incentives in the contract – Timely completion would be a concern for both Reclamation and the NCWCD and appropriate incentives would be incorporated into a construction contract.
- The use of pump #3 at Flatiron in order to increase the drawdown rate at Carter – Should the proposed Supplemental Outlet Alternative be selected, Reclamation and the NCWCD would work together to minimize the operational impacts of the required drawdown.
- Increase the capacity of Carter Lake by removing lakebed material while the Reservoir is drawn down – This comment is outside the scope of the EA and was not analyzed.
- Impacts to Floodplains or Wetlands – The AoE is not located within any floodplain (Loveland, 2007). Carter Lake and Dry Creek, located within the AoE, are not considered Waters of U.S., as defined in 33 CFR Part 328. Physically, the Reservoir has steep shores and limited amounts of wetlands fringe along the edges. There are no wetland fringes that would be impacted by the drawdown. Therefore, there would be no impacts to floodplains or wetlands associated with the CLOP.
- Impacts to Indian Trust Resources – Consultation with Reclamation archeologist Bob Burton identified no Indian trust assets within the CLOP area.

CHAPTER TWO

Alternatives

Chapter 2 presents the alternatives analyzed in this EA: the *No Action Alternative* – in which the supplemental outlet structure would not be constructed and the operation and maintenance of the existing outlet structure would continue as it has in the past – and the *Supplemental Outlet Alternative* – in which a supplemental outlet structure would be built at Dam No.1. Chapter 2 also describes an alternative considered but eliminated due to safety and feasibility concerns.

ALTERNATIVES CONSIDERED

NO ACTION ALTERNATIVE

Under the No Action Alternative Reclamation would not enter into a MOU with the NCWCD and instead the operation of the Reservoir would continue as described in the Background Section of Chapter 1. However, under this alternative the existing guard and operating gates would eventually need a major overhaul and repair (Sinden, 2006). The existing outlet would be inspected and monitored, and if it is determined that it is near a failure condition, it would be repaired. It is expected that this maintenance effort would drastically reduce or completely curtail the ability to deliver water to municipal, industrial, and agricultural interests while the repairs are being made.

Annual inspections as mentioned in Chapter 1 and minor repairs would continue to be performed at Carter Lake Dam No.1. However due to substantial corrosion of the existing outlet structure future rehabilitation or replacement of the outlet structure would be required. This could possibly lead to one or possibly several drawdowns of Carter Lake. Each drawdown would require deviation from the normal operation of Carter Lake and, due to unknown time, such an event could happen at a very inopportune time, adversely affecting the environment and recreational use of the Reservoir.

SUPPLEMENTAL OUTLET ALTERNATIVE – PROPOSED ALTERNATIVE

Under this alternative Reclamation would enter into a MOU with the NCWCD to allow an additional outlet structure to be constructed, operated, and maintained. The Supplemental Outlet Alternative would cost 10 million dollars and consist of the construction of a multi-level intake tower, approximately 110 feet high; a 6-foot diameter tunnel, 800 feet long; a connecting penstock, 400 feet long; and an energy dissipation and flow regulation structure connecting the new outlet to the existing Saint Vrain Supply Canal (Figure 2). Overall construction is estimated to take 18 months.

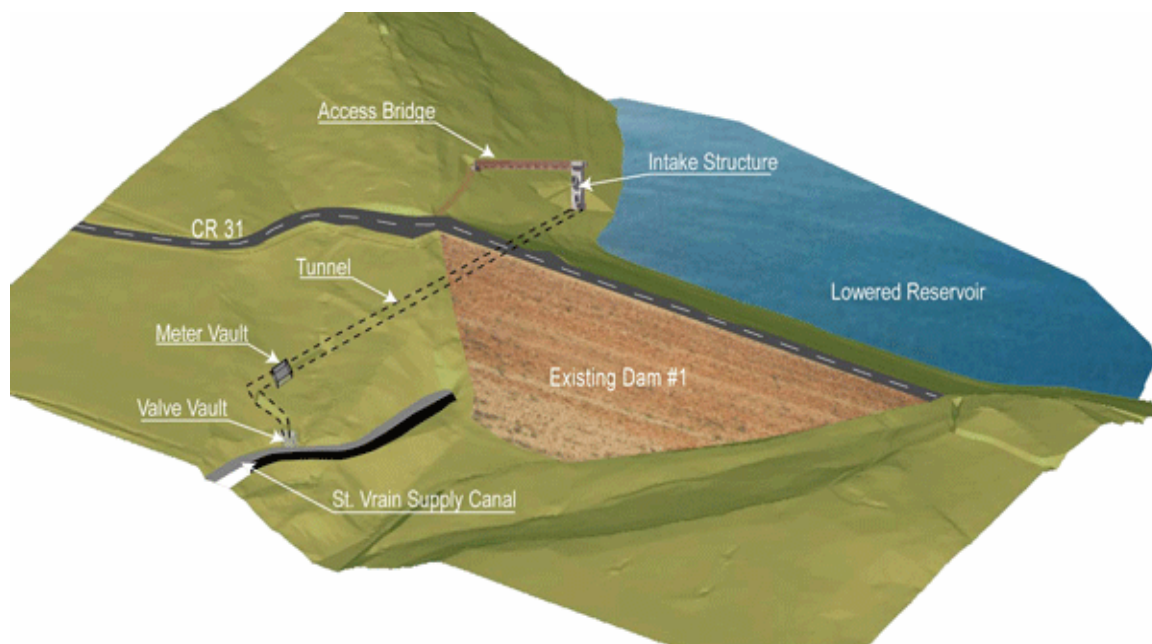
Construction of the supplemental outlet structure would require tunneling through the rock beneath the Dam. During the tunneling process and construction of the intake tower, the Reservoir would be restricted to a maximum elevation of 5,657 feet. The Reservoir's volume at this elevation would be 20,088 acre-feet and have a maximum depth of 78 feet. Work requiring the restriction on the maximum Reservoir elevation should require five months to complete. However, due to weather and construction uncertainties, this EA will evaluate the restriction on the maximum Reservoir elevation for a 6 month period from August 2007 to February 2008.

After construction, the Reservoir would be refilled and returned to the pre-construction operations. Yearly inspections of both the supplemental and existing outlet structures would continue to be performed by Reclamation and NCWCD personnel. These inspections would consist of a civil and mechanical examination of the outlet structures. Operations and maintenance recommendations would be compiled from those inspections and performed as required.

The environmental commitments discussed in Chapter 4 are an integral part of the Supplemental Outlet Alternative.

The disadvantages of this alternative are the lost public benefits provided by Carter Lake during the construction activities.

Figure 2. Carter Lake Outlet Project Map (NCWCD, 2006)



ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

SUPPLEMENTAL OUTLET WITH LIMITED RESERVOIR DRAWDOWN

This alternative would involve Reclamation entering into a MOU with the NCWCD to allow the construction of a supplemental outlet structure. This alternative would allow the installation of localized, temporary cofferdams around the construction area to accomplish the construction explained in the Supplemental Outlet Alternative without an extensive Reservoir drawdown. The cofferdams would enable tunneling through the Dam at a higher Reservoir elevation. However, a Reservoir drawdown would be required to install the cofferdams. Increased costs and high water around the cofferdams present safety and feasibility concerns for this alternative; therefore, this alternative was eliminated from further consideration.

CHAPTER THREE

Affected Environment and Environmental Consequences

This chapter describes the existing resource conditions at Carter Lake that have the potential to be affected by the alternatives. In addition to describing existing conditions, potential impacts to each resource area are discussed for each of the alternatives. The alternatives would not affect floodplains, wetlands or Indian Trust Assets. Therefore, those resources are not discussed further in this document as explained in Chapter 1.

The No Action Alternative represents current conditions assuming historical operation and maintenance schedules and for the purpose of this analysis is compared to conditions that would exist if the MOU was signed as described in Chapter 2. Furthermore, the No Action Alternative provided a baseline condition, which was used to evaluate the level of impact by the Proposed Action Alternative.

SECTION I.

Hydrology and Reservoir Operations

Affected Environment

Carter Lake was formed by enclosing a natural basin with a series of dams on the eastern shoreline. The length of the lake is about 2.6 miles and the width ranges from about 0.4 to 0.9 miles. Carter Lake is situated in a small pocket that is surrounded by small, gently-sloping ridges on the north, south, and west. The eastern border along the lake consists of three prominent knolls that are connected by the dams (EDAW, 1995). Average annual precipitation is approximately 15 inches, with most occurring between April and September (WRCC, 2006).

Carter Lake was constructed to provide terminal storage for the CBT Project. Carter Lake also provides water deliveries to the Town of Berthoud and Windy Gap Project beneficiaries. Water is pumped uphill to Carter Lake from Flatiron Reservoir via a pressure tunnel originating at Flatiron Power Plant that terminates in the northwest corner of the Reservoir. Water stored in the Reservoir is used for peak power generation, which is accomplished by allowing water to flow back down to the Flatiron Power Plant.

Reservoir Operations

Carter Lake is located along the eastern slope of the Rocky Mountains. The Reservoir is situated in a semi-arid climate. It experiences strong seasonal variations in temperature and abundant sunshine. Given the semi-arid climate and very small drainage area of 1.9 square miles, the Reservoir receives minor inflows from the surrounding watershed. Several small intermittent streams flow into the west side of the Reservoir during spring snowmelt and after heavy rains. Dry Creek originates at Dam No.1, and flows east. The flow in Dry Creek is dependent upon periodic releases from the Reservoir and seepage from Dam No.1.

The greatest influence on water levels in Carter Lake comes from the operation of the CBT project. From October through May water is pumped into Carter Lake from Flatiron Reservoir through a pressure tunnel that terminates in the northwest corner of the Reservoir. The top of the active conservation pool is at elevation 5,759 feet; however, the Reservoir does not reach this elevation every year. The Reservoir generally reaches its highest level for the year by May. As the demand for water increases in the summer months, the Reservoir is drawn down, mainly between the months of July and September. Reservoir fluctuations may expose up to 600 feet of shoreline during the year. Reclamation has no restrictions on the rate of filling or drawdown of the Reservoir. The fastest drawdown occurred in 1958 when the lake was dropped at approximately 1.4 feet per day.

Water Quality

A review of historical water quality data revealed that the Reservoir has clear, high quality water that is low in nutrients and metal concentrations. Water quality monitoring in 1991 and 1992 by the U.S. Geological Survey indicates that concentrations for all parameters are well below the proposed Environmental Protection Agency Maximum Contaminant Levels in Drinking Water (EDAW, 1995).

Carter Lake supplies raw water to the Carter Lake Filter Plant (CLFP), which is jointly owned and operated by the Little Thompson and Central Weld County Water Districts. The Environmental Protection Agency regulates the amount of certain compounds in water provided by public water systems. From January 1, 2005, to December 31, 2005, no violations in compounds regulated at the treatment plant were found. The testing of compounds regulated in the distribution system detected total coliform bacteria above the maximum allowable levels. However, the violations were found to be congruent with naturally present levels found in the environment. Later investigations determined the violations were due to a sampling process error, not a physical water quality problem. The Colorado Department of Public Health and Environment has issued waivers to the Little Thompson Water District and CLFP for the following compounds: asbestos, cyanide, dioxin, glyphosate and nitrite. The CLFP regulates and samples turbidity at the treatment plant. There are two standards for turbidity. One standard required that the reported monthly turbidity must be less than or equal to 0.3 Nephelometric Turbidity Unit (NTU). In 2005 the CLFP did not receive a violation for this standard. Also, turbidity must never be higher than 1.0 NTU at any time. Turbidity readings at the CLFP in 2005 ranged from 0.03 to 0.75 NTU (LTWD, 2005).

It is estimated that implementation of the Supplemental Outlet Alternative would require an 18 month construction period. The Reservoir would have to be restricted to an elevation of about 5,657 feet from August 2007 through February 2008, and the restriction would result in economic costs to the CLFP in the form of additional chemicals and electricity. The implications from the drawdown include the usage of more chemicals and an increase in the hours of coverage. The CLFP was initially designed to treat water from a lake that is relatively deep. Thus, the proposed Reservoir depth during construction will make filtration and purification more costly as a shallower Reservoir results in an increased sediment load (Maddox, 2006). Construction Best Management Practices as discussed in Chapter 4 would be employed in order to help minimize sediment loading and other raw water treatment issues as they impact the CLFP. The CLFP should not experience conditions much worse than seen in prior drought years. Also, in the long term the CLFP would benefit greatly from a supplemental outlet at Dam No.1. A supplemental outlet would reduce the necessity for future drawdowns needed to perform maintenance on the outlets.

Environmental Consequences

No Action Alternative

This alternative would result in Carter Lake water elevations continuing to fluctuate as they have historically as a result of normal operations of the CBT Project. The construction of the supplemental outlet structure would not occur. This alternative is the most cost effective in the short term, but could result in higher repair and replacement costs in the future, since the current outlet structure is nearly 60 years old. This type of maintenance would possibly result in emergency or periodic Reservoir drawdowns. When considering the operating constraints of the Reservoir, as well as the social, economic, and environmental effects of a drawdown, the optimal time for a drawdown becomes extremely complex. Due to possible impacts to recreation opportunities found at the Reservoir, as well as costly socioeconomic concerns, an ill-timed or multiple drawdowns is not the optimum alternative. Additionally, a drawdown undertaken before the onset of drought conditions may result in an extended timeframe to replenish Reservoir levels. Due to the water deliveries out of Carter Lake, environmental, and recreational demands at the Reservoir it would be very difficult to find an acceptable timeframe in which to schedule multiple drawdowns.

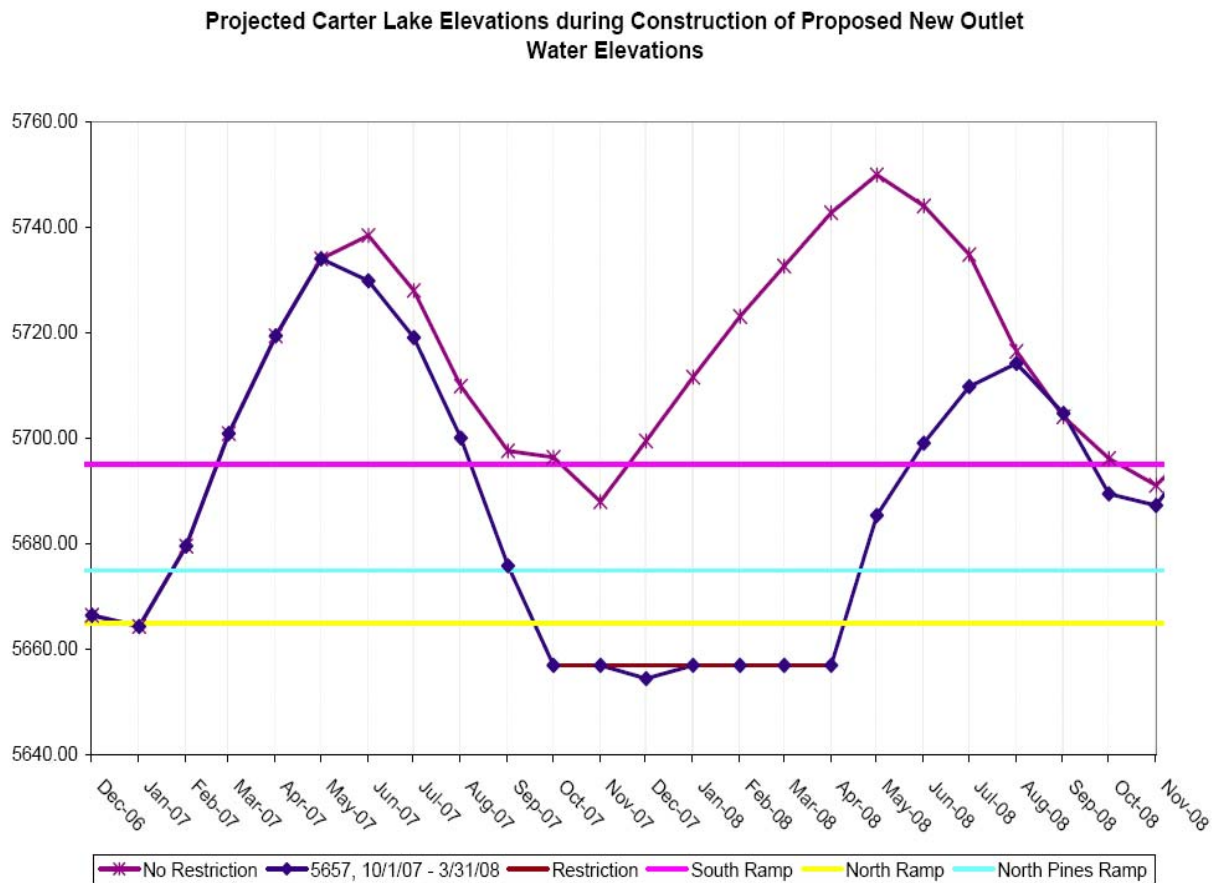
Supplemental Outlet Alternative

The proposed drawdown consists of lowering the Reservoir to elevation 5,657 feet over a 5 month period (May 2007 to September 2007), holding the Reservoir elevation for approximately 180 days, starting in October 2007, and then restoring Carter Lake to normal operations over an estimated 120 days. Upon completion of the construction Carter Lake would resume to normal operations in August 2008.

The existing outlet structure was not designed to handle the lower, more constant flows that are now delivered. This creates additional stress on the outlet structure. The supplemental outlet would be designed to handle these lower, more constant flows. The supplemental outlet structure would provide redundancy and help ensure constant water deliveries. There would be no impacts to water deliveries during the construction and drawdown period. Projections show that Carter Lake will be able to meet all water user demands throughout the construction period.

Figure 3 shows the projected Carter Lake elevations during construction of the supplemental outlet and the projected elevations under the No Action Alternative. The No Restriction line in Figure 3 represents an average water year over the past 30 years. The water year under the Supplemental Outlet Alternative is represented by the blue line labeled 5657. The 5,657 elevation restriction of the Reservoir is represented by the brown horizontal line.

Figure 3. Projected Carter Lake Elevations Under the Supplemental Outlet and No Action Alternatives (NCWCD, 2006).



The temporary lowering of the Reservoir water levels would result in some changes to water quality. Lowering the level would expose greater areas of the Reservoir bottom where wave action, coupled with precipitation events, could cause greater suspended materials and turbidity. However, shorelines erode continually at Carter Lake. Land use activities (e.g., dispersed recreation) have accentuated erosion and sediment loading in the Reservoir. Turbidity should reduce once the Reservoir resumes normal operations due to the constant turnover of water within Carter Lake. The exposed area between the historic high water line and the temporary high water line (5,657 feet) may experience weed and plant growth. Upon completion of the construction project and the resuming of normal project operations, this plant growth may add to the organic loading of the Reservoir which could lead to a subsequent decrease in dissolved oxygen and an increase in heavy metals being brought into solution. However, due to the fall/winter drawdown plant growth is expected to be minimal.

Reservoir elevations below 5,664 feet would begin to affect the ability of the CLFP to adequately treat raw water from Carter Lake. During the temporary water elevation restriction the CLFP may have to increase treatment processing or lower production in order to meet water quality standards (Maddox, 2005).

Although Dry Creek does fall within the AoE, the proposed construction activities would not affect Dry Creek (Sinden, 2006). Best Management Practices, as described in Chapter 4, will be used during construction to minimize localized impacts to water quality of Dry Creek.

Both the No Action and the Supplemental Outlet Alternative would cause impacts to Reservoir operations and water quality; however the Supplemental Outlet Alternative would involve one anticipated drawdown impact as compared to the No Action Alternative that may include more incidences of shorter duration impacts to Reservoir operations and water quality as described above. Therefore, in totality it is expected that in a 5 year timeframe the Supplemental Outlet Alternative would cause no greater impacts to Reservoir operations or water quality than the No Action Alternative.

SECTION II. Recreation

Affected Environment

Reclamation and Larimer County Parks and Open Lands Department (LCPOLD) entered into a recreation management agreement under contract No. 97-AG-60-09220 dated July 11, 1997, for the administration of recreation at four of Reclamation's Reservoirs including Carter Lake. Pursuant to this agreement, LCPOLD agrees to operate, maintain and administer lands and waters at Carter Lake for recreation purposes.

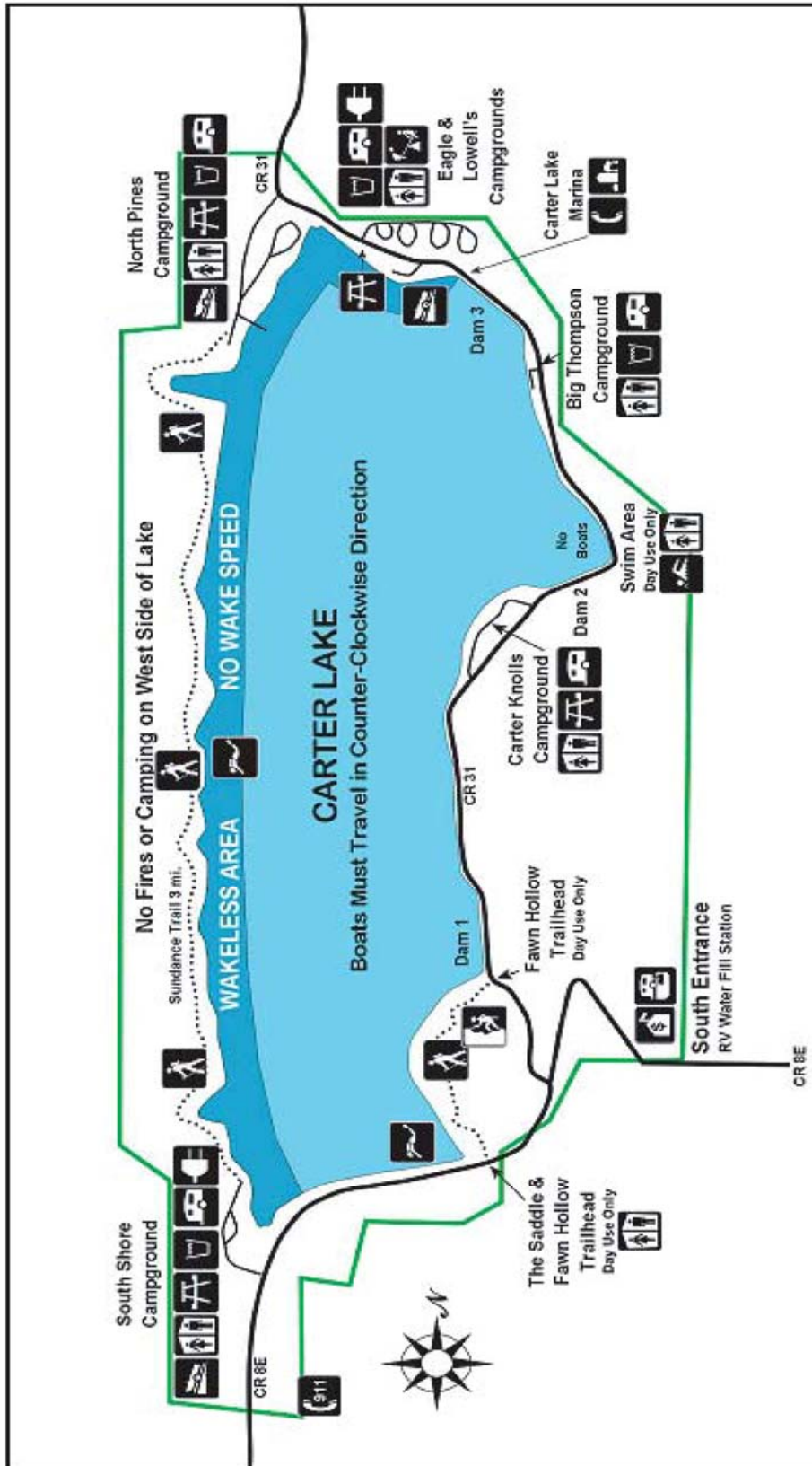


The southern trailhead for the Shoreline Trail at the South Shores Campground

Recreation at the Reservoir is both land- and water-based, with emphasis on water-related activities (Figure 4). Carter Lake has a total of 910 acres of recreational opportunities, which include 6 campgrounds that contain 107 campsites, Carter Lake Marina, three boat ramps, a swim beach, canoe and kayak rental and 4.5 miles of trails. On the west side of the Reservoir is the Carter Lake Sail Club (Sail Club), which consists of a clubhouse, boat slips and moorings. Use of the Reservoir varies throughout the year, with the greatest activity occurring on the weekends and holidays from May to early September.

The 6 campgrounds located within the AoE are South Shore, Carter Knolls, Big Thompson, Lowell, Eagle and North Pines. The campgrounds all have parking spurs, tables, fire grates, potable water and toilet facilities. Approximately a third of the 107 campsites have electrical hookups for RVs. Lowell, Carter Knolls and Eagle campgrounds are closed seasonally, while North Pines and Big Thompson campgrounds are open year-round. Seasonal closures run from November 11 through March 15 or April 1, depending on weather conditions. Larimer County defines peak season as May to September.

Figure 4. Recreational Opportunities at Carter Lake.



Motorized boating, including fishing boats, is the primary recreation activity at Carter Lake. In recent years LCPOLD staff estimates that the Reservoir reaches capacity three to four times during the summer based on a carrying capacity allowing 189 boats¹ on the Reservoir at one time (Reclamation, 2006). There were about 375,000 visitors to Carter Lake during the 2005 recreation season (Rieves, 2006).

There are three boat ramps serving Carter Lake. The north boat ramp extends to an elevation of 5,665 feet². North Pines ramp extends to an elevation of 5,675 feet and is usable throughout much of an average recreation season. The North Pines ramp is often used for the launching of sailboats and other deep-hulled vessels. The South Shore ramp, extending to elevation 5,695 feet, often becomes unusable toward the end of the recreation season. When South Shore is unavailable, use shifts to the two other boat launching ramps. All boat ramps areas are staffed at random times to provide regulation and safety information to boaters and to provide courtesy vessel safety inspections.

Boats are either put in the water for the day (or however long the boaters are camping) or boats are put in for the season and moored or slipped at Carter Lake Marina or at the Sail Club. The maximum number of combined public slips and moorings allowed at Carter Lake Marina is 200. Sixty percent of all boats must be in slip docks (up to a maximum of 120 boats in slips and 80 on moorings). The Sail Club is currently allowed a maximum of 50 boats plus two work boats within their designated lease area. Boating activities include water skiing, pleasure boating, fishing, jet skiing, sailing and canoeing/kayaking.

Other recreational activities at Carter Lake include picnicking, shoreline fishing, swimming, hiking and camping. During a 2005 survey conducted by LCPOLD, sixty five percent of respondents said that they could find their desired experience at Carter Lake (Reclamation, 2006). A recent Reclamation survey showed that during a typical recreation day 21 percent of the respondents felt moderately crowded at Carter Reservoir. When asked where they felt crowded 27 percent said they felt crowded in the campground and 15 percent said that they already feel crowded at the boat ramps and on the Reservoir (Reclamation, 2006).

Recreation at Carter Lake is operated pursuant to existing operational and management plans. By comparing national and the State of Colorado participation levels for certain recreation activities and their corresponding percentage change over several years, participation levels were projected to the year 2015. Land resource-based activities are projected to grow 2.4 percent annually over the next 10 years. Water resource-based activities are projected to increase 4 percent annually. Forty four percent of respondents to the LCPOLD's 2005 survey considered that the natural environment was very important to the public's enjoyment at Carter Lake (Recreation, 2006).

¹ The capacity number of 189 boats is part of a plan to regulate boats based on the elevation of the Reservoir. At maximum water elevation of 5,760 feet, the boat capacity would be 189 boats at any one time.

² Elevations indicate the approximate Reservoir elevation below which the boat ramps go out of service.

Environmental Consequences

No Action Alternative

Historically, elevation changes to Carter Lake have an affect on the availability of recreational resources at the Reservoir. Under the No Action Alternative, the construction of the supplemental outlet structure would not occur and recreation would continue to grow as explained above.

This alternative will result in the minimal impact to recreation in the short term, but future maintenance or repairs would possibly result in emergency or multiple Reservoir drawdowns. It is hard to determine the extent of drawdown needed to perform these future repairs. Recreational usage is increasing with time; therefore, impacts of future drawdowns could impact more recreational users. Hiking, biking, camping and other land based activities would continue, but at a lower level during those repair activities, as some of these pursuits are enhanced by the scenic attributes of Carter Lake. The lower water levels would also reduce the amount of boating at the Reservoir or even eliminate boating if water levels are reduced to unusable conditions. A reduction in camping would be expected as a result of less people using the Reservoir for boating (Reclamation, 2000).

When considering the operating constraints of the Reservoir, as well as the effects to recreation and recreation-based concessionaires of a drawdown, the optimal time for a drawdown becomes extremely complex. Due to possible impacts to recreational-based opportunities found at the Reservoir an ill-timed drawdown is not the optimum alternative. Additionally, a drawdown undertaken before the onset of drought conditions may result in an extended timeframe to replenish Reservoir levels. Due to the recreational demands at the Reservoir it would be very difficult to find an acceptable timeframe in which to schedule a drawdown for longer than 6 months or on a recurring basis.

Supplemental Outlet Alternative

Historically, elevation changes to Carter Lake affect the availability of recreational resources surrounding the Reservoir. Under this alternative, there would be short term impacts to recreation during the construction period. Roads accessing the Reservoir would remain open during the construction period, although vehicle access may be temporarily restricted to allow construction trucks to safely enter and exit the construction site.

For the estimated 18-month construction period, Reservoir elevations would be held to approximately 5,657 feet during critical construction periods. This critical construction period runs from August 2007 through February 2008 (Figure 3). Table 1 shows the impacts on boat ramps at Carter Lake. It may be possible to use low water periods as an opportunity to extend the ramps. However, there is some question as to whether having operational boat ramps would be a benefit though, because at lower water elevations the useable area of the reservoir is reduced, making boating unattractive.

Boat Ramp	Without Construction	With Construction
South Ramp (El. 5,695 feet)	Out of Service: October 5, 2007 – November 18, 2007	Out of Service: August 6, 2007 – May 21, 2008
North Pines Ramp (El. 5,675 feet)	Out of Service: Not out of service	Out of Service: September 1, 2007 – April 19, 2008
North Ramp (El. 5,665 feet)	Out of Service: Not out of service	Out of Service: September 17, 2007 – April 8, 2008

Table 1. Impact on Boat Ramps at Carter Lake.

Based on experiences during a drawdown of Horsetooth Reservoir, fishing and boating would decrease. The decrease in boating would also result in a reduction in the short term usage of the camping facilities. As with the No Action Alternative, land-based recreation such as hiking and biking would continue, although it would be impacted by haul traffic, dust, noise and visual impacts during the construction period (Reclamation, 2000).

The drawdown was evaluated according to seasonal timing and duration to assess the potential impacts to public facilities and services. The peak season months are May through September and a drawdown at this time would have the greatest potential for negative impacts to activities in the Reservoir area. During these months, the Carter Lake Marina is open 7 days per week, the Carter Lake Canoe and Kayak Rental, Inc. is open Friday through Sunday, all boat ramps, campgrounds, the swim beach, picnic shelters and recreational trails are open. This period is also when the highest numbers of visitors use the facilities.

The remaining months of September through April provide the most viable option for conducting the drawdown. During this time, visitations are about one-third of the yearly total, the swim beach, picnic shelters, concession areas, the Carter Lake Marina and the Canoe and Kayak Rental, Inc. are all closed or have reduced use, special activities have ended, and the campgrounds are at about one-fifth capacity.

There are many close substitutes for recreation on Carter Lake. Horsetooth Reservoir lies a short distance north of Carter Lake. A number of lakes and reservoirs offering public recreation opportunities similar to those found at Carter Lake are also found in Larimer County. It is expected that some visitors displaced by the lower water levels at Carter Lake would take advantage of recreational opportunities at these other lakes. If so, then some of the net benefits that would disappear at Carter Lake would reappear at these other reservoirs. The degree to which losses at Carter Lake are gains at other lakes is unknown; thus, the Supplemental Outlet Alternative would have an indeterminate short term effect on net benefits for recreation (Reclamation, 2006).

The implementation of either the No Action or the Supplemental Outlet Alternative would cause impacts to recreation at Carter Lake; however the Supplemental Outlet Alternative would involve short term, minor impact as compared to the No Action Alternative that may include a Reservoir drawdown at an inopportune time or more incidences of shorter duration impacts to recreation as described above.

SECTION III.

Vegetation

Affected Environment

The majority of vegetation communities in the CLOP area are shrub-grassland. Ponderosa Pine woodlands occur on the north and west sides of the Reservoir, with other small patches above 5,800 feet in elevation on the south and east portions of the AoE. Much of the area has been previously disturbed, particularly near the dams and access roads, and a few weedy species are present. There are no known distributions of historical or extant occurrences of Federal- or State-listed plant species within the CLOP area (Spackman, 1997).

Ponderosa woodlands in the AoE have a grassy understory, including orchardgrass, sand dropseed and cheatgrass. Scattered shrubs also occur, including mountain mahogany, Wood's rose, ninebark and skunkbrush. There are a few herbaceous species, including pennycress, mullein and cinquefoils. The forests are most dense on the east-facing slopes on the west shore of the Reservoir.

Shrub grasslands have a sparse overstory of mountain mahogany, Wood's rose, rabbitbrush, ninebark, skunkbrush and sumac. The species composition of the understory is similar to the woodland understory, and includes orchardgrass, sand dropseed, cheatgrass, big bluestem, smooth brome, blue grama and side oats grama. Herbaceous species such as cinquefoils, pennycress, mullein and yucca also are present (Guill, 2006).

Several Colorado designated noxious weeds are present near Dam No.1, including Canada and musk thistle, cocklebur, diffuse knapweed, and Russian olive (LCPOLD, 2005). Weed control at Carter Lake is done by the Larimer County Weed District; one of whose functions is to control noxious weeds on County property and County roadsides.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the construction of the supplemental outlet structure would not occur. Therefore, there would be no impacts to vegetation as a result of construction of an additional outlet structure and associated features. This alternative would result in Carter Lake water elevations continuing to fluctuate as they have historically as a result of normal operations of the CBT Project. Therefore, there would be no impacts to vegetation located within the littoral zone even if future Reservoir drawdowns are needed for maintenance or repair of the existing outlet structure.

Any effects to vegetation would reflect the impacts of continued visitation and dispersed use. Recreational use of Reservoir lands would continue. It is expected that surface disturbance from human activities around the Reservoir in developed and dispersed areas would increase as visitation grows. Habitat degradation could increase along the shoreline. However, these impacts would be expected with the continuation of past conditions and not as a result of the implementation of the No Action Alternative.

Supplemental Outlet Alternative

Vegetation associated in areas disturbed by construction activities associated with the CLOP would be lost; this is mainly grassland. Vegetation would also be affected in the areas designated for stockpiling material, disposal of tunnel muck and access roads. These would be short term impacts, as land disturbance associated with CLOP would be recontoured and seeded when construction is complete. Vegetation, mostly grasses, may become established in the exposed Reservoir shoreline. Upland species, such as ponderosa pine would be unaffected.

Both the No Action and the Supplemental Outlet Alternative would cause impacts to vegetation; however the Supplemental Outlet Alternative would limit the areas of vegetation to be impacted as compared to the No Action Alternative that may include more ground disturbing activities which would impacts greater areas of vegetation. Therefore, it is expected that the Supplemental Outlet Alternative would cause no greater impacts to vegetation than the No Action Alternative.

**SECTION IV.
Geology and Soils****Affected Environment*****Geology and Minerals***

Carter Lake is contained in a natural topographic basin that pre-dates the Reservoir. The Carter Lake basin is confined by hogback ridges of the Lyons Sandstone Formation on the west, and the Dakota and Morrison Formations on the east. The hogbacks are probably the most notable geologic features in the area. The Carter Lake anticline is a dramatic fold north of Dam No.1 that has been designated as an area of special interest by the Colorado Natural Areas Program (EDAW).

There are no known commercial mineral deposits within the project boundaries.

Slope and Soils

Carter Lake occupies the flat areas associated with the original basin mentioned above. The shoreline extends onto the slopes of the ridges on the east and west of the Reservoir. As a result, much of the shoreline and adjacent land areas are steep and difficult to utilize for recreational activities or facility development (EDAW, 1995).

The soils around Carter Lake reflect some combination of steep slope and shallow depth to bedrock/outcrops. The major of soils are suited to native grasslands or pastures (USDA, 2007).

Shorelines erode continually at Carter Lake. Land use activities (e.g., dispersed recreation) have accentuated erosion. Other factors that contribute to shoreline erosion include large wakes from boats or wind. Wind erosion is prominent at the shore of the swim beach.

Environmental Consequences***No Action Alternative***

The No Action Alternative would have no effect on geologic or mineral resources in the short term.

Although implementation of this alternative would not result in direct disturbance of new areas through the construction of a supplemental outlet structure, additional impacts to soil would occur. Increased visitation levels in combination of minimal access control would likely result in an increase in the amount of area disturbed by informal use areas. Also, future maintenance activities to the existing outlet structure could have similar effects. These impacts are difficult to quantify but over time could become a long term management problem.

Supplemental Outlet Alternative

As with the No Action Alternative, the Supplemental Outlet Alternative would have no effect on geologic or mineral resources.

Construction activities associated with the CLOP would result in minor disturbance of soils in the area. Adverse impacts to soil would include short term increases in erosion and possible reduction in soil productivity due to compaction. Due to the small amount of area affected by the CLOP, reductions in soil productivity would be minor.

Mitigation measures, which include minimizing the area disturbed during construction activities to the smallest practical area, controlling runoff from disturbed areas, and revegetation, are expected to limit impacts to localized and very minor short term soil impacts.

Both the No Action and the Supplemental Outlet Alternative would cause impacts to soils; however the Supplemental Outlet Alternative would limit the amount of soils that would be impacted as compared to the No Action Alternative. The No Action Alternative may include more ground disturbing activities which would impact greater amounts of soil. Therefore, it is expected that the Supplemental Outlet Alternative would cause no greater impacts to vegetation than the No Action Alternative.

SECTION V. Fish and Wildlife

Affected Environment

Fish populations in Carter Lake consist of coldwater species such as rainbow trout, kokanee, splake (a cross between speckled, or brown, and lake trout), and occasionally brown trout, and warmwater species including walleye, yellow perch, bluegill and largemouth bass (LCPOLD, 2006).

The habitats adjacent to the Reservoir include a ponderosa pine forest, montane shrub and grassland, and rock outcrops. The extensive riparian and shoreline areas are especially valuable to wildlife and provide nesting and foraging habitat for birds in the cottonwoods and shrubs. Waterfowl, shorebirds, raptors, songbirds as well as wild turkey are all likely to be found in the study area.

The Reservoir and surrounding lands provide habitat for several common mammals. Mule deer use the area in the winter and are prey for mountain lions that roam the area (EDAW, 1996). This area also provides range land for elk. Black bear are sporadically reported near the

Reservoir. Other mammals likely to be present in the area include coyote, red fox, raccoon, porcupine, striped skunk, ground squirrel, and several species of bats (NDIS, 2006).

Suitable habitat is present within the AoE for the following reptile species: common garter snake, lined snake, milk snake, racer, many-lined skink, ringneck snake and short-horned lizard.

Carter Lake lies within Larimer County. Table 2 shows the Federally-listed Threatened and Endangered species in that area.

Common Name	Scientific Name	Status
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered
Canada Lynx	<i>Lynx canadensis</i>	Threatened
Greenback Cutthroat Trout	<i>Oncorhynchus clarki stomias</i>	Threatened
Interior Least Tern	<i>Sternula antillarum</i>	Endangered
Mexican Spotted Owl	<i>Strix occidentalis</i>	Threatened
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered
Piping Plover	<i>Charadrius melodus</i>	Threatened
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	Threatened
Whooping Crane	<i>Grus americana</i>	Endangered

Table 2. Federally-listed Threatened and Endangered Species Located in Larimer County, Colorado.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the construction of the supplemental outlet structure would not occur. This alternative would not impact fish and wildlife including threatened and endangered species in the area, but could result in impacts similar to those described in the Supplemental Outlet Alternative when shutdown of the existing outlet would be required for future maintenance or repairs. This type of maintenance would possibly result in emergency or periodic Reservoir drawdowns. Multiple Reservoir drawdowns may result in increased fishing pressure and predation in the reduced volume which may reduce fish populations. The change in the fishery would reduce the availability of prey for the bald eagle. Upland wildlife species would not be impacted, but species that depend on the Reservoir for water or food, would be displaced.

No suitable habitat for the Preble's meadow jumping mouse (PMJM) is present in the project area. However, potentially suitable habitat for the PMJM occurs immediately east of the project area along the Dry Creek drainage. The Colorado Division of Wildlife's Natural Diversity Information Source has not identified Dry Creek as part of the PMJM occupied range (NDIS, 2006).

Supplemental Outlet Alternative

The study area was assessed for potential habitat for Federally-listed threatened and endangered species and other special status species and communities. The PMJM and bald eagle were identified as species that may be impacted by the CLOP.

Preble's meadow jumping mouse – No suitable habitat is present in the project area. However, potentially suitable habitat for the PMJM occurs immediately east of the project area along the Dry Creek drainage. The Colorado Division of Wildlife's Natural Diversity Information Source has not identified Dry Creek as part of the PMJM occupied range (NDIS, 2006).

Bald eagle – Bald eagle prefer to nest in large trees near open water or riparian habitats. Active bald eagle nests occur within 6 miles of the project area. Carter Lake is used as winter forage and winter range for the bald eagle (NDIS, 2006).

Construction activities would temporarily shift wildlife use away from Dam No.1 rehabilitation areas. There could be an impact of short term displacement of wildlife that would normally occupy the immediate project area. Generally, wildlife would be expected to move and find alternative areas for forage and cover easily, returning after construction and rehabilitation activities have been completed.

Bald eagles winter in the area and could use roosts in the vicinity of the proposed project. However, construction will begin prior to when bald eagles come to the area to winter. Therefore, it is unlikely that bald eagles would begin using a winter roost site and then be displaced by construction activities. In addition, bald eagles avoid areas with nearby human activity. Bald eagles would not be affected because there are alternative roosts sites in the area. Additionally, no large trees suitable for roosting will be disturbed as a result of the CLOP.

Any habitat impact would be minimal because Dam No.1 and associated construction areas were previously disturbed during the construction of Carter Lake and newly disturbed areas will be revegetated. There is no designated critical habitat for any listed species in the vicinity of the proposed construction area so no critical habitat will be affected (NDIS, 2006). Reclamation has determined that construction of the Supplemental Outlet Alternative will not affect bald eagles or any other Federally-listed threatened and endangered species.

Temporary impacts to benthic organisms are an unavoidable consequence of the drawdown. The reduction in volume of the Reservoir would concentrate the lake's fish in a smaller area, increasing predation, and trap some fish in isolated pockets of water, causing fish mortality in some cases depending on depth of the Reservoir.

These impacts would occur regardless of the season in which the drawdown occurs. However, a late fall or winter drawdown may increase fish stress and the possibility of fish kills during periods of low flow and reduced depth, as fish are already stressed by low temperatures. Any adverse effects on the benthic and fish communities are expected to be minor and limited in duration to the Reservoir elevation restriction period. The supplemental outlet works would be fitted with four-inch trash guards to ensure that fish species are not evacuated from the Reservoir when the outlet works are in use. LCPOLD currently and will continue to stock fish populations in Carter Lake (Rieves, 2006).

Both the No Action and the Supplemental Outlet Alternative would cause impacts to fish and wildlife in the area of the Reservoir; however the Supplemental Outlet Alternative would involve one expected 6 month drawdown impact as compared to the No Action Alternative that may include more incidences of shorter duration impacts to fish and wildlife as described above. Therefore, in totality it is expected that in a 5 year timeframe the Supplemental Outlet Alternative would cause no greater impacts to fish and wildlife than the No Action Alternative.

SECTION VI. Aesthetic Resources

Affected Environment

Carter Lake is located in a scenic setting that is dominated by the Reservoir and the prominent landforms on both sides of the Reservoir. A fairly uniform ridge rises on the west side of the Reservoir, most of which is forested with a dense stand of ponderosa pine. Although not a dramatic landform, the ridge encloses the Reservoir and adds interest with vegetation that contrasts with the sparser vegetation of the project area. More interesting landforms occur on the east side of the Reservoir where a complex of hogbacks and irregular ridges create a landscape dominated by cliffs and red rock outcrops. For the most part, the landscape retains a natural appearance, particularly on the west side of the Reservoir. Notable exceptions occur, including several areas around the Reservoir that has experienced residential development adjacent to the park boundary, and at several sites disturbed by quarrying activities associated with construction of the Reservoir's dams. Visual quality is also compromised at some of the use areas, such as South Shore, where a lack of vegetative screening and dense recreation facility development combine to create a somewhat cluttered landscape.

Current noise and lighting impacts in the AoE are limited to residential development that has occurred at a few locations adjacent to the Reservoir, particularly along County Road 31 at the north entrance, south of Carter Lake on County Road 8E, and in a large residential subdivision on the east side of the Reservoir above an old quarry area. Other noise and lighting impacts occur from recreation activities and from the Carter Lake Filter Plant. Quiet hours at all campgrounds located at Carter Lake are from 10:00 p.m. to 6:00 a.m.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, no supplemental outlet would be constructed. However, future maintenance or repairs would possibly result in emergency or periodic Reservoir drawdowns. It is hard to determine the extent of drawdowns needed to perform these future repairs.

Also, when the current outlet is to need major rehabilitation, additional aesthetic impacts similar to those described in the Supplemental Outlet Alternative would be realized.

Supplemental Outlet Alternative

The proposed drawdown would create a temporary change in the viewscape, as more of the shoreline would be exposed. Also, a change in aquatic habitats along the shoreline could occur which would reduce the scenic sites available with wildlife observation. Once the drawdown is over, Reservoir operations would return to normal and the shoreline and habitat areas would regenerate. The construction area would be recontoured and reseeded. The proposed CLOP would have no long term adverse impact to the aesthetic resources of the area; however, the visual impact of a multi-level intake tower may be objectionable to some.

The proposed drawdown itself would not impact noise levels. Heavy machinery used to construct the supplemental outlet would temporarily increase noise levels. The nearest residences are less than one mile from the project area. There is a possibility that the construction may take place 24 hours per day. During construction, the contractor would be subject to all local regulations and ordinances. No long term permanent impacts would result. Best Management Practices will be utilized to minimize impacts from lighting, dust and noise during construction.

Both the No Action and the Supplemental Outlet Alternative would cause impacts to the aesthetics of Carter Lake. The Supplemental Outlet Alternative would involve one anticipated 6 month drawdown impact as compared to the No Action Alternative that may include more incidences of air, noise, and light impacts to Reservoir aesthetics as described above.

SECTION VII. Cultural Resources

Affected Environment

Prior to the construction of the CBT, Burgh (1947) noted that the Carter Lake area had a high potential for the recovery of cultural resources. Archaeological activities yielded the first recorded site in 1948. In 1955, a prehistoric burial was found and recorded. The area was intensively inventoried in 1989, and 15 sites were recorded (Burney and Halasi, 1990). In 1992, the Carter Lake Burial, 5LR42, was relocated. The Reservoir itself and other assets associated with the CBT project have been recorded as historic sites. In total, 21 sites have been recorded at Carter Lake and two of these sites (5LR1782 and 5LR1783) are eligible for the National Register of Historic Places (Kinner et al. 2005).

Site 5LR11011.1 consists of a 197-meter-long, 5 meter-wide segment of the St. Vrain Supply Canal. The entire St. Vrain Supply Canal is eligible for the National Register of Historic Places, however, site 5LR11011.1 has been thoroughly physically compromised by previous modifications and is regarded as non-contributing to the historic significance of the greater site.

Environmental Consequences

No Action Alternative

No direct disturbance of cultural resource sites would result from the implementation of this alternative. Existing access and visitor management practices to limit disturbance to known cultural resource sites would continue. When the existing outlet would need repaired there would be additional land disturbance. However, any future construction projects would likely be restricted from any archaeological sites in the area.

Supplemental Outlet Alternative

The supplemental outlet works would be located on the southern portion of the Dam and would affect the Saint Vrain Supply Canal. The two archaeological sites within the AoE are the Saint Vrain Supply Canal and site 5LR42, which is located within the narrow Dry Creek valley directly below the Dam.

The Supplemental Outlet construction should not affect site 5LR42 if construction is restricted from the area. However, the Saint Vrain Supply Canal, specifically Site 5LR11011.1, would likely be affected by construction. However because of previous compromises, the State Historic Preservation Officer has concurred with Reclamation's determination of "no historic properties affected".

SECTION VIII. Socioeconomic Resources

Affected Environment

Carter Lake is an integral part of the CBT Project. All water diverted from the West Slope to the East Slope must be put to beneficial use. Carter Lake is a primary East Slope storage facility for the provision of irrigation and M&I water to the southern portion of the CBT Project. Although there is no power plant at Carter Lake, all diversions of irrigation and M&I water from the West Slope to the East Slope are routed through the CBT Project power plants. Thus, any changes in CBT Project diversions for M&I and irrigation purposes may affect CBT Project power generation.

In 2005, Larimer County's economy provided over 124,000 jobs and more than \$4.5 billion in earnings to workers (CDLE, 2006). Carter Lake draws approximately 300,000 visitors annually. A 2005 study concluded that an average visitor spends \$90.99 per trip to Carter Lake. In 2005 the LCPOLD underwent an extensive Economic Impact Analysis. It was found that visitors to Carter Lake directly contribute \$27,297,000 to Larimer County, the Carter Lake community, and the businesses associated with a trip to Carter Lake. Theoretically, these dollars are then re-spent in the community through salaries, tax revenues generated, goods purchased, and other miscellaneous means. In total, using the common multiplier for houses of 1.7992, the Carter Lake recreationists directly and indirectly contribute \$49,113,000 to the ambient economy (Stotlar, 2005).

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. The project area lies on federally owned lands in Larimer County, Colorado. After a review of the United States 2005 census information and socioeconomic data available for the Carter Lake area, populations that could potentially be affected by the proposed project were evaluated. There were no minorities or low-income populations.

Environmental Consequences

No Action Alternative

Normal operating procedures of the No Action Alternative usually do not permit the lake level to drop to an elevation of 5,657 feet. The No Action Alternative would have no additional impacts on the economy or the CLFP until the current outlet structure were to need major rehabilitation. This would severely decrease recreation opportunities available at the Reservoir and efficient water treatment at the CLFP. The current outlet would temporarily be taken out of operation and the Reservoir water elevation would be drawn down in order for proper repairs to be done. Any drawdown would require deviation from the normal operation of Carter Lake and, due to unknown timing, such an event could happen at a very inopportune time, adversely affecting the socioeconomics associated with the Reservoir. Impacts under this scenario would be similar to the Supplemental Outlet Alternative.

Supplemental Outlet Alternative

Estimation of power generation losses were made using a Reservoir operations study based on a projection of most likely short term hydrologic conditions as superimposed on recent CBT Project water years. Those projections show that water deliveries would not be impacted during construction, and impacts to power generation would be minimal.

Impacts to the small retail establishments that provide services for the Reservoir for lake visitors would be dependent on seasonal timing of the drawdown. Based upon the analysis of lake activities and visitations, having the drawdown during the winter would minimize negative impacts on the small retail establishments bordering the Reservoir. As discussed in Section II, no long term adverse impacts to recreation-based business or industrial activities would result from the proposed CLOP, and no business or industrial relocations would be required.

Any adverse impact resulting from the Supplemental Outlet Alternative would be focused on a few recreational enterprises located on Carter Lake. Because of the size of the Larimer County economy, the economic effects would be negligible at the county level. However, some individual enterprises may be negatively affected to a moderate degree. The impacts on local business may be negligible or short term, depending upon the degree to which local enterprise can accommodate and adapt to the changes in water levels.

Conducting the drawdown to install the supplemental outlet would keep the Reservoir at normal operating elevations during future maintenance activities and would, in turn, ensure that future long term economic impacts would not be brought about in the area.

The overall economic impact on the Larimer County economy is expected to be negligible. Any decline in business associated with the drawdown would have little effect on jobs or earnings of the workers of the economy.

Many specialized activities can be found under the term “recreationist.” At Carter Lake the most significant group of recreationists that would be affected by the proposed secondary outlet are the boaters (32 percent of Carter Lake visitors). LCPOLD projects a 35 percent decrease in boating during the proposed construction period. The county hopes to offset some of this lost money through increased visitation at other reservoirs managed by LCPOLD. Also, construction would be timed to limit the impacts to the recreational season. The Carter Lake Marina may experience a short term financial downturn, however; Larimer County has help to lessen the financial impact to the Marina operators by adjusting their concessionaire lease. The drawdown would also be timed to occur mainly during the recreational off season.

The project site and all lands impacted by the drawdown are in federal ownership. No change in property values or tax revenues would occur. Some minor loss of tax revenues would result for businesses in the vicinity that supply goods and services for recreationists visiting the Carter Lake area. The extent of the loss would depend on the seasonal timing of the project. Most losses would occur during the estimated 6 month Reservoir elevation restriction, however; some losses could occur during the period where the Reservoir is being drawn down leading up to the restriction.

No adverse impacts to the growth of the community or region would be realized as a direct result of this project.

Either the No Action or the Supplemental Outlet Alternative would cause impacts to the socioeconomics associated with Reservoir operations and activities; however the Supplemental Outlet Alternative would involve one estimated 6 month drawdown impact as compared to the No Action Alternative that may include more incidences of shorter duration impacts to socioeconomics as described above. Therefore, the Supplemental Outlet Alternative would cause no greater impacts to the socioeconomics of Carter Lake than the No Action Alternative.

SECTION IX.

Transportation

Affected Environment

The road systems in the region provide good access to Carter Lake. The Reservoir is located approximately 13 miles west of Interstate 25. Connections between the interstate and the Reservoir are via U.S. 34 to paved county roads from the north or via several State Highway combinations and paved county roads from the east. Access from the south is via unpaved county roads. Access over Dam No.1 is provided by County Road 31.

Environmental Consequences

No Action Alternative

The No Action Alternative would not have an impact on traffic and access near Carter Lake. If the existing outlet needs rehabilitation, the roads associated with Carter Lake may be temporarily closed or access may be limited due to the construction activities associated with the future outlet repair. There may also be a decrease in traffic associated with recreators near the Reservoir, as water-based recreation would decrease. It is hard to determine the extent of drawdown needed to perform these future repairs.

Supplemental Outlet Alternative

Traffic, due to construction, would increase from commuting workers and trucks hauling needed materials and equipment. Dust from the traffic and the exposed shoreline would increase, and safety concerns would increase due to the increase in large trucks. These impacts would be short term, for the 18 month length of the construction period. Best Management Practices will be utilized to minimize dust impacts.

During the construction of the supplemental outlet and associated structures there would be no permanent closures of roads that access Carter Lake. Temporary traffic delays on C.R. 31 and 8E may be needed in order to allow haul trucks to safely enter and exit these roads.

Construction contractors will be required to comply with all applicable safety and environmental regulations and ordinances.

Both the No Action and the Supplemental Outlet Alternative would cause impacts to local traffic in the form of temporary closures and delays; however the Supplemental Outlet Alternative would involve one approximate 6 month drawdown impact as compared to the No Action Alternative that may include more incidences of shorter duration impacts to Reservoir operations and local traffic as described above. It is expected that the Supplemental Outlet Alternative would cause no greater impacts to local traffic than the No Action Alternative.

CHAPTER FOUR

Environmental Commitments

The following environmental commitments would be implemented as an integral part of the Supplemental Outlet Alternative.

1. **Standard Best Management Practices** – Standard best management practices would be applied during construction activities to minimize environmental effects and would be implemented by construction personnel or included in contract specifications. Specifically, noise, light, air, sediment, and erosion controls, and revegetation plans would be utilized to protect environmental assets.
2. **Additional Analyses** – If the Supplemental Outlet Alternative were to change significantly from that described in the EA because of additional or new information, additional environmental analyses would be undertaken if impacts would be expected to exceed those presented in this EA.
3. **Permits** – Before implementing the selected alternative, the contractor would obtain all necessary permits. The conditions and requirements of any permits would be strictly adhered to by the contractor.
4. **Cultural Resources** – Anyone who has inadvertently discovered possible human remains must stop work immediately and contact archaeologist Bob Burton at 970-962-4361. Work would stop until the proper authorities are able to assess the situation and give written notice that work may resume.
5. **Disturbed Areas** – Disturbed areas resulting from the project would be smoothed, shaped, contoured, reseeded, and rehabilitated to as near their pre-project construction condition as practicable. Seeding and planting would occur at appropriate times with weed-free seed mixes of native plants. The composition of the seed mixes would be coordinated with the Eastern Colorado Area Office. Monitoring and treatment would continue until there are two successive years.
6. **Visual Resources** – Rehabilitation measures would be implemented immediately upon completion of the project. This will include re-contouring and reseeding disturbed areas in a natural appearing way, with native vegetation species. The spread of noxious weeds would be controlled, trash would be cleaned up and construction debris disposed of in designated areas.

Cumulative Impacts

In addition to project specific impacts, the potential for significant cumulative impacts to resources affected by the CLOP and by other past, present, and reasonably foreseeable activities in the area surrounding Carter Lake have been analyzed. According to the Council on Environmental Quality's regulations for implementing NEPA (40 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 actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time".

Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, the construction of a supplemental outlet structure would not occur. This alternative is the most cost effective in the short term, but could result in multiple impacts in the future, since the current outlet structure is nearly 60 years old and in need of repair. Repair or replacement of critical components such as the existing guard and operating gates would result in the need for an emergency or multiple drawdowns of the Reservoir.

Hydrology Emergency or multiple Reservoir drawdowns may be required in the future. As a result of the repeated lowering of the Reservoir water levels there would be a cumulative impact on the water quality in Carter Lake. If during an emergency drawdown the Reservoir elevations fall below 5,664 feet the ability of the CLFP to adequately treat raw water from Carter Lake is affected. The CLFP may lose the ability to draw water from Carter Lake or have to increase treatment processing or lower production in order to meet water quality standards (Maddox, 2005). As a result, the No Action Alternative may have a cumulative impact on hydrology in Carter Lake.

Reservoir Operations Among the goals of the CLOP is to improve the operational flexibility at Carter Lake. Without a supplemental outlet structure maintenance activities could render the existing outlet structure useless for an extended period. Deferred maintenance of the base conditions would likely result in disruption of water deliveries in the foreseeable future, adversely affect hundreds of thousands of people (NCWCD, 2006).

Recreation Historically, elevations changes to Carter Lake affect the availability of recreational resources at the Reservoir. Under the No Action Alternative, emergency or multiple Reservoir drawdowns may be required for maintenance of the existing outlet structure. Under this option recreators may choose to visit other lakes in the area due to uncertain water levels in the Reservoir. Due to possible impacts to recreation at the Reservoir the No Action Alternative is not the optimum alternative and may have cumulative impacts.

Fish and Wildlife Implementation of the No Action Alternative is expected to have cumulative impacts to fish and wildlife at Carter Lake. Multiple maintenance activities may permanently shift wildlife use away from Dam No.1. Emergency repairs could occur during critical periods for nesting or fawning of many wildlife species. If multiple Reservoir drawdowns were required for repair activities there would be an increase in stress to fish populations, which would increase the possibility of fish mortality.

Socioeconomic Resources The No Action Alternative would have no additional impacts on the economy or the CLFP. Until the current outlet structure were to fail or need major rehabilitation, which would cause recreation opportunities available at the Reservoir to severely decrease. The current outlet would temporarily be taken out of operation and the Reservoir water elevation would be drawn down in order to perform the necessary repairs. Impacts under this scenario would possibility significantly cumulative impacts to the economy of the Carter Lake Marina concessionaires, Larimer County, and the Carter Lake Filter Plant.

Cumulative Impacts of the Supplemental Outlet Alternative

Direct, indirect, and cumulative impacts of the Proposed Alternative are not expected to be significant. There would be short term minor impacts to fish and wildlife resources, hydrology, Reservoir operations, recreation, vegetation, aesthetics, soils, socioeconomics, and transportation as a result of implementing the Proposed Alternative. The potential for significant cumulative effects is lessened by the limited scope of the drawdown, and the limited area impacted by construction activities. The installation of the supplemental outlet structure would reduce cumulative impacts by negating the need for future drawdowns to perform inspections and maintenance activities at Dam No.1.

Since impacts from the Supplemental Outlet Alternative range from no impact to short term, minor impacts and the Proposed Alternatives will not contribute to the impacts of other past, present, and reasonably foreseeable future actions to the resources, Reclamation has determined that the Proposed Alternative would not cumulatively affect any resources.

CHAPTER FIVE

Consultation and Coordination

Agency Coordination

Beth Boaz, Activity Manager, Bureau of Reclamation
Bob Burton, Archeologist, Bureau of Reclamation
Harry Crocket, Fishery Biologist, Colorado Division of Wildlife
Bill Harlan, Hydrologist, Bureau of Reclamation
Brian Little, Natural Resource Specialist, Bureau of Reclamation
Carlos Lora, Hydrologist, Bureau of Reclamation
Dan Rieves, Larimer County Parks and Open Lands Department
Carlie Ronca, Natural Resource Specialist, Bureau of Reclamation
Roger Sinden, Head, Distribution Systems, Northern Colorado Water Conservancy District

Public Scoping Process

An early and open scoping process is required as part of the EA preparation (49 Code of Federal Regulations, Part 1501.7). Scoping, as defined in the Council on Environmental Quality (CEQ) regulations of 1978, is “an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.”

A scoping document (Attachment 1) was sent out to potentially interested parties about the CLOP EA scoping process and provided opportunities to comment. Reclamation also provided a news release about the scoping meeting to area media.

On March 22, 2006, Reclamation continued the public and agency scoping by holding a public meeting at the Larimer County Bison Visitor Center to solicit agency and public input on the proposal. Reclamation presented background information and described the preliminary alternative being considered for the supplemental outlet and provided opportunities to ask questions, identify issues and concerns associated with the preliminary alternative, or identify other alternatives. Fourteen individuals attended the public meeting (Attachment 2). Oral comments were recorded on flip charts. Comment sheets were provided; these comments along with internal and other agency inputs (Attachment 3) were used to shape the scope of the Draft EA. In addition to comments received at the meeting, a total of seven written comments were received and were included in the EA. The issues identified during this process have been considered throughout the discussion of the affected environment and environmental consequences.

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