



**US Army Corps
of Engineers®**
Omaha District

Environmental Assessment for the Bear Creek Dam and Lake Project Master Plan South Platte River, Colorado



September 2012

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Executive Summary

The U.S. Army Corps of Engineers' Bear Creek Dam and Lake Project (Project) is located in the South Platte River Basin on Bear Creek approximately eight miles upstream from its confluence with the South Platte River in Jefferson County and the City of Lakewood, Colorado.

The federal government lands at the Project are fee owned by the Corps of Engineers. The City of Lakewood holds a 50-year lease with the Corps of Engineers for the development of recreation facilities at the Project. Through this lease, the City of Lakewood administers land and water areas for recreation purposes and bears the costs of operations, maintenance, and replacement of all facilities.

Master plans are required for civil works projects (such as the Bear Creek Dam and Lake Project) for which the Corps of Engineers has administrative responsibility for management of natural and manmade resources. Master Plans provide guidelines and direction for future project development and provide a District-level policy consistent with national objectives and other state and regional goals and programs. The existing Bear Creek Dam and Lake Master Plan was first published in 1980 with a portion revised in 1988, but there has been no comprehensive revision to the Master Plan in more than 30 years. As such, the current Master Plan provides an inadequate basis on which to evaluate contemporary proposals.

The City of Lakewood has no plans for development of new major recreational amenities at the Bear Creek Lake Park, including areas within the federal project. Lakewood officials characterize the Bear Creek Lake Park as having reached a “*build-out*” condition where the existing real estate usage has been maximized. As such, neither the Omaha District, nor the City of Lakewood has plans for major future development at the Project.

However, maintaining existing facilities, improving some existing facilities, and protecting the project's natural areas and natural resources have a number of small-scale actions that would be the proposed future development under the updated Master Plan. This Environmental Assessment describes the existing environmental conditions at the Project (affected environment) providing a baseline for measuring expected changes that could result from small-scale actions implemented under the proposed revised Master Plan.

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1 INTRODUCTION

Master Plans are the basic document guiding the fulfillment of U.S. Army Corps of Engineers' (Corps of Engineers) responsibilities pursuant to federal laws at Corps of Engineers' projects; these responsibilities include preserving, conserving, restoring, maintaining, managing, and developing the lands, waters, and associated resources for the citizens of the United States. The existing Bear Creek Dam and Lake Project Master Plan was first published in 1980, but has not been comprehensively revised in more than 30 years.

The purpose of this Environmental Assessment (EA) is to consolidate and update information on Master Plan implementation, including potential future improvements in the Bear Creek Dam and Lake Project (Project). The EA will also provide an enhanced opportunity for public involvement in the decision-making process. It also has allowed the Corps of Engineers to address compliance with other environmental laws as part of a single review process rather than through separate reviews thereby reducing paperwork and ensuring comprehensive compliance.

1.1 Project Location

The Bear Creek Dam and Lake Project was constructed by the Corps of Engineers southwest of Denver on Bear Creek immediately below its confluence with Turkey Creek and approximately eight miles upstream from its confluence with the South Platte River. Upstream from the Bear Creek dam, the basin drains a total of 236 square miles, of which 90-percent is composed of mountainous terrain. The remaining 10-percent is characterized by high plains and rolling foothills and is separated from the mountains by a prominent hogback¹ that crosses the basin near Morrison, CO. The elevation of the basin ranges from 14,264 feet above mean sea level (MSL) at the headwaters at Mount Evans to 5,295 feet (MSL) at the Sheridan gage near the confluence with the South Platte River.

The Project is located approximately 10 miles southwest of Denver, CO and one-half mile east of Morrison, CO along the west edge of the City of Lakewood, CO. Figure 1 shows the Project location at the southern edge of the Omaha District's Civil Works Boundary. Figure 2 shows the Project on the western side of the Greater Denver region near the intersection of US Highways 285 and 470 and Figure 3 depicts the Project in the local context. Figure 4 identifies the City of Lakewood property, which is contiguous to the federal Project and managed by the City of Lakewood in conjunction with the recreation components of the federal Project as Bear Creek Lake Park.

¹ Geological term for a sharp-crested ridge of land in the foothills east of the Front Range of the Rocky Mountains.

Figure 1
Omaha District Civil Works Boundary

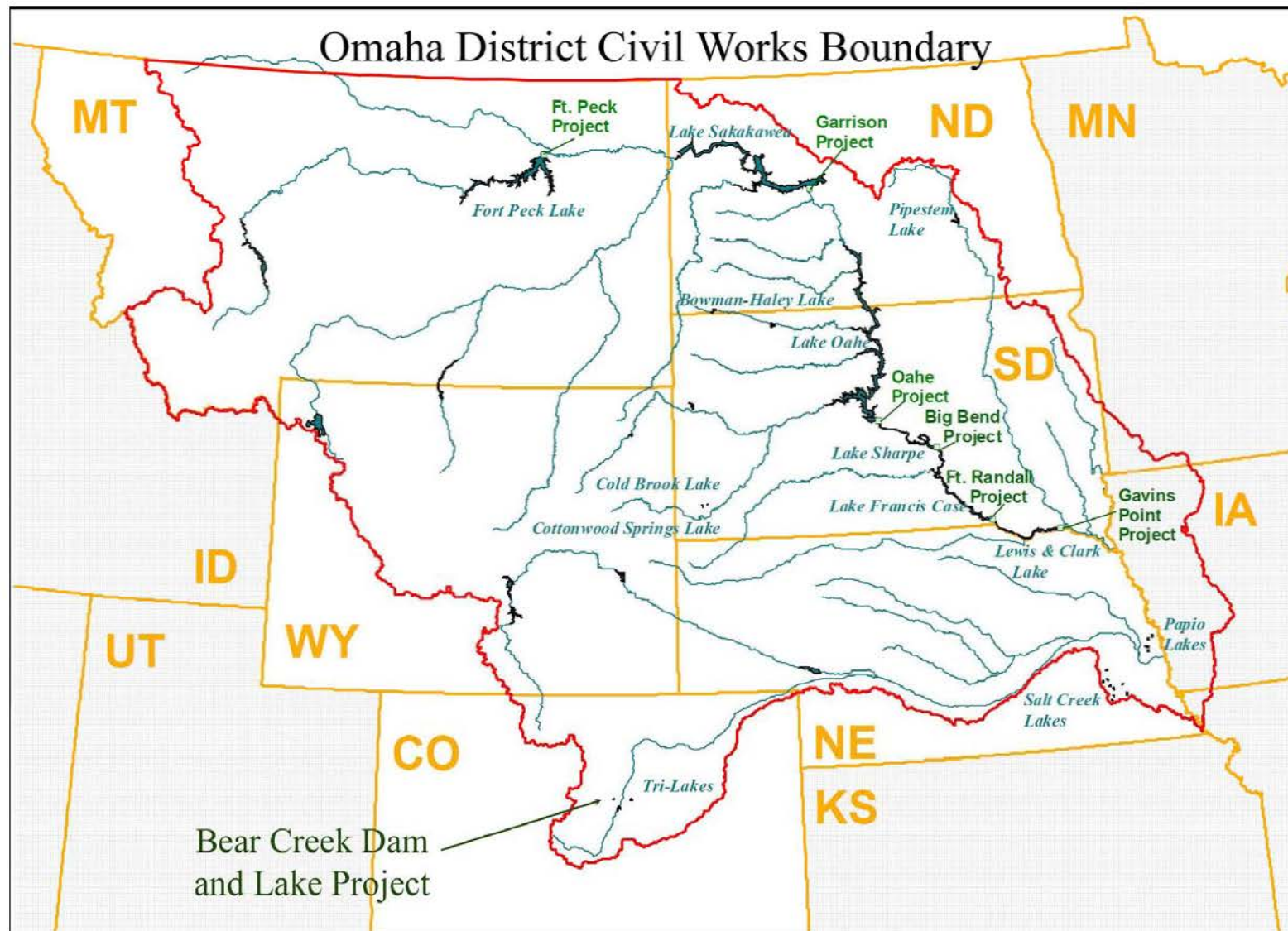


Figure 2
Bear Creek Lake Within Greater Denver Region

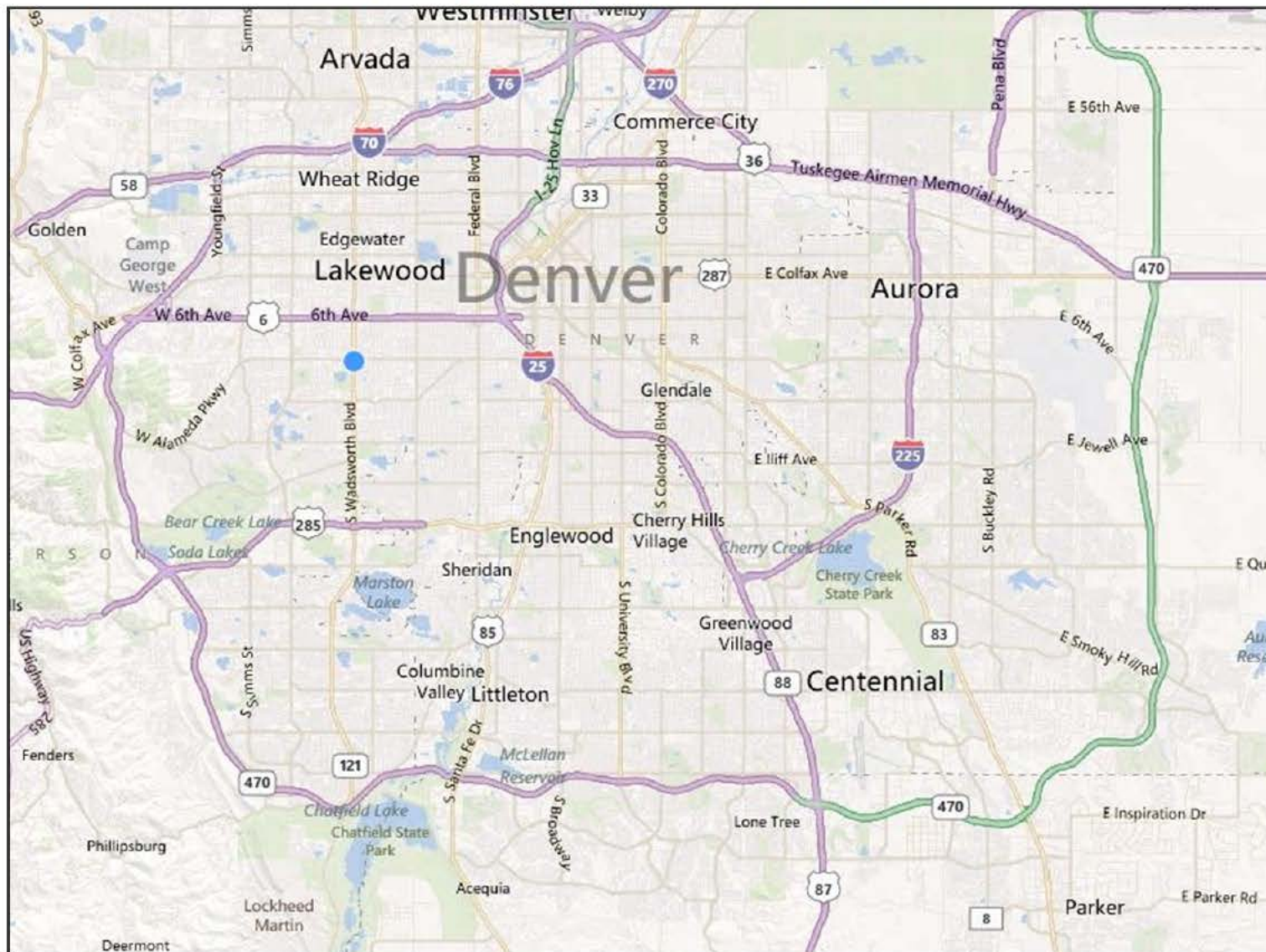


Figure 3
Local Map Depicting Bear Creek Lake

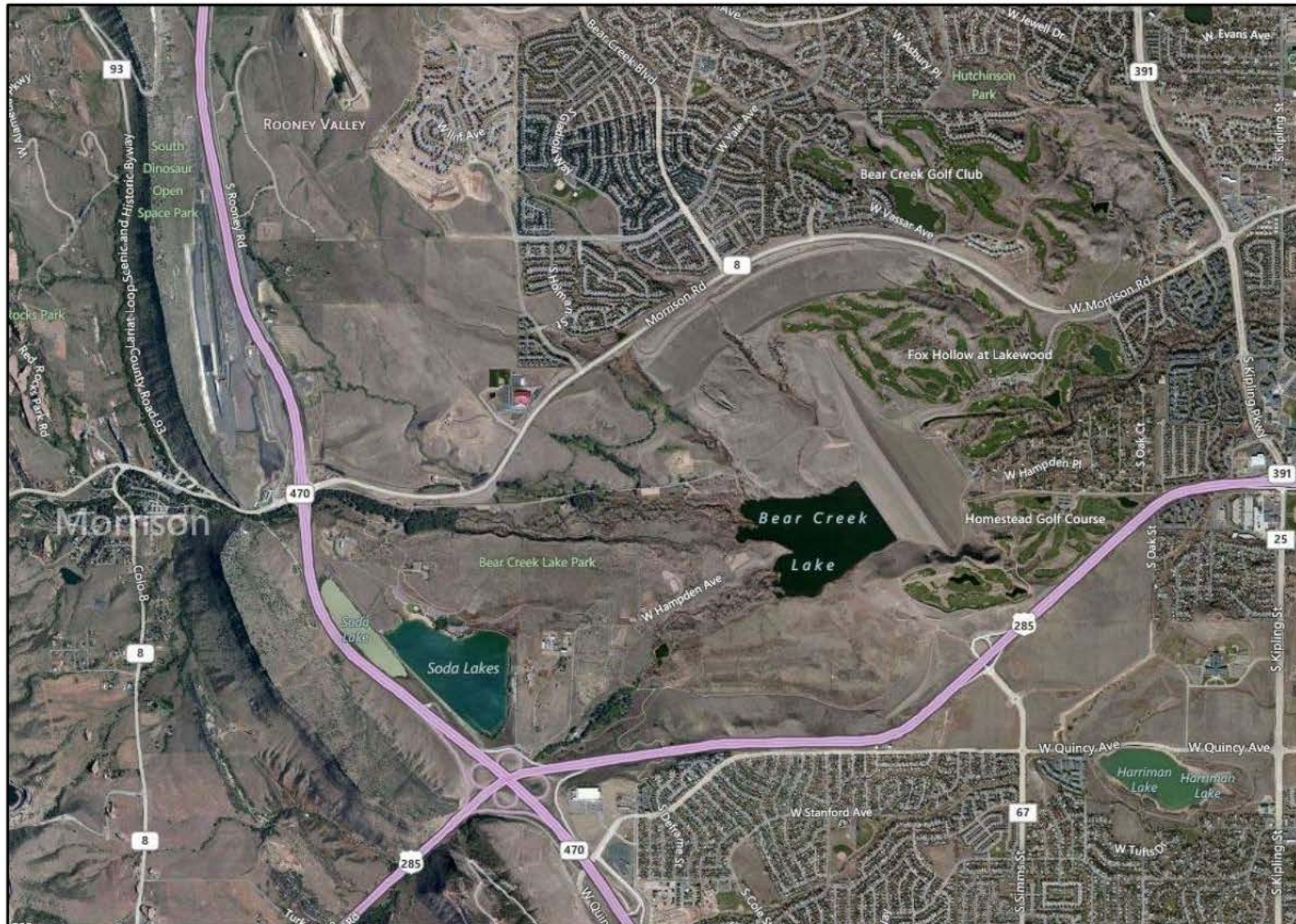
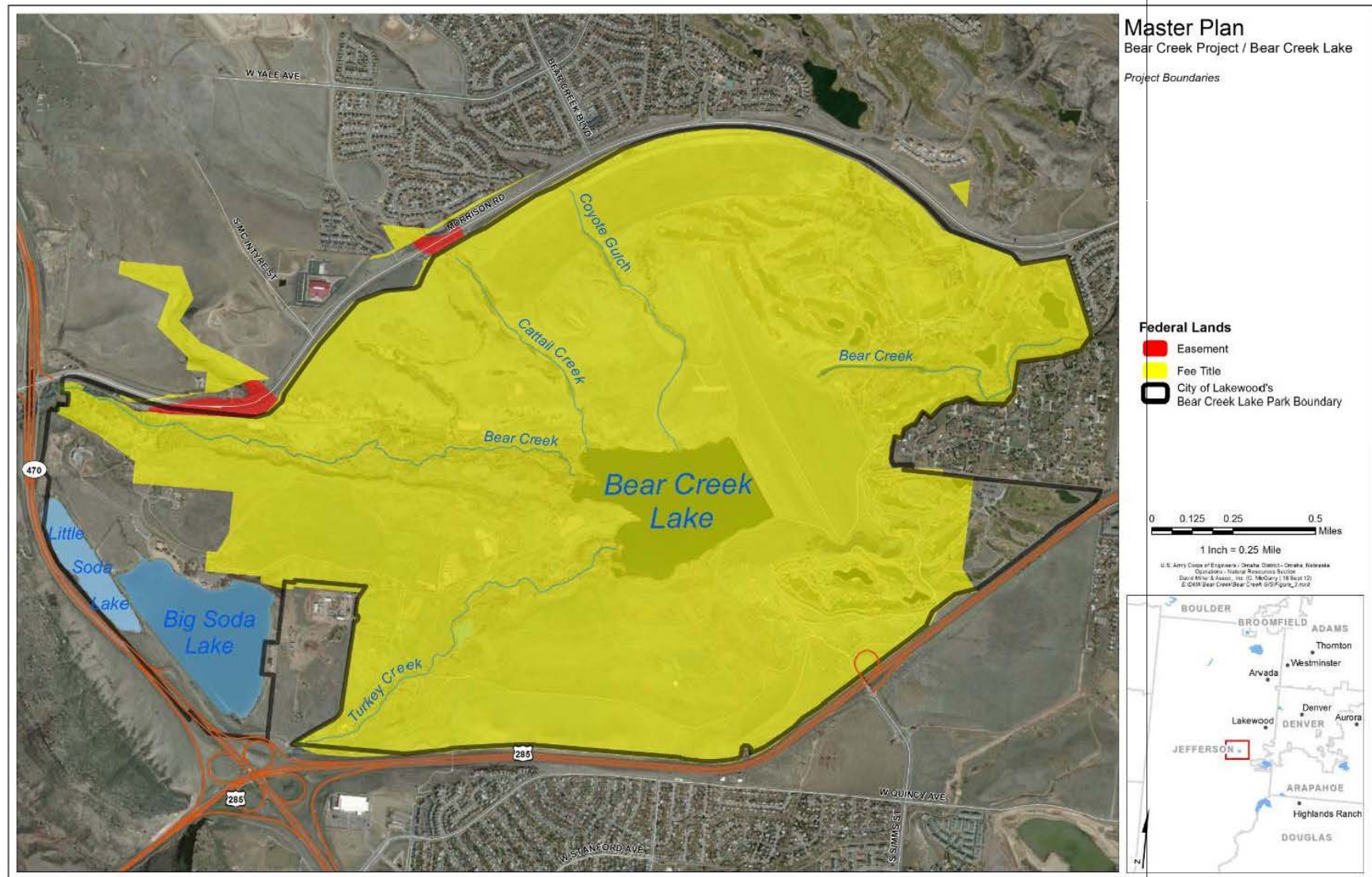


Figure 4
Lakewood's Bear Creek Lake Park and Federal Project Boundaries



1.2 Project Overview

The Project contains a total of approximately 2,324 acres which were purchased in fee with an additional 17 acres in Operation easements for a total of 2,341 acres. Major Project components include the main embankment, south embankment, intake and outlet works, and the emergency spillway. The main embankment across Bear Creek is 179.5 feet above the streambed at a crest elevation of 5,689.5 feet (MSL) and a crest length of 5,300 feet. The south embankment is 65.0 feet above the streambed, also at a crest elevation of 5,689.5 feet (MSL), with a crest length of 2,100 feet. The emergency spillway is located north of the main embankment and is 800 feet wide and 3,400 feet long with a crest elevation of 5,667 feet (MSL).

The length of the lake shoreline, based on the multipurpose pool elevation of 5,558 feet (MSL), is 2.2 miles. The lake averages 0.4 miles in width and extends upstream in the Bear Creek and Turkey Creek floodplain approximately 0.5 miles from the face of the embankment. The surface area of the lake is approximately 103 acres, average and maximum depth are approximately 20 and 35 feet, respectively; the shoreline is sloped at approximately 8.5-percent or less. At the top of surcharge pool (i.e., maximum pool), the surface area of the lake is approximately 1,215 acres.

1.3 Authorization and Project Description

The Bear Creek Dam and Lake Project was authorized for construction by the Flood Control Act of 1968. This was in accordance with the recommendations made in House Document No. 669 of the 80th Congress 2nd Session that provided an evaluation of the flood and related water problems of the South Platte River basin (USACE, 1977). The report included a plan for flood control on Bear Creek by means of a reservoir, but was not economically justified at that time. By the mid-1960s, development of housing and businesses along Bear Creek below the current dam site resulted in a favorable economic justification for the Bear Creek Project.

The authorized purposes of the project are flood control, recreation, and fish and wildlife enhancement. The percentages of benefits assigned to the authorized purposes are 92.2-percent for flood control and 7.8-percent for recreation and fish and wildlife enhancement. Construction began on 29 October 1973 and dam closure was made on 19 July 1977.

1.4 Relationship between the Corps of Engineers and the City of Lakewood

The Federal Water Projects Recreation Act of 1965 (Public Law 89-72) established cost-sharing requirements for all water resource projects constructed since 1965. To this end, in 1982, the City of Lakewood, CO signed a 50-year cost-share lease with the Corps of Engineers Omaha District for the initial development of recreation facilities at the project. The lands are fee owned by the Corps of Engineers and the City of Lakewood has responsibility for management. Through this lease, the City of Lakewood agreed to administer project land and water areas for recreation purposes. In addition, the City of Lakewood would bear the costs of operations, maintenance, and replacement of all facilities, including improvements made on the premises or added during the lease term.

The City of Lakewood manages the recreation components of the federal Bear Creek Dam and Lake Project in conjunction with contiguous City-owned properties as Bear Creek Lake Park. The contiguous City-owned properties are located at elevations above the top of surcharge pool elevation. In addition to the recreational amenities within the Corps of Engineers-owned property, the City of Lakewood owns adjacent property within Lakewood's Bear Creek Lake

Park that is not on Corps of Engineers-owned land. For example, as depicted in Figure 4, the Soda Lakes are to the west of the Corps of Engineers property boundary, but are within the City of Lakewood's Bear Creek Lake Park Boundary.

1.5 National Environmental Policy Act Overview

This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's (CEQ) Regulations (40 CFR §1500-1508), as reflected in the Corps of Engineers' Engineering Regulation, ER 200-2-2. The Corps of Engineers' ER 200-2-2 supplements, and is used in conjunction with, the CEQ regulations.

Within the regulations, a process is set forth where the Corps of Engineers must assess the environmental effects of proposed federal actions and consider reasonable alternatives to their proposed actions. In general, NEPA requires federal agencies to make a series of evaluations and decisions that anticipate adverse effects on environmental resources. For those actions with the greatest potential to create significant environmental effects, the consideration of the proposed action and alternatives is presented in an Environmental Impact Statement (EIS). Where the potential effects of the proposed action are believed to not be significant, the agencies prepare an EA; the revision to the Bear Creek Dam and Lake Project Master Plan is accompanied by an EA to support the decision making.

The CEQ's NEPA Regulations do not contain a detailed discussion regarding the format and content of an EA, but an EA must briefly discuss the:

- Need for the proposed action;
- Proposed action and alternatives;
- Probable environmental effects of the proposed action and alternatives; and
- Agencies and persons consulted in the preparation of the EA.

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2 PURPOSE AND NEED FOR CORPS OF ENGINEERS ACTION

2.1 Master Plan Overview

A master plan was developed for the Bear Creek project in 1980 and supplemented in 1988 (USACE, 1980; 1982). It is Corps of Engineers policy that each master plan shall be reviewed on a periodic basis and be revised as required. Engineer Regulation (ER) 1130-2-550 establishes the policy for the management of recreation programs and activities, and for the operation and maintenance of Corps of Engineers recreation facilities and related structures, at civil works water resource projects.

The master plan is the basic document guiding Corps of Engineers responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources. The master plan is a dynamic planning document that deals in concepts, not in details of design or administration.

Master plans are required for civil works projects and other fee-owned lands for which the Corps of Engineers has administrative responsibility for management of natural and manmade resources. Engineer Pamphlet (EP) 1130-2-550 establishes guidance for the preparation of master plans. As stated therein, the primary goals of the master plans are to prescribe an overall land and water management plan, resource objectives, and associated design and management concepts, which:

- 1) *Provide the best possible combination of responses to regional needs, resource capabilities and suitabilities, and expressed public interests and desires consistent with authorized project purposes;*
- 2) *Contribute towards providing a high degree of recreation diversity within the region;*
- 3) *Emphasize the particular qualities, characteristics, and potentials of the project; and*
- 4) *Exhibit consistency and compatibility with national objectives and other state and regional goals and programs.*

2.2 Purpose and Need for the Updated Master Plan

The existing Bear Creek Dam and Lake master plan was first published in 1980 with a portion revised in 1988 (USACE, 1980; 1988), but there has been no comprehensive revision to the master plan in more than 30 years. As such, the current master plan provides an inadequate basis with which to evaluate contemporary proposals. A number of the recreational amenities envisioned and described in the 1980 document were never constructed. In addition, there have been changes in demand for recreation, expansive adjacent population growth, and the construction of adjacent recreational amenities not on Corps of Engineers property, which dictate the need to update the Master Plan for the Bear Creek Dam and Lake Project.

The Master Plan update would provide a comprehensive description of the project, a discussion of factors influencing resource management and development, an identification and discussion of special problems, a synopsis of public involvement and input to the planning process, and descriptions of past, present, and proposed development.

The proposed revised Master Plan would also incorporate current Corps of Engineers land use classification standards, include contemporary requirements mandated by federal environmental laws, and better reflect the Corps of Engineers Environmental Operating Principles, natural resource management mission and environmental stewardship and ecosystem management principles.

3 ALTERNATIVES

When preparing an EA, the Corps of Engineers should develop a range of alternatives that could reasonably achieve the need that the proposed action is intended to address. The alternatives to be considered in this EA are a no action alternative of continuing to operate the Project under the 1980 Master Plan and 1988 supplement, and the proposed action of operating the park consistent with a new master plan. The preparation of an environmental assessment, with only two alternatives (continuing to operate the Project without a new master plan and operating the Project with a new master plan) is appropriate because there are no other reasonable alternatives to consider for evaluation; there has been no comprehensive revision to the master plan in more than 30 years. The CEQ regulations provide that “*agencies may prepare an environmental assessment on any action at any time in order to assist agency planning and decision making*” (40 CFR 1501.3(b)).

3.1 No Action

The no action alternative being evaluated should be viewed as "no change" from current management direction or level of management intensity. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action (under the existing Master Plan) until that action is changed (under a revised Master Plan). Because master plans provide the basis for evaluating contemporary proposals, the 1980 and 1988 documents do not account for the many substantial changes that have occurred since 1988. The existing master plan is capable of providing only minimal support to development and management of the project. Future development decisions would therefore be assessed on an *ad hoc* basis without the benefit of a comprehensive assessment of recreation and natural resource conditions and opportunities at the project.

Under the no action alternative, development and management of the project area would likely take the same general direction outlined in the proposed updated master plan and therefore, would generally share the same environmental consequences. However, future developments or resource management policies would require approval on a case-by-case basis without the benefit of evaluation in the context of a revised overall plan or analysis in an Environmental Assessment.

3.2 Proposed Action – Approval and Use of the Updated Master Plan

Under this alternative, an updated master plan would be approved for the Project to provide management guidance and would replace the 1980 and 1988 documents. The revised master plan addresses important updates due to the considerable changes in the demographics, recreation demand, amenities within the project, amenities on adjacent properties, current environmental conditions, and pertinent laws and policies. Although the City of Lakewood maintains city-owned property immediately adjacent to the Bear Creek Dam and Lake Project property, the scope of the revised master plan and environmental assessment are limited to actions on the Corps of Engineers’ property. The only exception being the consideration of potential cumulative effects associated with actions off of Corps of Engineers property.

3.2.1 Scope and Objectives of the Updated Master Plan

The master plan provides guidelines and direction for future project development and use and is based on authorized project purposes, Corps of Engineers policies and regulations on the operation of Corps of Engineers' projects (USACE, 1985; USACE, 1996; USACE, 1996a; USACE, 1999), responses to regional and local needs, resource capabilities and suitable uses, and expressed public interests consistent with authorized project purposes and pertinent legislation. The master plan provides a District-level policy consistent with national objectives and other state and regional goals and programs.

3.2.2 Land Allocation, Land Classifications, and Resource Objectives

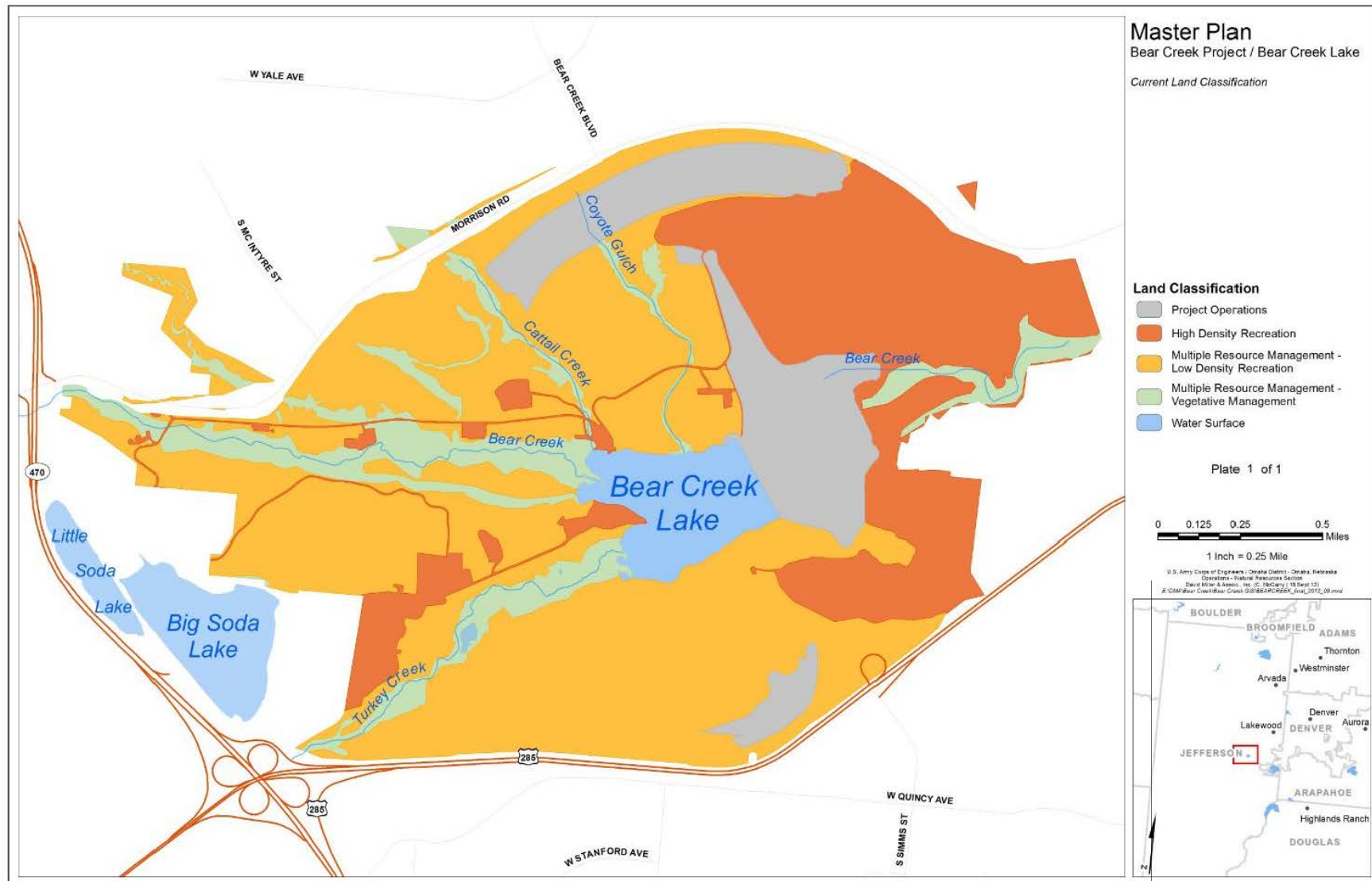
Land allocations at all Corps of Engineers Civil Works water resource projects are based on the Congressionally-authorized purpose for which the project lands were acquired. The Land Classifications and allocated lands and water surface area within the Bear Creek Dam and Lake Project are shown in Table 1 and delineated in Figure 5. A complete description of the land allocations for the Bear Creek Dam and Lake Project are provided in Appendix A.

Table 1
Bear Creek Dam and Lake Project Lands Classification

Classification	Acreage
Project Operations	290
High Density Recreation	540
Multiple Resource Management Lands	1,408
<i>Low Density Recreation</i>	<i>1,149</i>
<i>Vegetative Management</i>	<i>259</i>
Water Surface ²	103
<i>Restricted</i>	<i>2</i>
<i>Designated No-Wake</i>	<i>101</i>
<i>Open Recreation</i>	<i>101</i>
Total Project	2,341

² All Water Surface acreages at multipurpose pool.

Figure 5
Project Operations Lands



3.2.3 Future Development under the Proposed Updated Master Plan

Discussions with the City of Lakewood indicate that as of 2012, there were no plans for development of new major recreational amenities at the Bear Creek Lake Park, including areas within the federal project. Lakewood officials characterize the Bear Creek Lake Park as having reached a “build-out” condition where the existing real estate usage has been maximized. As such, neither the Omaha District, nor the City of Lakewood has plans for major future development at the project.

However, maintaining existing facilities, improving some existing facilities, and protecting the project’s natural areas and natural resources have a number of small-scale actions that would be the proposed future development under the updated master plan. Future improvements could include, but are not limited to:

- Connecting municipal water and sewer to the Bear Creek Lake Park facilities,
- Widening of roads within the project to improve safety for recreational use,
- Repairing and in-kind replacement of portions of the Bear Creek Trail,
- Campground Improvements:
 - Upgrading electrical service for the electrical hook-ups,
 - Constructing a small building for campsite check-in and a sundries store,
 - Installing an additional below-ground 15,000 gallon potable water tank,
 - Planting trees for shade and visual breaks between sites,
- Improving the Group Loop campground, and
- Constructing new restrooms in the Bear Creek Lake Park (Personal Communication, Drew Sprafke).

Limited and preliminary details on the respective potential future development are provided below.

3.2.3.1 Connecting to Municipal Water Supply and Sewage

Currently the City of Lakewood operates the Bear Creek Lake Park using two water supply wells and trucked-in water, the potable water system is gravity fed by two holding tanks (North and South), the sewage systems include composting toilets, a leach field, and removal of wastes via port-a-potty during peak demand.

The City of Lakewood previously evaluated the feasibility and costs of connecting to a municipal water supply. In order to connect and distribute upgraded utilities at the project, new water supply and sewer force main pipes would be installed below grade. Connections would be expected to be tied in the Town of Morrison’s water supply from the western side of the Bear Creek Lake Park as that would likely be the nearest source that would allow connection and distribution with the shortest length of new utility pipe necessary.

New water supply and sewer force main would typically be installed within an existing road or utility right-of-way to avoid undisturbed areas and natural resources within the project. Typical construction would have an approximately two feet wide by four-to-five foot deep trench excavated within the existing, disturbed, right-of-way. As excavation proceeded, the excavated materials would be side cast (i.e., deposited to the side of the trench). Once the new line placement was completed, the trench would typically be backfilled with a layer of crushed aggregate and then the excavated material that had been side-cast would be returned to the trench and compacted to match the pre-existing grade. The ground surface would be re-seeded to facilitate the re-growth of native vegetation.

3.2.3.2 Widening Existing Roads

Widening existing roads within the project would improve public safety for runners, hikers, and cyclists within the Bear Creek Lake Park because it would provide a paved shoulder. The new widening would be expected to add less than seven feet per lane (depending on the selected design width) for both lanes and would be expected to be less than eight miles in total length. Typical construction would include the preparation, placement, and compaction of a sub-base layer, base course, and the surface finished with an asphaltic wearing course. Constructing paved road shoulders would be expected to be completed within the existing rights-of-way and on previously disturbed property.

3.2.3.3 Repair and In-Kind Replacement of Sections of the Bear Creek Trail

The Bear Creek Trail is a 10-foot-wide concrete trail spanning roughly 14 miles across the southern metro Denver area, beginning in the Town of Morrison, and running through Bear Creek Lake Park for six miles and then continuing east through parks, greenbelts and neighborhoods in the cities of Lakewood, Denver and Sheridan. Because of the extent of the trail, it offers easy access to nearby scenic attractions including Bandimere Speedway, Red Rocks Park and Amphitheatre, Dinosaur Ridge, William F. Hayden Park on Green Mountain and Bear Creek Green Belt to the east and Chatfield State Park seven and a half miles to the south. The proposed action would require the repairing and in-kind replacement of portions of the Bear Creek Trail along a six mile section within Bear Creek Lake Park (City of Lakewood, 2012a).

The concrete, multi-purpose trail has suffered extreme cracking in certain areas resulting in a safety hazard for trail users. The project would involve the demolition and reconstruction of roughly 42,000 square feet of concrete along approximately 5,500 linear feet of trail. The portion of trail that runs from Turkey Creek in the southwest section of the park to the Mt. Carbon summit in the southeast has the most damage and would be the highest priority segment for replacement. The project would be completed over a period of 15 months and would require demolition and replacement of cracked concrete as well as soil stabilization for the most severely damaged sections of trail in order to prevent reoccurrence.

Project elements would include site mobilization and pre-construction erosion control at the various sites including temporary signage and site preparation; the demolition and removal of damaged concrete; and base course stabilization including the installation of road base and sand gravel to stabilize the soil beneath the new concrete. Concrete would be poured to a depth of approximately 6-inches with fiber mesh support; after construction was completed, site revitalization would include reseeding along repaired sites.

Because of the seasonal restrictions on placement of concrete, construction would take place in the spring and summer, unfortunately coinciding with the period of high trail use at Bear Creek Lake Park. The City of Lakewood would ensure that the trail remains open during construction to minimize disruption to users and may construct a temporary gravel trail around the construction sites or reroute trail users along an alternate park trail.

3.2.3.4 Campground Improvements

Electrical Service Upgrade – The existing electrical service to the campground (RV and camper hook-ups) would be upgraded to provide more power to the campground. This upgrade would require running new wire to the campground, but the upgrades would not require new trenching. The upgrade would be installed through existing, below-grade conduit. In addition, the upgrade would not be expected to require the construction of a new substation.

Check-In and Sundries Store – Currently, the administrative process for securing a campground is first-come, first-served, with sites issued through a self-serve process. The City of Lakewood would like to construct and operate a small building at the entrance to the campground to facilitate check-in and for the sale of an assortment of camping-related items (e.g., ice, firewood and related camping supplies). The building would likely be a wooden structure on a concrete foundation and a minimum of 10 feet x 10 feet. The structure would most likely be constructed near the entrance to the campground area.

Upgrade of the Existing Campground Water Supply – In addition to the previously-identified connection to municipal water, the City of Lakewood would like to install an additional bulk potable water storage tank (approximately 15,000 gallons) and associated connection infrastructure for the campground. This would provide an additional below ground water storage tank improving the reliability of water supply to the campgrounds during peak demand.

Tree Planting in the Campground – Tree planting in the campground would continue as an ongoing effort to provide a visual break between sites, improve the aesthetics of the campground, and to provide shade for the campsites. Species that would be planted typically include cottonwoods, Rocky Mountain junipers, and a variety of conifers.

3.2.3.5 Group Loop Improvements

Across from the campground sites, the ‘Group Loop’ would have improvements to improve efficiency, better define the camp sites, and plant some new trees. Possible additional improvements include the separation of the area into two group camping sites; installation of shelter structures; new fire rings, tables, grills and tent pad areas; and landscaping improvements.

3.2.3.1 New Restrooms

The City of Lakewood has identified the need for at least three additional restrooms within the Bear Creek Lake Park. These new restrooms would be vaulted privies similar to existing restrooms in the park.³ The general locations for these restrooms would be in proximity to the Pelican Point picnic shelter, a shared unit for the horse stables and archery range area, and off the Corps of Engineers project lands at the Meadowlark Cove picnic shelter.

³ For example, pre-engineered structures from www.romtec.com/.

4 AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act and the Council on Environmental Quality's NEPA Implementing Regulations require that an Environmental Assessment identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. The determination of whether an impact significantly affects the quality of the human environment must consider the context of an action and the intensity of the impacts (40 CFR 1508.27).

The term context refers to the affected environment in which the proposed action would take place and is based on the specific location of the proposed action, taking into account the entire affected region, the affected interests, and the locality. The term intensity refers to the magnitude of change that would result if the proposed action were implemented.

Determining whether an effect significantly affects the quality of the human environment also requires an examination of the relationship between context and intensity. In general, the more sensitive the context (i.e., the specific resource in the proposed action's affected area), the less intense an impact needs to be in order for the action to be considered significant. Conversely, the less intense of an impact, the less scrutiny even sensitive resources need because of the overt inability of an action to effect change to the physical environment. The consideration of context and intensity also must account for the indirect and cumulative effects from a proposed action. This section describes the existing environmental conditions in the project area (affected environment) providing a baseline for measuring expected changes that would result from implementation of the proposed revised Master Plan.

This Section presents the adverse and beneficial environmental effects (direct and indirect) of the proposed action and the No Action alternative. The section is organized by resource topic, with the effects of alternatives discussed under each resource topic. Impacts are quantified whenever possible. Qualitative descriptions of impacts are explained by accompanying text where used.

Qualitative definitions/descriptions of impacts as used in this section of the EA include:

Intensity:

- Minor – noticeable impacts to the resource in the project area, but the resource is still mostly functional,
- Moderate – the resource is impaired, so that it cannot function normally,
- Major – the resource is severely impaired so that it is no longer functional in the project area

Duration

- Short term – temporary effects caused by the construction and/or implementation of a selected alternative, and
- Long term – caused by an alternative after the action has been completed and/or after the action is in full and complete operation.

4.1 Reservoir, Pool, and Lake Operation

4.1.1 Existing Condition

The Bear Creek Dam and Lake Project is regulated for flood control primarily to prevent damage to the metropolitan areas of Denver from floods originating on Bear Creek upstream of the Dam. The developed method of flood control regulation of Bear Creek Lake is classified as Method C, as defined by EM 1110-2-3600. This represents a combination of the concept of reducing downstream damaging stages as much as possible during each flood with the current available storage space, with consideration of control of floods and project design magnitude (USACE, 1977). During flood or apparent flood situations, Bear Creek Lake releases will be reduced to as low as zero in effort to reduce downstream flooding or essential downstream water right requirements as determined by the State of Colorado. Table 2 presents the project's Reservoir Release Schedule.

Table 2
Bear Creek Dam and Lake Release Schedule

Range of Reservoir Elevation in Feet (MSL)	Release Rate (CFS)
5,558.0 - 5,611.5	up to 500
5,611.5 - 5,625.0	1,000
5,625.0 - 5,635.5	1,500
5,635.5 - 5,667.0	2,000

Source: USACE, 1977.

The potential vulnerability of recreational features to various flood frequencies (5-year, 20-year, 50-year, and 100-year) was considered in the original 1980 Master Plan. These flood frequencies and the assertions made remain valid; therein, the Corps of Engineers asserted, *"Recreational facilities, such as roads and parking areas, buildings, and boat ramps, could withstand inundation during the drawdown period with minimal damage"* (USACE, 1980).

4.1.2 Environmental Consequences

4.1.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under "Future Development under the Proposed Updated Master Plan" would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to reservoir, pool, and lake operation occur under no action as they would under the proposed action.

4.1.2.2 Proposed Action

Implementation of the ongoing project management and future development actions proposed under the revised master plan would result in no changes to the Bear Creek Lake Reservoir or

lake operations. Operations are controlled by the project's Reservoir Regulation Manual (USACE, 1977); the revised master plan does not change lake operations.

4.2 Climate

4.2.1 Existing Condition

The climate of the project area is distinctly continental. Located long distances from any moisture source, and separated from the Pacific source by a high mountain barrier, the area experiences light rainfall, low relative humidity, a large daily range in temperature, high daytime temperatures in summer, a few protracted cold spells in winter, moderately high wind movement, and a high percentage of sunshine. Temperatures of 95-degrees F or higher are common during the summer months and the lowest temperatures are approximately 25 degrees below zero. The mean annual precipitation is approximately 17 inches and approximately 70-percent of the annual precipitation falls in the six-month period from April through September; much of the rainfall is from intense isolated summer thunderstorms (USACE, 1977).

4.2.2 Environmental Consequences

4.2.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under "Future Development under the Proposed Updated Master Plan" would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to climate would occur under no action as they would under the proposed action.

4.2.2.2 Proposed Action

There would be no environmental consequences of implementing the new master plan or future actions within the new master plan on the climate in the project vicinity.

4.3 Air Quality

4.3.1 Existing Condition

The U.S. Environmental Protection Agency (USEPA) Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen (O₃) are combined by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

As part of the greater Denver metropolitan area, the project is located in the South Platte River drainage area, with mountains located to the west and relatively high terrain to the south and north. Under certain meteorological conditions, the local topography has the tendency to trap

pollutants resulting in elevated ambient concentrations. The pollutants can be trapped under strong inversions that inhibit dispersion and cause poor air quality (FHA, 2009).

Jefferson County is in attainment/maintenance for PM-10 and CO, and is designated nonattainment for the 8-hour O₃ standard. It is currently in attainment for the remaining criteria pollutants (USEPA, 2012).

4.3.2 Environmental Consequences

4.3.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to air quality would occur under no action as they would under the proposed action.

4.3.2.2 Proposed Action

Air quality would not be predicted to change from existing conditions as the effects of implementing the updated master plan and any of the future development actions on air quality would be minimal. There would be some localized and temporary emissions associated with construction of new or improved amenities (e.g., utility trenching, road paving, supplying asphalt/concrete, excavation). Emissions from construction actions would typically include byproducts of diesel and gasoline combustion, fugitive dust, and vapors from asphalt paving. The emissions associated with equipment operation and construction would be localized, of relatively short duration, and would occur when building any of the features described in the Future Development under the Proposed Updated Master Plan.

Although the Bear Creek Dam and Lake Project is within a non-attainment zone for the 8-hour ozone standard, the small scale of the Future Development projects would likely lead to them being exempt from air permitting requirements. According to the State of Colorado’s General Construction Permit requirements for Land Development Projects, “*Land development activities that are less than 25 contiguous acres and less than six months in duration are exempt from permitting and do not need to report air emissions to the Division*” (CDPHE, 2009).

4.4 Topography, Geology, and Soils

4.4.1 Existing Condition

The Bear Creek Dam and Lake Project is set in the foothills of the Colorado Front Range⁴ within the Great Plains physiographic province with elevations ranging from approximately 5,558 feet at the Bear Creek Lake to the top of Mount Carbon at approximately 5,779 feet. The foothills of the Colorado Front Range are regionally known as “hogbacks” and were created through folding, faulting, and uplifting of the sedimentary layers adjacent to the mountains. Sloping eastward

⁴ The Colorado Front Range is a colloquial geographic term for the area of transition from the western edge of the Great Plains to the Rocky Mountains. Aligned in a north-south configuration, the region lies mostly within the Colorado Piedmont, in the valley of the South Platte and Arkansas rivers on the east side of the Rockies.

from the hogbacks are flat tablelands called Piedmonts that are composed of coarse alluvium and separated from each other by flat bottomed valleys. Bear Creek and Turkey Creek flow eastward across the area in valleys that cut through the elevated alluvium and other formations.

The project area has been influenced by the erosion of softer and less resistant sedimentary rocks along the mountain front. The parent materials of the rolling hills are mostly Upper Cretaceous in age resulting in secondary accumulation of calcium carbonate indicating relative stability with respect to erosion. Piney Creek alluvium along the low terraces is Holocene in age and rock fragments in this area have igneous or metamorphic lithology with some fluvial stratification. In the wetlands and streambeds along Bear Creek, the Post-Piney Creek Alluvium from the Holocene age has created a high proportion of silt mixed with sand and loam (Harner & Associates, 1990).

Most of the soils at the Bear Creek Dam and Lake Project are well drained and range in texture from a cobbled sandy loam through a clay loam. Most surficial soils are underlain by significant gravel deposits; at some time prior to the construction of the project, large areas of the project lands had been disturbed through gravel mining operations. In general, surficial topsoils are very thin and mostly inadequate for healthy plant growth especially in areas that were mined for gravel and did not have topsoil replacement.

4.4.2 Environmental Consequences

4.4.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to topography, geology, and soils would occur under no action as they would under the proposed action.

4.4.2.2 Proposed Action

Prior to construction of any of the new or improved future development features, best management practices would be deployed (e.g., use of silt fences) to minimize erosion and soil loss, when appropriate. As a result of the reasonable use of best management practices, minimal effects would be predicted to topography, geology, and soils from implementing the new master plan or future actions within the new master plan.

4.5 Surface Water Hydrology and Groundwater

4.5.1 Existing Condition

The Bear Creek watershed is a specific geographic area and includes all tributary water flows that discharge into Bear Creek Lake. The watershed extends from the Mount Evans Wilderness on the western end to the Town of Morrison on the eastern end; the two major tributaries are Bear Creek and Turkey Creek.

In 2010, the total estimated discharge into Bear Creek Reservoir was approximately 29,627 acre-feet with approximately 29,462 acre-feet flow through and 166 acre-feet of evaporation. Flow contribution to the lake from Bear Creek and Turkey Creek are estimated at approximately 72-

percent and 28-percent respectively. Upstream of the Bear Creek Lake, Bear Creek has flow diverted at the Arnett-Harriman Ditch in Morrison during the irrigation season (BCWA, 2011).

An evaluation of the diversion’s influence on Bear Creek downstream of the diversion (including Bear Creek Lake) examined data from 1999-2007 (BCWA, 2011). As shown in Table 2, during that eight year period, there were a total of 2,591 days where the diversion operated leaving only 329 days (approximately 11-percent) over the eight year period when water wasn’t diverted from the Bear Creek. Over the eight year period of assessment, operation of the Arnett-Harriman ditch reduced flows in lower Bear Creek below 10 cubic feet per second (cfs) about 28-percent of the time (Table 3). According to the operational allowances, the ditch systems can dewater lower Bear Creek to less than five cfs for periods of up 11 consecutive days; in 2010, lower Bear Creek was dewatered to less than five cfs flow for 50 days or almost 14-percent of the time. The cumulative effect of water diversion for 2010 was a reduction of flow into Bear Creek Lake of approximately 2,200 acre-feet or 7.4-percent of the 29,627 acre-feet of estimated total discharge into the Bear Creek Reservoir.

Table 3
Diversion of Bear Creek by the Arnett-Harriman Ditch (1999-2007)

Total Days (Eight Years)	Number of Days < 10 cfs	Number of Days < 2.5 cfs	Number of Days < 1 cfs	Number of Days < 0 cfs
2,920	813	350	172	85
Percent of Days	28	12	6	3

Source: (BCWA, 2011)

The elevation of the groundwater fluctuates seasonally. In the spring, recharged by snowmelt and precipitation, the depth of the water table along the tributary streams (e.g., Bear Creek, Turkey Creek) is approximately 5-10 feet. South of Morrison Road, the depth to the groundwater table is typically 10-20 feet. Seasonal and annual fluctuations in the groundwater table elevation along Bear Creek are relatively small because of the hydraulic connection between the perennial stream and water-table; during the dry season, Bear Creek may become a losing stream (Harner & Associates, 1990).

4.5.2 Environmental Consequences

4.5.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the Project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to surface water hydrology or groundwater would occur under no action as they would under the proposed action.

4.5.2.2 Proposed Action

There would be no environmental consequences of implementing the new master plan or future actions within the new master plan expected on the surface water hydrology or groundwater of the Project.

4.6 Sedimentation and Tributary Erosion

4.6.1 Existing Condition

At the time of original construction, more than 50-percent of the Project lands were disturbed and required topsoil and seeding. The current Project lands are maintained as short grass habitat limiting the extent of erosion. In the early 1990s, the Corps of Engineers reported that 1.2 million kg/year (1,323 tons) of suspended solids reached Bear Creek Lake on an annual basis, but that a large amount of this material passed through the lake and was deposited downstream. The sediment load was derived from basin erosion associated with development, highway construction (at the time), and stream bank erosion and there had not been significant infilling in the central pool (USACE, 1991). At the time of construction, the sediment reserve created for the Bear Creek Lake was 2,000 acre-feet of storage (USACE, 1980).

In 2007-2008, the Urban Drainage and Flood Control District, Jefferson County, the City of Lakewood, and the Omaha District conducted a stream-bank stabilization project on Coyote Gulch. Within the Bear Creek Dam and Lake Project lands, the channel was “*severely incised with a persistent and unstable erosion problem.*” The project consisted of stream stabilization and erosion control with seven drop structures; the end goal was to reduce sediment flow and to improve water quality by diminishing phosphorus flow into Bear Creek Lake (USACE, 2006).

Construction was completed in 2007 with vegetation seeded after construction “*well established*” by 2008. In order to examine the project’s efficacy, the Bear Creek Watershed Association (BCWA) conducted a paired water-sampling program, allowing the evaluation of the effectiveness of the restoration effort. Under this monitoring program, the BCWA monitored flow and limited chemistry from March 2006 through 2010 in Coyote Gulch. Prior to construction, the average monthly base load of total phosphorus was about 20 pounds per month with specific storm loading events exceeding 100 pounds. After completion of the project, the monthly average base load of total phosphorus was reduced approximately 60-88-percent (BCWA, 2011).

4.6.2 Environmental Consequences

4.6.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects from sedimentation and tributary erosion would occur under no action as they would under the proposed action.

4.6.2.2 Proposed Action

Prior to construction of any of the new or improved future development features, best management practices would be deployed to minimize erosion and sedimentation in Bear Creek Lake. As a result of the reasonable use of best management practices, minimal effects would be predicted to sedimentation and tributary erosion from implementing the new master plan or future actions within the new master plan.

4.7 Water Quality and Aquatic Habitat

4.7.1 Existing Condition

The Bear Creek Watershed Association is the local water quality agency responsible for monitoring and tracking water quality in the Bear Creek Watershed; the BCWA publishes an annual report. The Association membership includes counties, local general-purpose governments, special districts (wastewater dischargers), associate agencies, and local citizen groups. The BCWA maintains a website⁵ that provides extensive data and water quality reporting for Bear Creek as well as the Bear Creek Lake.

The watershed-monitoring program characterizes nutrient loading into Bear Creek Reservoir from two primary drainages: Bear Creek and Turkey Creek. Parameters measured and reported include total phosphorus, dissolved phosphorus, and nitrate-nitrite nitrogen on a monthly basis, and for total nitrogen in the Bear Creek Reservoir from July-September, and below the reservoir.

The total phosphorus load from the watershed comes from a combination of wastewater treatment plant point source loads and nonpoint sources, including runoff. In addition, there are over 27,000 septic systems in the watershed. The estimated total phosphorus load in 2010 from all sources reaching the reservoir was 3,654 pounds with the Bear Creek drainage contributing approximately 72-percent of the load. The estimated nitrate loading (47,868 pounds) was typical of past flow conditions with approximately 77-percent of the load coming from Bear Creek. Although the point source discharges of total phosphorus were about 1,120 pounds, the water diversions above the reservoir divert a portion of this phosphorus in the flow before it reaches the reservoir.

Various management actions have been implemented to achieve reduction of total phosphorus reaching the reservoir on an annual basis. In the early 1990s, Bear Creek Lake was described as having a *“trophic status that ranges from eutrophic to hypertrophic...caused by excessive loadings of phosphorus and nitrogen in the water which result in algal blooms throughout the growing season and under ice conditions”* (USACE, 1991). Since the early 1990s, the concentration of total phosphorus inflow from both Bear Creek and Turkey Creek has declined from between 200-400 micrograms per liter to typically less than 50. The short-term trends for annual nitrate inflow indicate a pattern of fluctuation since the early 1990s with no clear long-term trend.

Generally, the reservoir trophic state in 2010 was eutrophic. Although external nutrient loads were lower than historic trends, the reservoir continues to have an internal nutrient loading problem, which causes eutrophic water quality conditions. The Colorado Department of Public

⁵ BCWA site at: www.bearcreekwatershed.org.

Health and Environment has listed the Bear Creek Reservoir (Section 303(d)) for impaired use for cold-water aquatic life with parameters of concern being chlorophyll a and phosphorus.

As a water quality enhancement/best management practice, the City of Lakewood has operated and maintained an in-lake aeration treatment system since the early 1990s (BCWA, 2003). The first iteration was a hypolimnetic aeration system (1993) was modified to a Dura-Venturi system in 1999, and finally the current Lakebed Aeration System was installed in 2002. The 2002 aeration system increases the amount of dissolved oxygen in the water column to protect the existing fishery. There have been no comprehensive surveys of the submerged aquatic vegetation or benthic community in Bear Creek Lake with which to describe or characterize the existing condition.

The original aeration system was designed to oxygenate the water column through a series of anchored towers, but the hypolimnetic aeration system didn't de-stratify the water column. Beginning in 2002 the modified aeration system began to structurally fail from continued freezing in the winter. Consequently, the City of Lakewood installed a new complete aeration system in early fall of 2002 providing greater coverage throughout the reservoir and improved oxygen transfer potential. In 2010, operational studies were conducted to evaluate the aeration system's efficacy in oxygen transfer during phased on-off cycling. Results of the testing indicate that the aeration system can increase the dissolved oxygen concentrations throughout the water column by about 2 mg/l within a two-week period (BCWA, 2011).

Bear Creek Lake Park is involved in Colorado efforts to stop the spread of aquatic nuisance species in Colorado waters, particularly zebra (*Dreissena polymorpha*) and quagga (*Dreissena rostriformis bugensis*) mussels. These species can have a dramatic effect on the ecology of a fishery and on water control structures. Boat inspections are required for all trailered boats, motorized boats, sailboats and fishing boats prior to launching on Bear Creek Lake. Boats that typically would not need inspection include non-motorized bellyboats, rafts, canoes, kayaks, paddleboards, and windsurfers. A watercraft inspection and decontamination station is located in the Whitetail parking lot where all trailer and motorized boats require inspection by state certified inspectors at the station for any aquatic species. Park staff did more than 2,280 standard inspections during 2011 and had no positive samples (Personal Communication, Tim Rose).

Within the Project, Bear Creek flows for approximately two miles before flowing into Bear Creek Lake. Because of the inconsistent surface flow (described in Section 4.5.1, Surface Water Hydrology and Groundwater), there is insufficient flow to support a trout fishery and this section of Bear Creek is not stocked.

4.7.2 Environmental Consequences

4.7.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under "Future Development under the Proposed Updated Master Plan" would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to water quality and the aquatic habitat would occur under no action as they would under the proposed action.

4.7.2.2 Proposed Action

Under the proposed action, future development under the proposed master plan would occur without discernible effects to the water quality or the aquatic habitat of Bear Creek Lake or its tributaries. Although construction activities would result in ground-surface disturbances that could increase runoff and diminish water quality (e.g., Bear Creek Trail repair/replacement, new restrooms), best management practices during construction would be expected to minimize the potential for deleterious effects. After construction was completed, re-seeding and re-vegetation would be performed to minimize erosion losses and protect surface soils. The existing water quality in Bear Creek Lake is a result of factors substantially unrelated to the management actions on Project lands and results from land use and discharges to the watershed upstream from Bear Creek Lake. In addition, programs conducted by the City of Lakewood to stop the spread of aquatic nuisance species into Bear Creek Lake would continue as currently implemented.

4.8 Terrestrial Habitat

4.8.1 Existing Condition

The Bear Creek Dam and Lake Project contains two primary terrestrial habitat types: short grass prairie in the uplands and riparian woodland along the surface drainage channels. In the 1971 Final EIS (USACE, 1971), when the Project was constructed vegetation was characterized as “*haven been impacted by horse and cattle overgrazing and consisting mostly of weedy grasses and annual forbs*” (USACE, 1991). After construction in 1977, much of the Project lands were graded and reseeded with dryland grasses (short grass prairie species) in order to reduce and control erosion. There are several miles of riparian corridor along Bear Creek, Turkey Creek, Cattail Creek, and Coyote Gulch that meander through short grass prairie before flowing into Bear Creek Lake. Figure 6 depicts the locations of these habitats within the Project area.

The upland vegetation of the area includes short grass prairie including species such as smooth brome (*Bromus inermis*) little bluestem (*Schizachyrium scoparium*) western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), side-oats grama (*Bouteloua curtipendula*), needle and thread grass (*Hesperostipa comata*), and the exotic Canada thistle (*Cirsium arvense*) (USACE, 2006). Small areas of native shrubs occur on the crests of hills where the soil was too thin for cultivation and include true mountain mahogany (*Cercocarpus montanus*) and rabbitbrush (*Chrysothamnus viscidiflorus*).

Plains cottonwood (*Populus deltoides occidentalis*), box elder (*Acer negundo*), and sandbar willow (*Salix exigua*) are the most abundant woody plant species within the Bear Creek, Turkey Creek, and Coyote Gulch riparian corridors (Harner & Associates, 1990). The composition of the riparian corridor understory species includes chokeberry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), and snowberry (*Symphoricarpos albus*) (Harner & Associates, 1990).

4.8.1.1 Noxious Weed Management

As shown in Figure 7, the City of Lakewood maps the locations of noxious weeds within the Bear Creek Lake Park and utilizes a number of different methods of control under their overall noxious weed management program. Fire ecology for short grass prairie indicates that burns happened in intervals from every one to six years. However, fire suppression since the early 1900s has interfered with prairie fire’s natural periodicity. Native species evolved adapting to frequent burns; conducting prescribed burns within the Project lands helps to remove dense

Figure 6
Terrestrial Habitat of the Bear Creek Dam and Lake Project

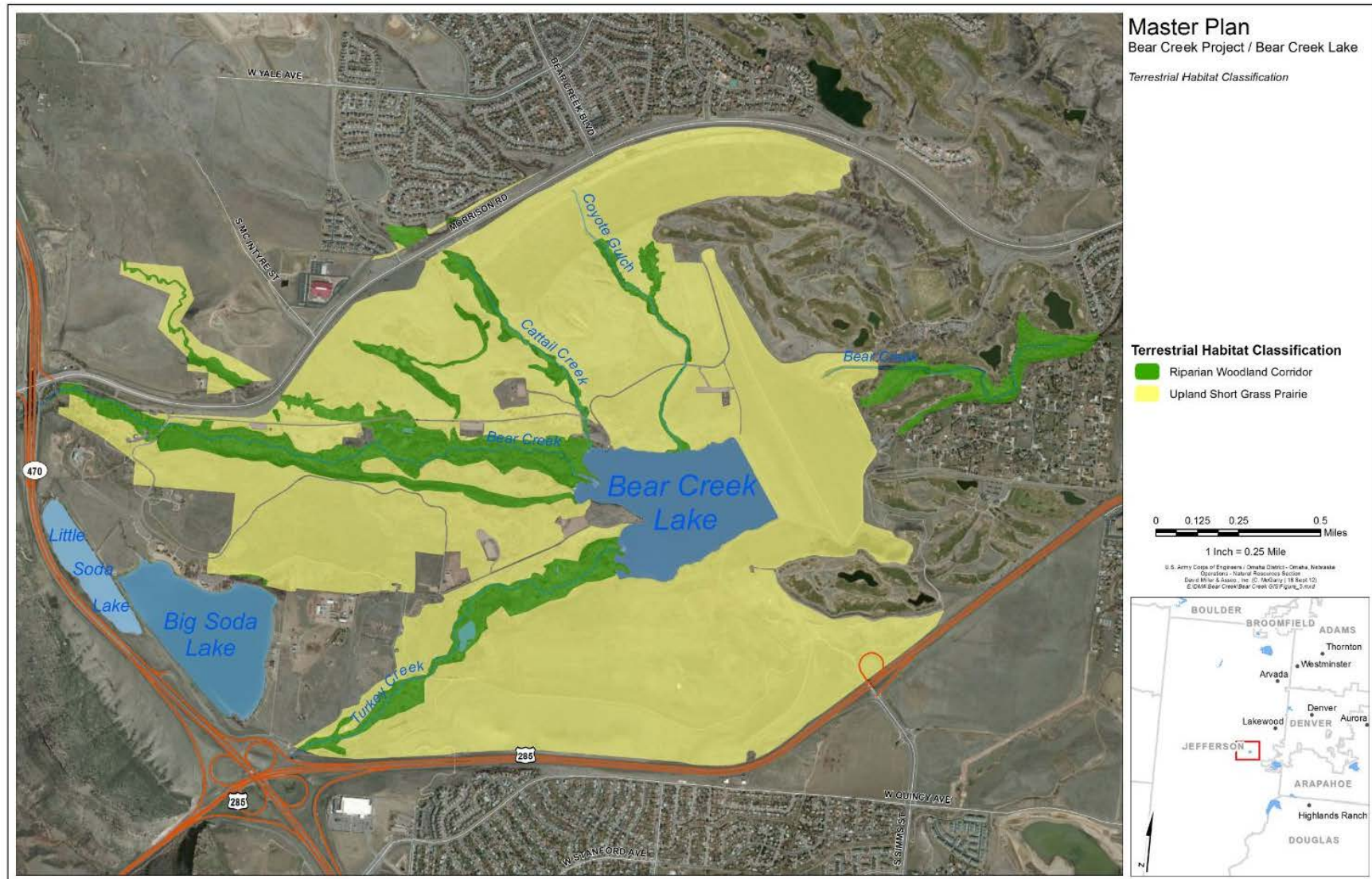
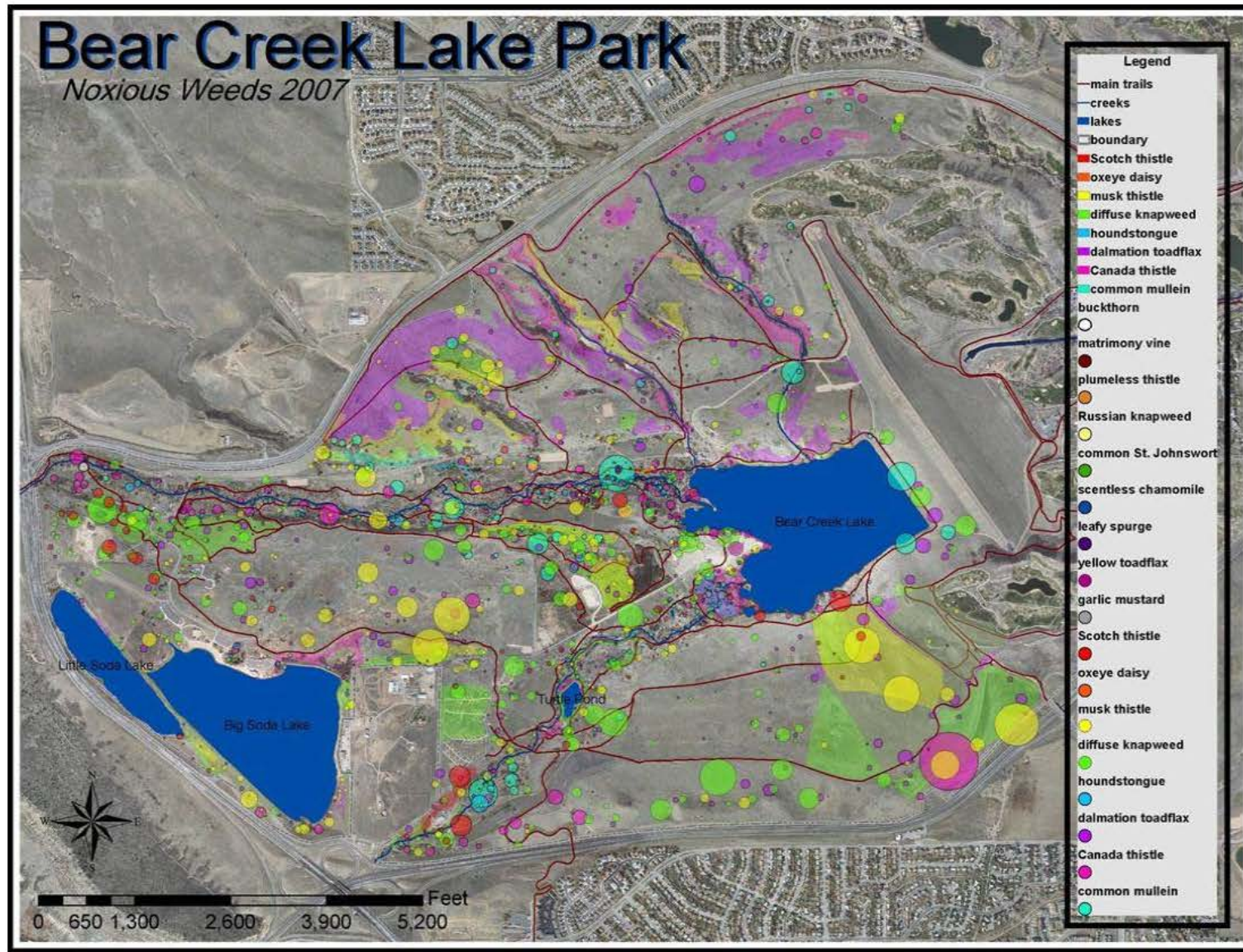


Figure 7
Noxious Weeds at the Bear Creek Lake Park (2007)



cover, replaces nutrients in the soil, and restores an important natural process to the habitat. Historically, burn cycles occurred in the late summer and early fall when temperatures are high and the vegetation is dry. As shown in Figure 8, the City of Lakewood has been conducting prescribed burns on areas within Bear Creek Lake Park; noxious weeds have declined significantly in areas where this practice has been used (City of Lakewood, 2012). Lands classified as Project Operations (e.g., spillway, dam, etc.) are excluded from controlled burns as part of the weed management program.

Figure 8
Prescribed Burn at Bear Creek Lake Park



4.8.2 Environmental Consequences

4.8.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to the terrestrial habitat would occur under no action as they would under the proposed action.

4.8.2.2 Proposed Action

Under the proposed action, future development under the proposed master plan would occur in or immediately adjacent to areas already designated as “High Density Recreation” use or within

previously disturbed road or utility rights-of-way. As such, adding to or improving existing infrastructure as well as repairing or in-kind replacement of recreational amenities would occur with minimal effects to the terrestrial habitat of Bear Creek Dam and Lake Project. In addition, the City of Lakewood would continue to implement their vegetation management program within the Bear Creek Lake Park for the control of noxious weeds (City of Lakewood, 2011b).

4.9 Wetlands

4.9.1 Existing Condition

In the early 1990s the City of Lakewood delineated 13.4 acres of jurisdictional wetlands within the Bear Creek Lake Park (AWC, 1990). Riparian wetlands adjacent to Bear Creek and other tributaries comprised 12.9 of the total 13.4 acres and wetlands occurring along the bottoms of drainage swales accounted for the remaining 0.46 acres. The riparian wetlands were classified as scrub-shrub, palustrine and the swale wetlands were classified as emergent palustrine according to Cowardin et al. (1979).

4.9.2 Environmental Consequences

4.9.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to wetlands would occur under no action as they would under the proposed action.

4.9.2.2 Proposed Action

There would be no environmental consequences of implementing the new master plan or future actions within the new master plan on the wetlands on Project lands. Site selection and best management construction practices for the future development would be implemented to avoid direct or indirect effects to wetlands.

4.10 Fish and Wildlife

4.10.1 Existing Condition

The fish and wildlife resources of the Bear Creek Dam and Lake Project have been described and documented previously (USACE, 1971; USACE, 1977; USACE, 1980; USACE, 1991). The occurrence and abundance of wildlife within the Project are determined by the types, distribution, and interspersions of major plant communities; connectivity to similar habitat types off Project lands; and the land uses within and adjacent to the Project. The three most abundant habitats for fish and wildlife at the Project are the upland short grass prairie, riparian woodland along and including the surface drainage channels, and the aquatic habitat of Bear Creek Lake.

Riparian habitat supports a higher diversity of wildlife year-round than any other habitat in the Front Range and these riparian habitats also provide corridors that link habitat patches and wildlife populations allowing movement through urban matrix (CDOT, 2004). The occurrence and abundance of wildlife at the Project is strongly influenced by the extent of urban

development that nearly surrounds the Project as well as the extensive use by the public for recreation.

4.10.1.1 Fish

The State of Colorado Division of Parks and Wildlife has conducted an extensive stocking program at Bear Creek Lake since the inception of the Project (USACE, 1980; USACE, 1988). Since 1977, nearly 2.3 million fish have been stocked in Bear Creek Lake (Colorado Division of Parks and Wildlife, 2012). Rainbow trout and saugeye (walleye x sauger) are the most abundantly stocked, but do not naturally reproduce in the lake; these fisheries are considered “put-and-take” and “put-grow-and-take” fisheries, respectively (Personal Communication, Paul Winkle). Although slightly fewer than 50,000 smallmouth bass have been stocked into Bear Creek Lake, they are abundant in surveys and their diverse size classes indicate natural reproduction is occurring in Bear Creek Lake.

4.10.1.2 Birds

The extensive short grass prairie within the Project lands lead to relatively low species diversity and abundance of breeding birds (USACE, 1991). Characteristic songbirds include black billed magpie (*Pica hudsonia*) western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), savannah sparrow (*Passerculus sandwichensis*), and vesper sparrow (*Pooecetes gramineus*). The riparian woodland supports a larger number of species and abundance even though the cover type has so many fewer acres within the Project (USACE, 1991). The habitat would be expected to support more than 40 different species of breeding birds on an annual basis including lazuli bunting (*Passerina amoena*), blue-gray gnatcatcher (*Polioptila caerulea*), gray catbird (*Dumetella carolinensis*), and yellow-breasted chat (*Icteria virens*)(CFO, 2006). The presence of surface water, greater plant structural complexity (i.e., trees, shrubs, forbs), and a diversity of plant species lead to the greater avian community diversity in the riparian corridor (USACE, 1991).

In 2007 a listing of the birds of the Bear Creek Lake Park was compiled to summarize the avifauna observed at the Project (Henwood, 2007). The list includes over 225 species that have been observed; the majority of these species are neither permanent resident birds nor do they breed on Project lands, but were observed utilizing the habitat during migration.

4.10.1.3 Mammals

Mammalian wildlife observed at the Project include: mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), desert cottontail rabbit (*Sylvilagus audubonii*), black-tailed prairie dogs (*Cynomys ludovicianus*), raccoon (*Procyon lotor*), red squirrel (*Tamiasciurus hudsonicus*), striped skunk (*Mephitis mephitis*) and beaver (*Castor canadensis*). The ability to thrive within a disturbed habitat in close proximity to human environments is characteristic of the commonly-observed mammal species at the Bear Creek Dam and Lake. Very rarely have black bears (*Ursus americanus*) or mountain lion (*Puma concolor*) been observed in the park (Personal Communication, Drew Sprafke).

4.10.1.4 Nuisance Species Management

The City of Lakewood has management plans for the control of certain wildlife species that—because of their potential for human-wildlife conflict or potential to damage property at parks--

are the subject of management actions. These plans and the associated actions at the Bear Creek Lake Park are ongoing and include measures to address the various problems with beavers, black-tailed prairie dogs, coyotes, and Canada geese (City of Lakewood, 2011b).

4.10.2 Environmental Consequences

4.10.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to fish and wildlife resources would occur under no action as they would under the proposed action.

4.10.2.2 Proposed Action

Under the proposed action, future development under the proposed master plan would occur in or immediately adjacent to areas already designated as “High Density Recreation” use or within previously disturbed road or utility rights-of-way. As such, adding to or improving existing infrastructure as well as repairing or in-kind replacement of recreational amenities would occur with minimal effects to the aquatic or terrestrial habitat and would therefore have minimal effect on the fish and wildlife resources. In addition, the City of Lakewood would continue to implement their ongoing wildlife management program within the Bear Creek Lake Park (City of Lakewood, 2011b).

4.11 Listed Species

4.11.1 Existing Condition

Except for the occasional transient species, no federally listed endangered, threatened, or candidate species under USFWS jurisdiction are known to exist in the Project area. The following species are addressed because of their high profile history of review in the region.

Black Footed Ferret (*Mustela nigripes*) – Listed Endangered

The presence of black-tailed prairie dogs at the Bear Creek Dam and Lake Project raises questions about the potential for the presence of the endangered black-footed ferret. The black-footed ferret is one of the most endangered mammals in North America. Initially protected under the Endangered Species Protection Act in 1967 and later under the Endangered Species Act in 1973, as many as 5.6 million black-footed ferrets may have existed in the Great Plains in the late 1800s (USFWS, 1988). Black-footed ferret populations declined drastically in the 1900s, primarily because of the eradication of prairie dogs – their main source of food. The decrease of prairie dog numbers are a result of habitat loss, disease, and purposeful elimination because of grazing conflicts with livestock and feeding on winter wheat crops. Black-footed ferrets also rely on prairie dogs burrows for protection and cover.

Black footed ferret surveys conducted in 1990 concluded, “*We did not find any single sign, or combination of signs, to indicate presence of black footed ferrets on any of the colonies searched. It is highly unlikely, due to the human traffic in the park, vehicular traffic nearby, and*

people living in adjacent to the prairie dog colonies that ferrets would not be killed on the roads...or be observed in the Bear Creek Lake Park area” (RMWS, 1990).

Preble’s Meadow Jumping Mouse (*Zapus hudsonius preblei*) – Listed Threatened

The U.S. Fish and Wildlife Service (Service) has designated a Denver Metropolitan Area Block Clearance Zone for the federally-threatened Preble's meadow jumping mouse, *Zapus hudsonius preblei* (Preble's) (USFWS, 2004)

In designating a block clearance zone, the Service eliminates the need for agencies to coordinate with the Service prior to conducting activities in habitats that otherwise would be deemed to have the potential to support Preble's. The establishment of this block clearance zone is based on the likely absence of Preble's within the area, and little likelihood that any of the area would be of importance in any future plan to recover the species. The entire Bear Creek Dam and Lake Project is within the block clearance zone (USFWS, 2010).

Platte River Recovery Implementation Program

In 2007, the USFWS, Mountain-Prairie Region established information for project proponents in Colorado relative to their potential effects on four federally-listed species (i.e., ‘target species’) within the Platte River Basin. The four federally-listed species that have been the focus are the whooping crane (*Grus americana*), the northern Great Plains population of the piping plover (*Charadrius melodus*), the interior least tern (*Sternula antillarum*), and the pallid sturgeon (*Scaphirhynchus albus*) (USFWS, 2007). Under the program, a streamlined consultation process was established and utilizing a programmatic biological opinion of June 16, 2006 (USFWS, 2006).

4.11.2 Environmental Consequences

4.11.2.1 No Action

No changes to the listed species resources of the Project would be predicted as a result of implementing the no action alternative.

4.11.2.2 Proposed Action

Listed Species Effects Determination

The black footed ferret (*Mustela nigripes*) has not been found within the Bear Creek Dam and Lake Project lands and would not be likely to occur within Project lands in the future.

The finding is a determination of no effect to the black-footed ferret.

The Preble's meadow jumping mouse (*Zapus hudsonius preblei*) has not been observed at the Project; in addition, the entire Project is within an area that the USFWS has designated as the Denver Metropolitan Area Block Clearance Zone (USFWS, 2010).

The finding is a determination of no effect to the Preble's meadow jumping mouse.

The whooping crane (*Grus americana*), the northern Great Plains population of the piping plover (*Charadrius melodus*), the interior least tern (*Sternula antillarum*), and the pallid sturgeon (*Scaphirhynchus albus*) have not been observed ever to use the Bear Creek Dam and Lake Project. The USFWS policy is that water-related activities in the Platte River basin resulting in

less than 0.1 acre-foot/year of depletions in flow to the nearest surface water tributary to the Platte River system have an insignificant effect on the Platte River four target species, and thus do not require consultation with the USFWS for potential effects on those species (USFWS, 2007). There are no changes to the operations of the Bear Creek Dam and Lake Project as part of the proposed master plan and future development actions. As such, there would be no effects to the Platte River target species and no consultation with the USFWS would be required regarding the target species.

The finding is a determination of no effect to the whooping crane, piping plover, interior least tern, and pallid sturgeon.

4.12 Demographics and Environmental Justice

4.12.1 Existing Condition

Located in Jefferson County, the City of Lakewood is a western suburb of Denver. At roughly 44 square miles, Lakewood is Colorado's fifth largest city and shares its boundaries with the cities of Denver, Littleton, Golden, Wheat Ridge, Morrison, and Edgewater. The 2010 Census reported 142,980 residents and families represent 26-percent of the city's residents of which 21-percent are children under the age of 18. Older adults age 60 and older comprise 18-percent of Lakewood's population.

Table 4 shows the population changes to the communities surrounding the Bear Creek Dam and Lake Project and that utilize the Bear Creek Lake Park. From 1980 through 2010, the increase in population has been substantial with the City of Denver adding more than 100,000 residents and Jefferson County adding more than 160,000 residents over the 30-year period.

Table 4
Population Characteristics in the Bear Creek Lake Vicinity

Community	Population				Population Growth 1980-2010	Percent Increase 1980-2010
	1980	1990	2000	2010		
Applewood	319	11,069	7,123	7,160	6,841	2,145
Columbine	1,801	23,969	24,095	24,280	22,479	1,248
Golden	11,314	13,116	17,159	18,867	7,553	67
Ken Caryl	10,661	24,391	30,887	32,438	21,777	204
Lakewood	113,080	126,481	144,126	142,980	29,900	26
Littleton	28,503	33,685	40,340	41,737	13,234	46
Morrison Town	405	465	430	428	23	6
Sheridan	541	4,976	5,600	5,664	5,123	947
Jefferson County	371,753	438,430	527,056	534,543	162,790	44
Denver	492,365	467,610	554,636	600,158	107,793	22
Colorado	2,889,735	3,294,394	4,301,261	5,029,196	2,139,461	74

4.12.1.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations (Executive Order, 1994), directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low-income populations. When conducting NEPA evaluations, the Corps of Engineers incorporates Environmental Justice (EJ)⁶ considerations into both the technical analyses and the public involvement in accordance with the USEPA and the Council on Environmental Quality guidance (CEQ, 1997).

The CEQ guidance defines “minority” as individual(s) who are members of the following population groups: American Indian or Alaskan native, Asian or Pacific Islander, Black, not of Hispanic origin, and Hispanic. The Council defines these groups as minority populations when either the minority population of the affected area exceeds 50-percent of the total population, or the percentage of minority population in the affected area is meaningfully greater than the

⁶ EJ definition at <http://www.epa.gov/environmentaljustice/>

minority population percentage in the general population or other appropriate unit of geographical analysis.

Low-income populations are identified using statistical poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty (USCB, 2010). In identifying low-income populations, a community may be considered either as a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The threshold for the 2010 census was an income of \$10,956 for an individual and \$21,954 for a family of four (USCB, 2010). This threshold is a weighted average based on family size and ages of the family members.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations," issued in 1994, directs federal and state agencies to incorporate environmental justice as part of their mission by identifying and addressing the effects of all programs, policies and activities on minority and low-income populations. Compliance with Executive Order 12898 on EJ requires an evaluation of the nature of the proposed actions and the human context into which those actions would be undertaken. In order to have potential EJ impacts, a proposal must have potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Native American tribes.

In addition to Executive Order 12898, the EJ analysis is being developed per requirements of "Department of Defense's Strategy on Environmental Justice." Per the above directives, EJ analyses identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of the project on minority and low-income populations. The methodology to accomplish this includes identifying low-income and minority populations within the study area, as well as community outreach activities such as stakeholder meetings with the affected population.

The median household income in Lakewood is \$52,960, well below that of Jefferson County at \$66,075, and greater than that of Denver at \$45,501. The 2010 Census also states that 11-percent of Lakewood residents have an annual income below the federal poverty level. Table 5 shows the 2010-estimated population and the ethnic mix (as a percentage) for communities surrounding the Bear Creek Dam and Lake Project. The City of Lakewood is an ethnically diverse city with Hispanic residents comprising approximately 22-percent of total residents, making up the area's second highest demographic group with Caucasians constituting about 83-percent of the population (USCB, 2012).

Table 5
Race and Poverty Characteristics in the Bear Creek Lake Vicinity

Percent of Race and Poverty (2010)						
Community	Caucasian	Black	American Indian - Alaskan Native	Asian	Two or More Races	Percent Below Poverty Level (2010)
Applewood	93.5	0.6	0.8	1.6	2.2	5.5
Columbine	92.5	0.6	0.6	2.0	2.3	3.8
Golden	90.6	1.2	0.6	3.8	2.3	16.5
Ken Caryl	91.8	0.8	0.5	2.2	2.6	3.8
Lakewood	82.9	1.6	1.4	3.1	3.3	11.7
Littleton	89.0	1.4	0.8	2.2	2.6	11.0
Morrison	97.4	0.0	0.7	0.7	0.2	5.5
Sheridan	72.5	2.8	2.0	1.7	5.2	22.7
Jefferson County	88.4	1.1	0.9	2.6	2.7	8.0
Denver	68.9	10.2	1.4	3.4	4.1	19.2
Colorado	81.3	4.0	1.1	2.8	3.4	12.2

4.12.2 Environmental Consequences

4.12.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. Under the no action alternative, the trends of growth of population observed in the recent years surrounding the Project would be expected to continue, but at a slower rate of growth given the extent to which the human environment has been built out. There would also be no disproportionate adverse effects to minority or low-income communities as a result of implementing the no action alternative.

4.12.2.2 Proposed Action

The changes in population and associated stresses on the municipal resources and services over the past 30 years have occurred while the Corps of Engineers and City of Lakewood have managed the Project at Bear Creek Lake. Implementing the revised master plan--including the future development actions--would be expected to have no effect on the demographic trends of the surrounding communities.

The future development actions that could occur under the updated master plan have been evaluated for potential disproportionately high environmental effects on minority or low-income

populations and there would not be a high human health or environmental impact on minority or low-income populations.

4.13 Recreation and Visitation

4.13.1 Existing Condition

As an approximately 2,600-acre regional park, Bear Creek Lake Park provides numerous recreation amenities and sufficient open space to serve the entire metro Denver and Front Range regions. Visitors participate in a variety of wildlife viewing, conservation, and recreational activities including nature study and environmental learning, swimming, boating, fishing, horseback riding, camping, archery, hiking and bicycling. There are over 20 miles of trail throughout the park including soft and paved surface trails that meander through upland prairie and riparian ecosystems.

Roughly 400,000 residents from across the City of Lakewood, Denver Metro Area, and the state of Colorado visit Bear Creek Lake Park each year. In the summer of 2003, the City of Lakewood conducted a survey of Bear Creek Lake Park visitors. The 2003 visitor survey provides an ordinal ranking of park facilities by level of use. The most heavily used facility is the swim beach at Big Soda Lake, which is on City of Lakewood property. The trails were ranked as the recreational facility on federal property that were used the most by park visitors. Trail related activities also ranked very highly in the 2003 survey. Hiking was the number one ranked activity (41.3-percent participation), biking ranked fifth (34.2-percent participation), horseback riding ranked ninth (14.1-percent), and running ranked thirteenth (10.2-percent participation). In an average year with 400,000 visitors in attendance and 41.3-percent of visitors engaged in hiking, there would be 165,000 visitors who hiked. Additionally, with the exception of the swim beach located at the City of Lakewood's adjacent Big Soda Lake, the park's system of soft surface and paved trails is considered to be the most popular amenity used by visitors (City of Lakewood, 2003).

The park is open year round and requires a per-vehicle day use fee of \$5 for the general public and \$4 for seniors. Visitors who enter the park via non-motorized transportation, such as cycling or walking, can enter the park at no cost. Bear Creek lake Park is located in the Ward 5 area of Lakewood that is comprised of a dense mix of residential neighborhoods and small businesses. Several subdivisions surround Bear Creek lake Park including the Bear Creek, Fox Haven and Pheasant Creek subdivisions to the east; Tamarisk, Summit Glen, Coyote Gulch and Solterra subdivisions to the north; and the Town of Morrison to the west. Most communities have direct access to the park through various trail access points including the Bear Creek Trail. The Bear Creek Trail offers easy access to nearby scenic attractions including Bandimere Speedway, Red Rocks Park and Amphitheatre, Dinosaur Ridge, William F. Hayden Park on Green Mountain and Bear Creek Green Belt to the east and Chatfield State Park seven and a half miles to the south.

The 2003 recreational survey also included data on the place of origin for park visitors and found that 88.6-percent of park visitors come from the metropolitan Denver area and visitors from areas of Colorado outside of the Denver metropolitan area accounted for only 7.7-percent of respondents. A review of the mailing addresses from the 2010 Bear Creek Lake Park annual passes indicates a similar pattern of use. More than 80-percent of annual pass holders were collectively from the communities of Lakewood, Littleton, Denver, Golden, Morrison, Arvada, and Evergreen as listed in Table 6.

Table 6
Community Representation for Holders of Annual Passes (2010)

Municipality	Number	Percent
Lakewood	962	41.4
Littleton	288	12.4
Denver	260	11.2
Golden	148	6.4
Morrison	136	5.9
Arvada	70	3.0
Evergreen	53	2.3
TOTAL	2,323	80.2

Over 4,000 visitors participate in environmental education programs each year including school groups and teachers; families with young children; Boy and Girl Scout groups; community and neighborhood organizations; volunteer groups; as well as recreation, sporting and nature enthusiasts. Audiences, particularly youth, are often exposed to the natural environment for the first time through school programs, scout programs and family-oriented naturalist programs. Families, community groups and nature enthusiast enjoy warm weather programs including campfire programs, full-moon night hikes, wildflower hikes, and specialized programs dedicated to the regions' indigenous wildlife. Volunteers dedicated to improving park lands can participate in a variety of stewardship events including Earth Day and National Public Lands Day (City of Lakewood, 2011a).

The recreational facilities at Bear Creek Lake Park are heavily used, especially on summer weekends. The campground was full 20 of 31 weekends during the 2011 camping season, with similar levels of use in 2010 (Personal Communication, Drew Sprafke). In addition to the recreational amenities at the park, the campground is attractive because of the proximity to the Red Rocks Amphitheatre and Bandimere Speedway, which are a brief drive from the Park.

Recreational use of Bear Creek Lake is also extensive; in 2011, the boat wash facility conducted 2,280 boat inspections, which indicates that the boat ramp was used by trailered boats 2,280 times in 2011. Non-trailered boats, such as canoes and kayaks, likely also used the boat ramp in 2011 although no usage data are collected. Fishing on Bear Creek Lake is very popular. A creel survey was conducted in 2010 by Colorado Parks and Wildlife to estimate the level of fishing effort and catch at Bear Creek Lake. The creel survey estimated that fishermen fished at the lake a total of 9,319 trips (7,466 trips for shore fishing and 1,853 from a boat). In total, angler effort was estimated at 26,387 fishing hours at the lake (20,131 hours from shore and 6,251 hours from a boat) (Colorado Parks and Wildlife, 2010).

4.13.2 Environmental Consequences

4.13.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the Project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related disruptions to recreation as well as the beneficial effects of improved facilities (i.e., safer road shoulder, maintained trail, improved water and electrical supply) would occur under no action as they would under the proposed action.

4.13.2.2 Proposed Action

Recreational use of the Bear Creek Dam and Lake Project would not be predicted to change appreciably from existing use patterns as a result of implementing the proposed action. Because there are no major new recreational amenities planned in the future, the development at the Bear Creek Lake Park involves minor improvements, replacements-in-kind, and facility improvements; none of these would be expected to substantially increase visitation. However, the recreational experience at the Project would be improved with additional power supply, more reliable water supply, and improved safety on the roads and trails. There would be some localized and temporary annoyance to recreational users (e.g., noise, fugitive dust, trails closed) during construction of new or improved amenities, but these would be relatively short-term.

4.14 Cultural Resources

4.14.1 Existing Condition

The Bear Creek Dam and Lake Project has been the subject of previous cultural resource inventories that were conducted pre-dam closure (USACE, 1971) and in association with the preparation of other planning documents the architectural and historical resources as well as the pre-historic resources of the Project were assessed (USACE, 1980a; Goodson & Associates, Inc. 1990; Hammer, Siler, George Associates, 1990; CHS, 1990). These narratives chronicling the cultural resources are herein, incorporated-by-reference⁷ and summarized briefly.

The National Park Service conducted a preliminary investigation on Project lands in 1970 and found no archeological resources at that time (USACE, 1980). In 1980, the Omaha District conducted a cultural resources investigation in the Bear Creek Lake area to “*locate and evaluate all cultural resources within the confines of the project area*” using literature search, field survey, and personal interviews (USACE, 1980a). The literature search involved an investigation of previous research in the area as well as examination of records on specific historic or prehistoric sites. An on-the-ground survey was conducted to locate and identify unrecorded cultural resources which might exist in undisturbed portions of the study area, and personal interviews were conducted with local residents and historians to provide supplemental information (USACE, 1980a). The findings did not identify any prehistoric archeological sites

⁷. 40 CFR 1502.21 – Incorporation-By-Reference: Agencies shall incorporate material into an environmental impact statement [or environmental assessment] by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described.

and asserted that “*quarrying, mining, farming, and the construction of highways, railroads, and canals left only a small fraction of the study area undisturbed*” (USACE, 1980a).

The Goodson & Associates, Inc. investigation (1990) intensively surveyed 500 acres that was to have been impacted by the proposed Bear Creek Lake Golf Course. The field work resulted in the identification of three pre-historic finds, none of which were declared eligible for the National Register of Historic Places (CHS, 1990). Their findings concluded, “*The number of prehistoric resources located on the project area was lower than originally expected. However, after surveying the area and observing the amount of previous land disturbance, the low number of identifiable prehistoric resources is understandable* (Goodson & Associates, 1990).

The Hammer, Siler, George Associates investigation (1990) of the architectural and historic resources reported that “*no sites of historic archeological significance have been identified*” (Hammer, Siler, George Associates, 1990). As part of early agriculture, water diversion ditches were constructed and four relic irrigation canals run through the Bear Creek Dam and Lake Project lands are the Harriman, Ward, Pioneer, and Warrior Ditches. Most of the early ditches have been destroyed by subsequent urbanization (Hammer, Siler, George Associates, 1990).

In addition, three older farm structures have been removed from the Project (Peterson House, Ticen House, and Spickerman House) leaving no historic structures within the Project boundaries that could be eligible for listing on the National Register of Historic Places.

4.14.2 Environmental Consequences

4.14.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. As such, the construction-related effects to known or unknown cultural resources would occur under no action as they would under the proposed action.

4.14.2.2 Proposed Action

Implementing the revised master plan--including the future development actions--would be expected to have no effect on the very limited cultural resources of the Project as all known sites have been previously evaluated for the potential for cultural and archeological resources. Locations considered for future development under the proposed updated master plan would be evaluated for the potential to affect resources in coordination with the Colorado Historical Society’s State Historic Preservation Officer.

4.15 Hazardous, Toxic, and Radioactive Waste Materials (HTRW)

4.15.1 Existing Condition

There are no permitted hazardous waste disposal facilities in proximity to the Bear Creek Dam and Lake Project and there are no known sites of hazardous, toxic, or radioactive materials on Project lands.

4.15.2 Environmental Consequences

4.15.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no comprehensive planning for the Project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a comprehensive planning document. Regardless, there would be no environmental consequences related to HTRW, because these substances are not found on Project lands.

4.15.2.2 Proposed Action

Implementing the revised master plan—including the future development actions--would be expected to have no effect on HTRW materials as there are no known pre-existing sources at the Project. While the potential to create HTRW materials as a result of equipment malfunction or failure during the construction process exists (e.g., fluid leaks from heavy equipment), best management practices and regular equipment maintenance reduce these risks. Storage, fueling, and lubrication of equipment and motor vehicles associated with the construction process (e.g., pavers, trenchers, cement trucks) would be conducted in a manner that affords the maximum protection against accidents and spills.

4.16 Aesthetics/Visual Qualities

4.16.1 Existing Condition

Near the base of the Dakota Hogback formation in the foothills of the Front Range of the Rocky Mountains, the project area is bisected by both Bear Creek and Turkey Creek. Because of the topographic diversity, open views, and proximity to both the Front Range and Denver, Colorado, the visual resources of the Bear Creek Dam and Lake Project are impressive. The Project includes diverse scenic and natural resources including dramatic views of the surrounding Colorado landscape. Existing habitat within the Project affords visitors opportunities to view wildlife within natural conditions within a substantially suburban setting.

The Bear Creek Trail is an upland prairie environment and provides scenic views of the Project’s major ecosystems and wildlife including prairie dogs, coyotes, and elk. The combination of elevation and openness within the Valley allows for expansive views; Southwest Denver is visible from site as well as Pike’s Peak (City of Lakewood, 2002). From the Bear Creek Trail, visitors can also view beautiful Front Range geological features and landmarks including Red Rocks, Green Mountain and the Dakota Ridge Hogback. As trail users cross the park from one end to the other they are able to view the natural beauty of the park and develop a deeper awareness and understanding of Colorado’s Front Range ecosystems (City of Lakewood, 2012a).

4.16.2 Environmental Consequences

4.16.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Reservoir project in the foreseeable future and there would be no comprehensive planning for the project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely be built, but without the benefit of a

comprehensive planning document. As such, the construction-related effects to the aesthetic character and visual quality of the Project would occur under no action as they would under the proposed action.

4.16.2.2 Proposed Action

Implementing the revised master plan--including the future development actions--would be expected to have no long-term effect on the aesthetic character of the Project. Comprehensive planning under the new master plan could potentially facilitate improved construction planning minimizing the temporary aesthetic effects during construction.

4.17 Noise

4.17.1 Existing Condition

Changes in noise are typically measured and reported in units of dBA, a weighted measure of sound level. The primary sources of noise within the Project area would include everyday vehicular traffic along the adjacent highways (typically between 50 and 60 dBA at 100 feet) and human-generated recreational activities at the Bear Creek Lake Park. Noise ranging from about 10 dBA for the rustling of leaves to as much as 115 dBA (the upper limit for unprotected hearing exposure established by the Occupational Safety and Health Administration) is common in areas where there are sources of recreational activities, construction activities, and vehicular traffic.

4.17.2 Environmental Consequences

4.17.2.1 No Action

Under the no action alternative, an updated master plan would not be approved for the Bear Creek Dam and Lake Project in the foreseeable future and there would be no new comprehensive planning document for the Project. However, actions described under “Future Development under the Proposed Updated Master Plan” would likely still be built, but without the benefit of a new master plan. Noise related to the construction of would still occur, but would be temporary and short-term.

4.17.2.2 Proposed Action

Implementing the revised master plan--including the future development actions--would be expected to have no long-term effect on the level of background or ambient noise character of the Project. Some of the measures planned for construction at the campground and Group Loop (e.g., tree planting) would, over time, dampen the noise between campsites thereby improving the recreational experience for campground users. Temporary increases in noise would be expected during future construction (including demolition of portions of Bear Creek Trail), but comprehensive planning under the new master plan could potentially facilitate implementing best management practices to minimize the temporary noise effects during construction.

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5 CUMULATIVE EFFECTS

NEPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impact of the action. A cumulative impact is defined as *“the 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 (Federal or non-Federal) or person undertakes such other actions (40 CFR§1508.7).”* Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. These actions include on- or off-site projects conducted by government agencies, businesses, or individuals that are within the spatial and temporal boundaries of the actions considered.

In addition to the actions identified in Future Development under the Proposed Updated Master Plan (Section 3.2.3), the City of Lakewood has plans to construct a New Visitor’s Center on City of Lakewood property adjacent to the Corps of Engineers Project lands (City of Lakewood, 2011a). Should construction of the visitor’s center (or other project on adjacent land) coincide with construction of amenities listed in Section 3.2.3, there would be cumulative construction-related effects (e.g., noise, fugitive dust, etc.) to visitors at Bear Creek Lake Park. These cumulative effects would be temporary and minor. There would also be cumulative beneficial effects from implementing the actions described under the master plan because of the overall improvement of recreation for the visitors at the Project.

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6 SUMMARY OF ENVIRONMENTAL EFFECTS

The revised master plan provides guidelines and direction for future Project development and use and is based on authorized Project purposes, Corps of Engineers policies and regulations on the operation of Corps of Engineers projects, responses to regional and local needs, resource capabilities and suitable uses, and expressed public interests consistent with authorized Project purposes and pertinent legislation.

In cooperation with the Omaha District, the City of Lakewood has successfully planned and executed actions to improve and maintain recreation at the Bear Creek Dam and Lake Project for more than 30 years. Careful planning, sound engineering, appropriate coordination with resource agencies and effective execution have developed the recreational resources at the Project while protecting and enhancing the important environmental resources; these practices would be expected to continue.

Section 3.2.3, Future Development under the Proposed Updated Master Plan identifies a number of future actions that could be implemented by the City of Lakewood. Because the City of Lakewood's ability to implement these projects is strongly influenced by the availability of funding--including the award of grants (City of Lakewood, 2011a; City of Lakewood 2012a)--there are no scheduled initiation dates for these actions. If and when these projects were implemented, localized and temporary construction-related effects (e.g., diesel/gasoline engine emissions, noise, fugitive dust, minor earth-moving) would be the extent of the environmental consequences.

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7 COMPLIANCE WITH ENVIRONMENTAL LAWS

Revision of the Bear Creek Dam and Lake Master Plan and the subsequent construction of the potential future modifications to existing infrastructure as well as new features would not commence until the proposed actions achieve environmental compliance with the applicable laws and regulations, as described below. Environmental compliance for the proposed actions would be achieved upon coordination of this Environmental Assessment with appropriate agencies, organizations, and individuals for their review and comments.

American Indian Religious Freedom Act (AIRFA) of 1978, 42 U.S.C. 1996.

In compliance.

AIRFA protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. Implementing the revised master plan would not adversely affect the protections offered by this Act.

Bald Eagle Protection Act, 16 U.S.C. Sec. 668, 668 note, 668a-668d.

In compliance.

The Bald Eagle Protection Act contains requirements on Corps of Engineers projects concerning bald eagles. Approval and implementation of the revised master plan would not adversely affect bald eagles or their habitat.

Clean Air Act, as amended, 42 U.S.C. 1857h-7, et seq.

In compliance.

The purpose of this Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain, or maintain. Minor and temporary releases would occur during construction activities for actions to maintain or improve facilities at Bear Creek Lake Park (e.g., fugitive dust, internal combustion engine emissions); however, these emissions would be short term, small-scale, and air quality would not be affected to any measurable degree.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq.

Full compliance.

The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters (33 U.S.C. 1251). The Corps of Engineers regulates discharges of dredge or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the United States including navigable waters and wetlands. The Section 404 requires authorization to place dredged or fill material into water bodies or wetlands. If a Section 404 authorization is required, a Section 401-water quality certification from the state in which the discharge originates is also needed. The

proposed projects considered in the master plan would not result in the placement of dredged or fill material into water bodies or wetlands.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

Not applicable.

Typically CERCLA is triggered by (1) the release or substantial threat of a release of a hazardous substance into the environment; or (2) the release or substantial threat of a release of any pollutant or contaminant into the environment that presents an imminent threat to the public health and welfare. To the extent such knowledge is available, 40 CFR Part 373 requires notification of CERCLA hazardous substances in a land transfer. The implementation of the revised master plan would not involve real estate transactions.

Conservation of Forest Lands in Reservoir Areas (1960), Public Law 86-717 (74 Stat. 817).

In compliance.

This law provides for the development and maintenance of forest resources on Corps of Engineers managed lands and the establishment and management of vegetative cover so as to encourage future resources of readily available timber and to increase the value of such areas for conservation. Resource objectives and development needs for the management units include planting trees and shrubs to increase the amount of woody vegetation for winter and nesting cover for upland and big game species; planting trees, food plots, native grasses, and/or marsh grasses to supplement the existing food sources for upland and big game species and/or waterfowl; and developing additional woody draw habitat.

Endangered Species Act, as amended. 16 U.S.C. 1531, et seq.

Full compliance.

Section 7 (16 U.S.C. 1536) states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior (Secretary), insure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical.

This Environmental Assessment represents the assessment and findings regarding the proposed revised master plan and associated future actions and serves as the Biological Assessment with a determination of no effect to the black footed ferret (*Mustela nigripes*) or the Preble's meadow jumping mouse (*Zapus hudsonius preblei*).

The findings also allow a determination of no effect to the Platte River Target Species (whooping crane (*Grus americana*), the northern Great Plains population of the piping plover (*Charadrius melodus*), the interior least tern (*Sternula antillarum*), and the pallid sturgeon (*Scaphirhynchus albus*) because there would be no change in the operations of the Bear Creek Dam as a result of implementing the revised master plan.

Environmental Justice (E.O. 12898).

In compliance.

Federal agencies shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. The Project does not disproportionately affect minority or low-income populations.

Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), et seq.

In compliance.

The Act establishes the policy that consideration be given to the opportunities for outdoor recreation and fish and wildlife enhancement in the investigating and planning of any federal navigation, flood control, reclamation, hydroelectric or multi-purpose water resource project, whenever any such project can reasonably serve either or both purposes consistently. The revision and update of the Master Plan facilitates the efficient planning to enhance recreational resources in conjunction with this Project.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.

In compliance.

The FWCA requires governmental agencies, including the Corps of Engineers, to coordinate activities so that adverse effects on fish and wildlife would be minimized when water bodies are proposed for modification. No modifications are proposed in association with the proposed update to the Master Plan.

Land and Water Conservation Fund Act (LWCFA), as amended, 16 U.S.C. 4601-4601-11, et seq.

Not applicable.

Planning for recreation development at Corps of Engineers projects is coordinated with the appropriate states so that the plans are consistent with public needs as identified in the State Comprehensive Outdoor Recreation Plan (SCORP). The Corps of Engineers must coordinate with the National Park Service (NPS) to insure that no property acquired or developed with assistance from this Act will be converted to other than outdoor recreation uses. If conversion is necessary, approval of NPS is required, and plans are developed to relocate or re-create affected recreational opportunities. There are no land acquisitions associated with the proposed update to the Master Plan.

Migratory Bird Treaty Act

Full compliance.

The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Executive Order 13186 (2001) directs agencies to take certain actions to implement the act. The Corps of Engineers consulted with the USFWS (through their review of the draft EA) with regard to their consideration of the effects of the actions identified in the master plan revision for potential effects on migratory birds.

National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq.

In compliance.

Federal agencies having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking would take into account the effect of the undertaking on any district, site, building, structure, or object that is included in, or eligible for inclusion in, the National Register of Historic Places. The Omaha District has made the determination that the actions identified in the proposed master plan revision and update do not have the potential to adversely impact cultural resources.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq.

In compliance.

This Environmental Assessment and Finding of No Significant Impact (FONSI) has been prepared in accordance with the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508). An Environmental Impact Statement (EIS) is not required.

1990 - Native American Graves Protection and Repatriation Act (P.L. 101-601; 25 U.S.C § 3001-13; 104 Stat. 3042)

In compliance.

The Native American Graves Protection and Repatriation Act (NAGPRA) provides for the protection of Native American and Native Hawaiian cultural items. It establishes a process for the authorized removal of human remains, funerary, sacred, and other objects of cultural patrimony from sites located on land owned or controlled by the federal government. NAGPRA requires federal agencies and federally assisted museums to return specified Native American cultural items to the federally recognized Indian tribes or Native Hawaiian groups to which they are associated. In the event of inadvertent discoveries of human remains, artifacts, and funerary objects, the Corps of Engineers would follow the terms of the NAGPRA regulations, 43 CFR 10 et seq.

Noise Control Act of 1972, 42 U.S.C. Sec. 4901 to 4918.

In compliance.

This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. Noise emission levels at the Project site would increase above current levels temporarily due to construction of improvements or features identified in the proposed master plan revision. Appropriate measures would be taken to keep the noise level within the compliance levels.

North American Wetlands Conservation Act, 16 U.S. C. Sec. 4401 et. seq.

Not applicable.

This Act establishes the North American Wetlands Conservation Council (16 U.S.C.4403) (NAWCC) to recommend wetlands conservation projects to the Migratory Bird Conservation Commission (MBCC). Section 9 of the Act (16 U.S.C. 4408) addresses the restoration, management, and protection of wetlands and habitat for migratory birds on Federal lands. Federal agencies acquiring, managing, or disposing of federal lands and waters are to cooperate with the Fish and Wildlife Service to restore, protect, and enhance wetland ecosystems and other habitats for migratory birds, fish and wildlife on their lands, to the extent consistent with their missions and statutory authorities. The actions identified in the proposed master plan revision would not involve the disposal of land.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

In compliance.

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The actions identified in the proposed master plan revision would not involve the construction of structures within Bear Creek Lake.

Floodplain Management (E.O. 11988).

In compliance.

Section 1 requires each agency to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. The actions identified in

the proposed master plan revision would not affect the flood holding capacity or flood surface profiles of Bear Creek, Turkey Creek, or the Bear Creek Lake.

Protection of Wetlands (E.O. 11990).

In compliance.

Federal agencies shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use. The actions identified in the proposed master plan revision would not involve construction in, or affects to, wetlands.

8 COORDINATION, CONSULTATION, AND LIST OF PREPARERS

8.1 List of Agencies Consulted

City of Lakewood

Jefferson County

Town of Morrison

Colorado Division of Parks and Wildlife

U.S. Fish and Wildlife Service

Colorado Historical Society – State Historic Preservation Officer

8.2 List of Persons Consulted

City of Lakewood

Bill Jewell – Regional Parks and Golf Manager, Department of Community Resources

Drew Sprafke – Regional Parks Supervisor, Department of Community Resources

Vince Casteel – Department of Planning and Public Works

Alan Searcy – Stormwater Quality Coordinator/Bear Creek Watershed Association

Mike Towner – Water Quality, Department of Community Resources

Todd Taylor – Senior Ranger, Bear Creek Lake Park

Eric Nelson – Natural Resource Specialist, Department of Community Resources

Jefferson County

Amy Ito – Manager of Planning and Development, Jefferson County Open Space

Bear Creek Watershed Association

Russ Clayshulte – Manager

Town of Morrison

Jerry Smith – Special Projects Coordinator

Colorado Division of Parks and Wildlife

Harry Vermillion - Aquatic Database Manager

Paul Winkle – Aquatic Biologist

Corps of Engineers

Fred Rios – Tri-Lakes Project Operations Manager, Omaha District

Tim Rose – Tri-Lakes Project Natural Resource Specialist/Ranger, Omaha District

8.3 Public Participation

An agency meeting concerning Bear Creek Dam and Lake Project master plan development was held at the Corps of Engineers Tri-Lakes Project Office in Littleton, CO on 21 November 2011. Attendees included representatives of the City of Morrison, City of Lakewood, Jefferson County, Bear Creek Watershed Association, Corps of Engineers Omaha District, and Corps of Engineers Tri-Lakes Project Office.

A public scoping meeting was held on the evening of 21 November 2011 at the Lakewood City Center. Although advertised,⁸ the meeting was not attended by any members of the public; only by Corps of Engineers and City of Lakewood personnel were present. Figure 9 shows a copy of the news release.

After public release of the draft Master Plan and Environmental Assessment an additional public meeting was held at the Lakewood Cultural Civic Center, 470 South Allison Parkway, Lakewood, Colorado, on August 7, 2012, at 7:00 p.m. No public comments were received at that time (Traux, 2012).

Figure 9
News Release for Bear Creek Lake Master Plan Public Meeting



⁸ Advertised at USACE Omaha District Website - <http://www.nwo.usace.army.mil/pa/2011/NR20111109-Bear%20Creek%20Master%20Plan.pdf>, Twitter - <http://twitter.com/#!/Omahausace> -, Facebook - <http://www.facebook.com/events/261143003935973/>,

8.4 List of Preparers

Table 7
List of Preparers

Responsibility	Name, Affiliation
Study Manager	Jonas Grundman, CENWO
Review	Thomas Morrissey, Office of Counsel, CENWO
Environmental Manager	Eric Laux, CENWO
Environmental Manager	Dave Crane, CENWO
Economist/Planner	Dr. Jerry Diamantides, David Miller & Associates, Inc.
NEPA Specialist	Michael McGarry, David Miller & Associates, Inc.
Ecologist/Planner	Robert Wiley, David Miller & Associates, Inc.
GIS Specialist	Christopher McGarry, David Miller & Associates, Inc.
Environmental Planner	Corey Miles, David Miller & Associates, Inc.

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Appendix A - Land Allocation, Land Classifications, and Resource Objectives

Land allocations can fall under one, and only one, of four categories at Corps of Engineers' projects:

- i) Operations. Lands acquired for the Congressionally-authorized purpose of constructing and operating the project,
- ii) Recreation. Lands acquired specifically for the Congressionally-authorized purpose of recreation and are referred to as separable recreation lands,
- iii) Fish and Wildlife. Lands acquired specifically for the Congressionally-authorized purpose of fish and wildlife management and are referred to as separable fish and wildlife lands, and
- iv) Mitigation. Lands acquired or designated specifically for the Congressionally-authorized purpose of offsetting losses associated with development of the project and are referred to as separable mitigation lands.

At the Bear Creek Dam and Lake Project, all project lands are allocated to Operations because they were acquired to provide safe, efficient operation of the project for its authorized purposes and separable lands were not acquired for purposes of recreation, fish and wildlife conservation, or mitigation (USACE, 1988).

Within the Operations allocation, project lands are further divided into one of six separable land classifications.⁹ These designations identify the primary use for which project lands are managed. As such, all lands acquired for project purposes are classified in a manner that provides for development and resource management consistent with authorized project purposes and other federal laws.

These six land classifications¹⁰ and any sub-categories are further explained as follows:

- i) Project Operations. This category includes those lands required for the dam, spillway, switchyard, levees, dikes, offices, maintenance facilities, and other areas that are used solely for the operation of the project,
- ii) High Density Recreation. Lands developed for intensive recreational activities for the visiting public including day use areas and/or campgrounds. These could include areas for concessions (marinas, comprehensive resorts, etc.), and quasi-public development,

⁹ Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, Multiple Resource Management Lands, and Water Surface.

¹⁰ Land Classification categories are based on the current proposal to modify section 3-5 of ER 1105-2-550 as presented in Final MP PDT Rpt2011_Proposed Section 3-5.docx

- iii) Mitigation. This classification will only be used for lands with an allocation of Mitigation and that were acquired specifically for the purposes of offsetting losses associated with development of the project,
- iv) Environmentally Sensitive Areas. Areas where scientific, ecological, cultural or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act or applicable State statutes. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration,
- v) Multiple Resource Management Lands. This classification allows for the designation of a predominate use as described below, with the understanding that other compatible uses described below may also occur on these lands. (e.g., a trail through an area designated as Wildlife Management.) Land classification maps must reflect the predominant sub-classification, rather than just Multiple Resource Management,
 - (1) Low Density Recreation. Lands with minimal development or infrastructure that support passive public recreational use (e.g., primitive camping, fishing, hunting, trails, wildlife viewing, etc.),
 - (2) Wildlife Management. Lands designated for stewardship of fish and wildlife resources,
 - (3) Vegetative Management. Lands designated for stewardship of forest, prairie, and other native vegetative cover,
 - (4) Future/ Inactive Recreation Areas. Areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources,
- vi) Water Surface. If the project administers a surface water zoning program, then it should be included in the Master Plan,
 - (1) Restricted – Water areas restricted for project operations, safety, and security purposes,
 - (2) Designated No-Wake – To protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and for public safety,
 - (3) Fish and Wildlife Sanctuary – Annual or seasonal restrictions on areas to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning, and

- (4) Open Recreation – Those waters available for year round or seasonal water-based recreational use.

Land classifications at the Bear Creek Dam and Lake Project include Project Operations, High Density Recreation, Multiple Resource Management Lands (Low Density Recreation and Vegetative Management), and Water Surface (Restricted, Designated No-Wake, and Open Recreation). There are no project lands classified as Mitigation or as Environmentally Sensitive Areas.

Project Operations Lands (see Figure 5 in text) at the Project include lands required for the dam (main embankment), spillway, south embankment, and emergency stockpile area. The total Project Operations acreage at multipurpose pool level is 290 acres, which includes 103 acres of surface water. Note that project lands are managed based on the multipurpose pool level. When at the top of the surcharge pool, there would be approximately 1,215 acres of surface water (USACE, 1988) and all High Density Recreation Lands and most Multiple Resource Management Lands would be submerged below the Bear Creek Lake water surface.

High Density Recreation Lands at Bear Creek Lake include camp grounds, boat launch, boat wash station, fishing and fish cleaning stations, archery range, picnic areas, stables, viewing stations, paved roads, and parking areas. These areas are intensively used by the public and include structural enhancements such as toilets, overhead protection, paving, and signage. The total area of High Density Recreation Lands at the project is 540 acres.

Multiple Resource Management Lands include Low Density Recreation and Vegetative Management Lands. There are no project lands classified as Wildlife management or Future/Inactive Recreation Areas at the project. Low Density Recreation lands include unpaved multi-use trails and a paved bike trail. The paved bike trails connect with regional trail system project lands which continue outside of project boundaries. Low Density Recreation lands also include undeveloped areas which may be used for wildlife viewing and bird watching. The total Low Density Recreation acreage is 1,408 acres.

Vegetative Management Lands include the riparian corridors associated with Bear Creek, Turkey Creek, Cattail Creek, Coyote Gulch, and un-named drainages. Vegetative Management Lands also include Turtle Pond and associated wetlands as well as prairie grassland areas. The total Vegetative Management Land acreage is 259 acres. The entire lake is Designated No-Wake, with a 10-horsepower maximum boat engine restriction. Bear Creek Lake is classified as Open Recreation with recreational use for fishing, power boating, as well as self-propelled watercraft (e.g., kayak).