Appendix W
CWA Section 404(b)(1) Analysis
Dredge and Fill Compliance

CWA Section 404(b)(1) Analysis
Dredge and Fill Compliance
Chatfield Reservoir Storage Reallocation FR/EIS

1. INTRODUCTION

In 1986, Congress authorized the USACE to conduct a reallocation study for Chatfield Reservoir for joint flood risk management (flood control)-conservation purposes, including storage for M&I water supply, agriculture, and recreation and fishery habitat protection and enhancement. In 1996, the Colorado Water Conservation Board (CWCB), a division of the State of Colorado's Department of Natural Resources (DNR), requested that the U.S. Army Corps of Engineers (USACE; the Corps) consider reallocating space within Chatfield Reservoir for water supply purposes, on behalf of a group of 15 water providers (Providers) in the Denver metropolitan area. Reallocation is the assignment of the use of existing storage space in a reservoir project to another use. Section 808 of the Water Resources Development Act of 1986 authorizes the Corps to implement a reallocation of existing storage space at Chatfield Reservoir to joint flood control-conservation purposes, including storage for municipal and industrial water supply and other named uses, upon meeting two conditions. First, the DNR must request and coordinate the reallocation. Second, the Chief of Engineers must find the reallocation to be feasible and economically justified. Public Law 99-662. See also River and Harbor Act of 1958 (Title III, Water Supply Act of 1958), as amended (43 U.S.C. 390b).

In 1999, a Feasibility Report and Environmental Impact Statement (FR/EIS) was commissioned under the Section 808 project authorization to develop the plan and conduct the analyses required for the Chief of Engineer's findings. ER1105-2-100, Ch. 4. The FR/EIS evaluates the proposed reallocation, identifies alternatives, evaluates those alternatives, and selects the best alternative for addressing the requested reassignment of existing storage space at Chatfield Reservoir based on solid planning principles. The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&Gs) (U.S. Water Resources Council 1983) establish the standards and procedures that the Corps and other federal water resources agencies use for planning and evaluating the merits of a proposed water storage reallocation. The FR/EIS has evaluated in detail the environmental, social, and economic effects of the Recommended Alternative, as well as two other alternatives and the No Action alternative. As discussed in the FR/EIS, the impacts associated with each alternative would be fully mitigated and would result in alternatives with minimal net effects, and alternatives that would be relatively equal when considering net environmental effects.

The FR/EIS involved an initial screening process that used the State of Colorado's State Water Supply Initiative (CWCB 2004, 2009) and other recent, relevant planning studies to identify candidate alternatives to reallocation. A total of 37 concepts were evaluated in the initial screening process. The development of alternatives to reallocation and the screening process are described in detail in Chapter 2 of the FR/EIS. The Chatfield Reservoir reallocation alternative with 20,600 acre-feet of reallocated storage (Alternative 3) was selected as the Recommended Plan. This plan is the National Economic Development (NED) plan and is the plan preferred by the Providers.

The proposed reallocation of storage at Chatfield Reservoir requires the Corps to make decisions regarding feasibility and economic justification of the proposed reallocation and appropriate contract terms and conditions if the reallocation is approved. The proposed reallocation of storage and use of the reallocated storage will not require the discharge of dredge or fill material into waters of the U.S. The reallocation of storage space and the subsequent filling of that space will only involve the inundation of environmental and recreational resources. As such, as required in its planning guidance, the Corps must consider modifying the affected recreational facilities to maintain recreation, as well as identify mitigation for affected environmental resources. The proposed reallocation will increase water elevations at Chatfield Reservoir, and the increased water levels will inundate recreation infrastructure and environmental resources. The proposed mitigation of environmental resources and modification of recreation facilities will involve the discharge of dredge or fill material into waters of the U.S.

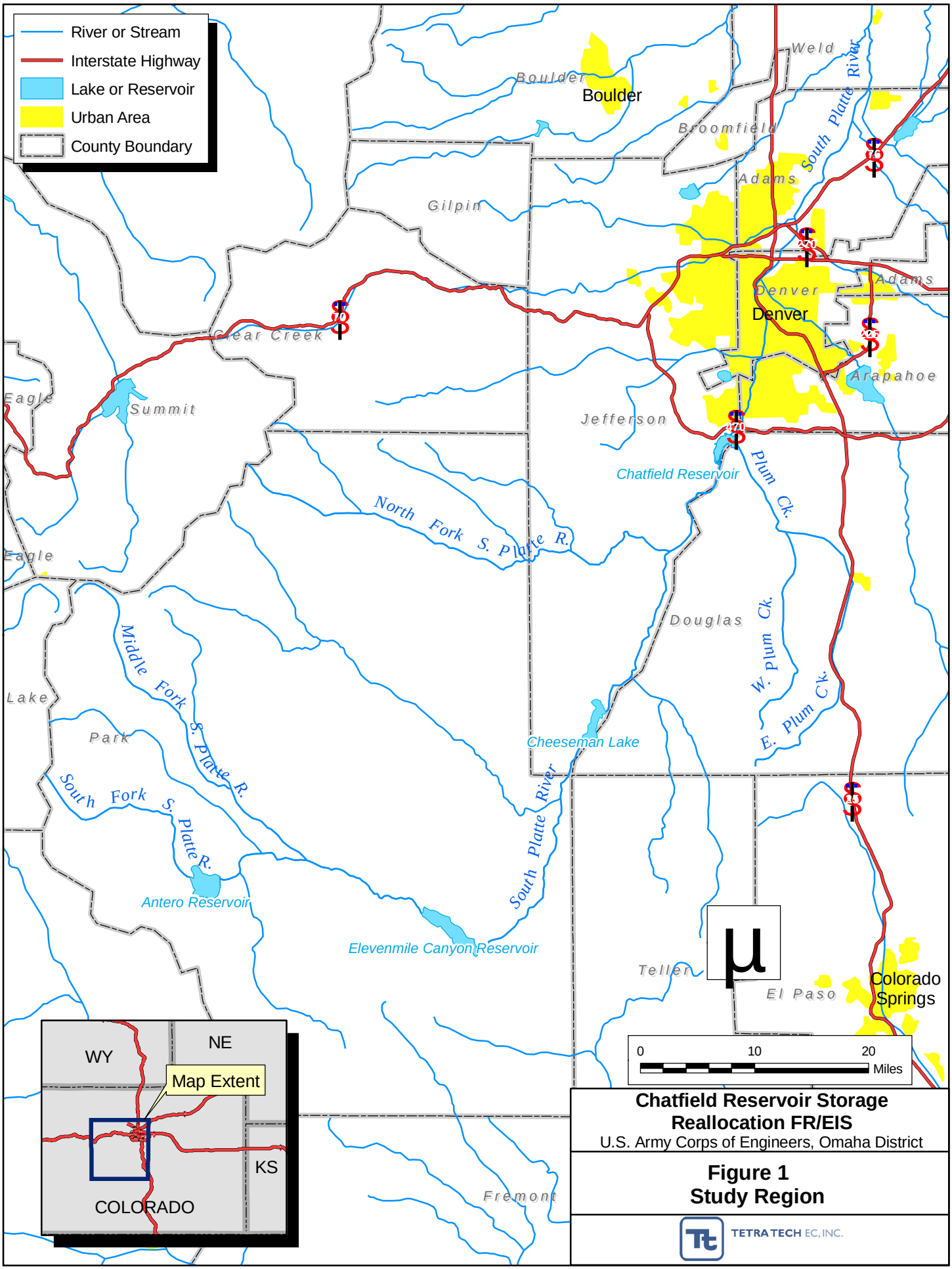
The Section 404(b)(1) Guidelines (Guidelines) are the substantive criteria used to evaluate discharges of dredge or fill material into waters of the U.S. under Section 404 of the Clean Water Act. This analysis addresses how the activities that involve a discharge of dredge or fill material into waters of the U.S. comply with the Guidelines. As used in this analysis, the discharge of dredge and fill material into waters of the U.S. refers to the following:

- Fill material placed below the existing ordinary high water mark (OHWM) of Chatfield Reservoir of 5,432 feet above mean sea level (msl);
- Dredging (discharge of dredged material) below the existing OHWM; dredging will typically involve the scraping and pushing of soil with earthmoving equipment (dredging is also referred to as "cuts"); and
- The discharge of dredged or fill material into wetlands (above or below the existing OHWM).

2. PROJECT DESCRIPTION

2.1 Location and General Description

Chatfield Reservoir is southwest of Denver at the confluence of the South Platte River and Plum Creek within the South Platte River Basin (Figure 1). The reservoir is owned and operated by the USACE. The reservoir was completed in 1976 for purposes of flood protection for the metropolitan Denver area following the disastrous South Platte River flood of 1965. The U.S. Forest Service (USFS) manages most of the lands along the mainstem of the South Platte River upstream of the reservoir. Plum Creek flows through a mixture of rangelands and suburban areas. The overall EIS study area encompasses the area in the immediate vicinity of Chatfield Reservoir and extends downstream to where the river intersects the Adams/Weld county line. The Chatfield Reservoir has a maximum depth of about 45 feet and an average depth of 24 feet. Water levels in the reservoir vary in response to climatic conditions and other factors, but in general the reservoir has been managed to maintain water levels within a 9-foot range (elevation 5,425 to 5,434 feet above msl) (USACE 2000). From 1976 to 1996, the change in water level was within this 9-foot range approximately 80 percent of the time. The average range of mean monthly elevations is small, less than 3 feet from low to high reservoir periods. The current OHWM elevation is 5,432 feet above msl.



Chatfield Reservoir Storage Reallocation FR/EIS

U.S. Army Corps of Engineers, Omaha District

Figure 1
Study Region

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The Recommended Plan would reallocate 20,600 acre-feet of Chatfield's flood control storage to water supply storage. The Providers would be responsible for the operation, maintenance, and repair of infrastructure, treatment, and distribution facilities associated with their water. They would also provide their share of the Chatfield Reservoir project operation, maintenance, repair, rehabilitation, and replacement costs. Environmental mitigation and recreation modifications would be required to mitigate the impacts of operating the reservoir under the storage reallocation. The Providers would fully fund environmental mitigation and recreation modifications. The USACE, U.S. Fish and Wildlife Service (USFWS), and State of Colorado would continue to be involved in the design and overview of environmental mitigation and recreation modification measures.

2.2 General Description of Dredge and Fill Activities

The discharge of dredge and fill material into waters of the U.S. will occur with the following proposed activities that are incidental to the proposed reallocation:

- Relocation of recreation facilities and associated infrastructure
- On-site environmental mitigation
- Off-site mitigation for impacts to Preble's meadow jumping mouse (Preble's) designated critical habitat

The following describes each of these activities and the associated discharge of dredge and fill material into waters of the U.S. Alternatives to these discharges and measures taken to avoid and minimize the discharge of dredge and fill material into waters of the U.S. are discussed in Section 4.2.

2.2.1 Dredge and Fill Activities Associated with the Recreation Facilities Modification Plan

The proposed Recreation Facilities Modification Plan (EDAW/AECOM 2010) identified 10 areas where fill material (in uplands, wetlands, or waters) would be required for site preparation, such as slope adjustment and general grading. A summary of disturbance area size, cut and fill requirements, and anticipated wetland disturbance area is presented in Table 1. Each area is described in detail below with locations shown in Figure 2. Upland borrow areas that would be used to provide the fill material are described in Section 2.3.

Table 1. Summary of Cuts and Fills in Waters and Wetlands for Each Recreational Facility Modification Area (EDAW 2009)

Area	Fill Area below 5,432 feet msl (Acres)	Cut Area below 5,432 feet msl (Acres)	Wetlands Above OHWM (5,432)		Wetlands Below OHWM (5,432)		Wetland Fill (CY)
			Cut	Fill	Cut	Fill	
North Boat Ramp	2.105	0.841					
Massey Draw							
Eagle Cove Day Use Area			2.02		0.83		
Swim Beach Area, & Jamison Area	0.26	7.63		0.24		1.13	1820
Catfish Flats & Fox Run		13.50					
Kingfisher & Gravel Pond Area				0.17		0.01	11
Platte River Trailhead							
Riverside Marina & Roxborough Day Use Area	3.41	4.68	0.01	0.02	0.09	0.27	443
Campground Area		0.13					
Plum Creek		0.2		0.78			

The CWCB and Providers received a waiver from the Corps allowing floodable, wet floodproofed recreation facilities to be located within the 10-year floodpool at an elevation of 5,447 feet msl (see Section 4.2.1). This waiver allows the recreation facilities to be relocated closer to the new OHWM. The discharge of dredge and fill material into wetlands associated with relocation of recreation facilities will be used to elevate the relocated facilities above the new OHWM of 5,444 feet msl and transition grades (cut and fill) between the new recreation facilities and the new OHWM. The recreation facilities would be relocated prior to use of the reallocated storage by the Providers. This sequencing will facilitate relocation of the facilities and dredging activities below the existing OHWM by maintaining lowered reservoir levels during construction. The wetlands that will be filled by the relocation of the recreation facilities occur below 5,444 feet msl and would be inundated, at least periodically, by the new reservoir levels associated with reallocation. Therefore, the wetland losses associated with the discharge of fill implementing the Recreation Facilities Modification Plan also would occur with reallocation.

North Boat Ramp. This is the only formal boat launch area on the west side of the reservoir, and includes two ramps, paved parking and circulation areas, and a variety of support facilities. The two existing boat ramps would largely be inundated and several of the picnic shelters would also be affected. Remaining areas, including most of the parking and circulation roads, would remain above the proposed high water elevation (5,444 feet msl).

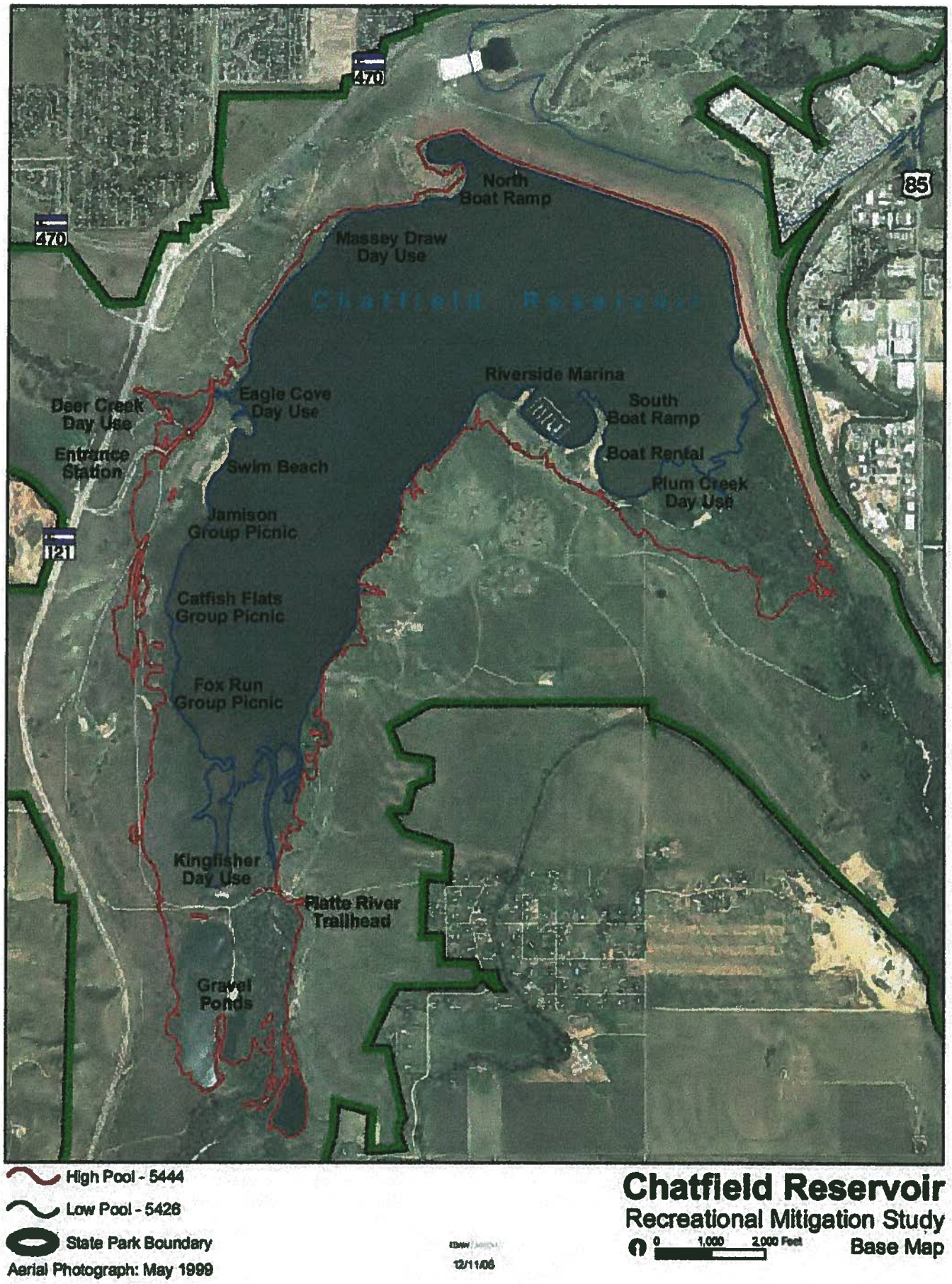

Figure 2. Location of Recreation Facility Modification Areas

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Boat ramps would be constructed to extend to the elevation of the existing ramps in order to operate at low water levels. The slope on the new ramps would be reduced. Day use shelters and furniture would be relocated, as would trails. This involves a substantial amount of fill to raise a portion of the parking area. Development would require some cut and fill below the current high water elevation of 5,432 feet msl (Table 1). No discharge of fill material into wetlands is anticipated.

Massey Draw. Massey Draw is a day use area in the vicinity of the North Boat Ramps. The beach area, including a volleyball court and horseshoe pits, would be inundated at the proposed high water elevation of 5,444 feet msl. Relocation of this area would include importing fill material to raise the elevation above 5,444 feet msl and to create a usable recreational area in the same location with a similar amount of usable area that currently exists. Existing beach volleyball and horseshoe pits would be rebuilt. No discharge of dredge or fill material into waters of the U.S., including wetlands, is anticipated.

Eagle Cove Day Use Area. Eagle Cove is north of Deer Creek and has limited facilities. All of the facilities in this area would be relocated. The existing gravel parking lot and portable restroom at Eagle Cove would be inundated at 5,444 feet msl.

The gravel parking lot at Eagle Cove would be redeveloped within the same general area at an elevation above 5,444 feet msl. The use of additional fill would be minimized in this area due to existing grades above 5,444 feet msl. Approximately 3 acres of wetlands would be cut in developing this area (Table 1).

Swim Beach Area, including Jamison Group Use Area. The Swim Beach Area also includes the Deer Creek Area with its balloon launch facilities and day use sites. An increase in water elevation to 5,444 feet msl would inundate most of the area and require that these facilities and parking area be developed at another location. The Jamison Group Use Area is immediately south of the Swim Beach Area and includes a parking area, restroom, and picnic tables. All of these would be inundated at 5,444 feet msl.

The Swim Beach would be relocated to the southwest of the current facility. In order to construct the beach, the existing facility would be demolished and excavated. Sand would be saved and also imported to create the new beach. Relocation of the Swim Beach Area involves 7.63 acres of excavation below the current OHWM. The excavated material would assist in filling low areas that would be inundated at 5,444 feet msl to ensure these areas are usable at this proposed elevation. The redevelopment would entail cut and fill below the current high water elevation, and would have limited disturbance to wetlands above (0.24 acre) and below (1.13 acres) the current high water elevation (Table 1).

Catfish Flats and Fox Run Group Use Areas. These areas consist of a series of group use areas that include picnic shelters, restrooms, parking, and related facilities. At 5,444 feet msl, all of these facilities would be inundated and they would be redeveloped at another location. Portions of the trail system would also be redeveloped. The entrance to the Fox Run Group Use area parking lot would be reconstructed due to the new location of the main park road. About 13.5 acres would be excavated below the existing OHWM. There would be no discharge of dredge or fill material into wetlands.

Kingfisher, Gravel Ponds, and Platte River Trailhead Areas. A variety of uses occur at the south end of the reservoir, especially around the gravel ponds that are south of the main park road that leads to the Campground and Marina Area. The large gravel pond is used by dog training clubs, nonmotorized boaters, fishermen, and others. There are relatively few developed facilities in this area, primarily parking areas and trails. The Kingfisher area would be entirely inundated at 5,444 feet msl.

For the Kingfisher Area, a long section of the main park road would be raised and a new bridge constructed across the South Platte River. The bridge would remain in the same general location and would be designed to provide for pedestrian use. A new parking area would be developed along the shoreline at a site west of its current location. The area would include a portable restroom and similar facilities to those that exist at the current site. Existing trail connections would be redeveloped above the high waterline. The borrow area would be reconfigured to enhance fishing opportunities and recreational experience.

For the Gravel Ponds Area, a new parking lot would be constructed west of the existing site and above the 5,444 feet msl elevation. Roads for emergency access only would be developed on the berms to the east and south of the gravel pond, and a new permeable dike would be built to an elevation of 5,457 feet msl based on the current bridge elevation above the current high water level. The dike would prevent inundation of the gravel pond. The redevelopment would entail limited filling of wetlands above (0.17 acre) and below (0.01 acre) the current high water elevation (Table 1).

Riverside Marina Area and Roxborough Day Use Area. This is a major use area that has been extensively developed. The area includes the marina, a fishing pier, extensive paved parking areas, a boat ramp, group picnic sites, and an extensive network of walkways and trails. Nearly all of the existing facilities in this area would be affected by an increase in the water level to 5,444 feet msl and most of the area would be redeveloped.

Significant fill would be completed to ensure future use in this area. The current facilities would be on an elevated surface and the fill placement would include construction of new breakwaters similar to those that currently exist that would function at water elevation 5,444 feet msl. The accessible fishing pier would be replaced in a similar location. At the marina, the reservoir floor would be excavated down to 5,412 feet msl to enable it to operate at extreme low water levels. This excavated material would be used to raise the breakwater elevations and provide fill for other locations. The marina would operate close to the existing location. The redevelopment would entail cut and fill below the current high water elevation, and would fill wetlands above (0.03 acres) and below (0.36 acre) the current high water elevation (Table 1).

The adjacent Roxborough Day Use Area would be entirely inundated at water elevation 5,444 feet msl. It would be relocated to a new location close to its existing one.

Campground Area. The Campground Area would be relocated to a higher location relative to the planned high water elevation, involving some regrading. About 0.13 acre of excavation below the existing OHWM would occur. There would be no discharge of dredge or fill material in wetlands.

Plum Creek Day Use Area. The Plum Creek Day Use Area serves as a trailhead and also has a day use area with tables, a restroom, and parking. This area would be entirely inundated at the proposed water elevation.

The area would be relocated to the southern edge of the reservoir. The recreational facilities would be replaced at this location and a new restroom built. The trailhead would be relocated to this area and inundated trail segments replaced. A new trail bridge would be built to span Plum Creek. Relocation of the Plum Creek Trail would involve the filling of an estimated 0.78 acre of wetlands. The existing sanitary sewer line at Plum Creek would need to be relocated above 5,444 ft msl. The relocation of this utility would impact 1.1 acres of wetlands. These impacts are considered temporary as they would be addressed through onsite revegetation and restoration that would be performed as part of the recreation facility relocation.

Fill material for the modification of recreation facilities would be derived from five borrow sources within the park boundary. These areas are discussed in Section 2.3. Impacts to borrow areas above 5,444 feet msl and to fill areas would be mitigated in-place by restoring the areas to conditions similar to those present prior to disturbance. The two borrow areas below 5,444 feet msl would be used as compensatory mitigation areas. These areas would be converted to wetlands using a limited amount of grading.

2.2.2 Dredge and Fill Activities Associated with Environmental Mitigation

On-site environmental mitigation will involve the creation, enhancement, and protection of wetlands, riparian habitat, Preble's habitat, and bird habitat as presented in the Compensatory Mitigation Plan (CMP) (FR/EIS, Appendix K). The creation of wetlands and riparian and Preble's habitat will focus on the conversion of uplands to wetter habitats by driving sheet pile to "mound" ground water and/or redirected surface water. The majority of the on-site mitigation will occur in uplands and will involve the use of sheet pile, and will not involve the discharge of fill material into waters of the U.S. The redirection of surface water to mitigation areas may require minor discharges of fill material into waters of the U.S. The amount and location of these minor discharges would be determined as part of final design, and would typically involve a small diversion structure. The CMP identified areas where habitat conversion would occur on-site to change upland grasslands to wetlands (Figure 3). This type of conversion is generally accomplished by manipulating ground surface elevations, and surface water and groundwater, to provide hydrology adequate to support mesic riparian and wetland habitats. In most cases, the habitat conversion activities would require heavy equipment and earthwork, including the installation of sheet pile cutoff structures to raise the ground water table closer to the surface, the creation of new secondary channels, ditches, or backwaters to bring surface water to mitigation areas, and the modification of surface topography to lower the ground surface closer to ground water or to better retain surface water. These activities entail localized in-place excavation and grading and would not impact long-term water quality or the aquatic ecosystem. In many locations, the proposed activities would provide a beneficial effect on sediment erosion control and riparian habitat preservation.

Off-site environmental mitigation for impacts to wetlands, Preble's and bird habitat will focus on the protection, restoration, and enhancement of habitat in the Chatfield Reservoir watershed. These mitigation activities will be designed to meet the opportunities for mitigation for each protected

property. It is unlikely that these off-site habitat enhancement and restoration activities would involve the discharge of dredge or fill material into waters of the U.S.

Mitigation for impacts to Preble's designated critical habitat in the Upper South Platte critical habitat unit (CHU) is proposed to occur on Sugar Creek, a tributary to the South Platte River on the Pike National Forest. The mitigation involves reduction of sediment inputs into Sugar Creek and its associated wetlands and riparian areas that are Preble's designated critical habitat, and the creation and enhancement of riparian habitat (CH2M Hill 2009a). Implementation of the proposed mitigation would involve the discharge of fill material into and a loss of about 0.8 acre of wetlands, but would result in minimizing sediment impacts into about 4.5 miles of Sugar Creek and its associated wetlands and riparian habitats, and would result in gains in Preble's riparian habitat. The activities involving the discharge of fill material into wetlands bordering Sugar Creek include:

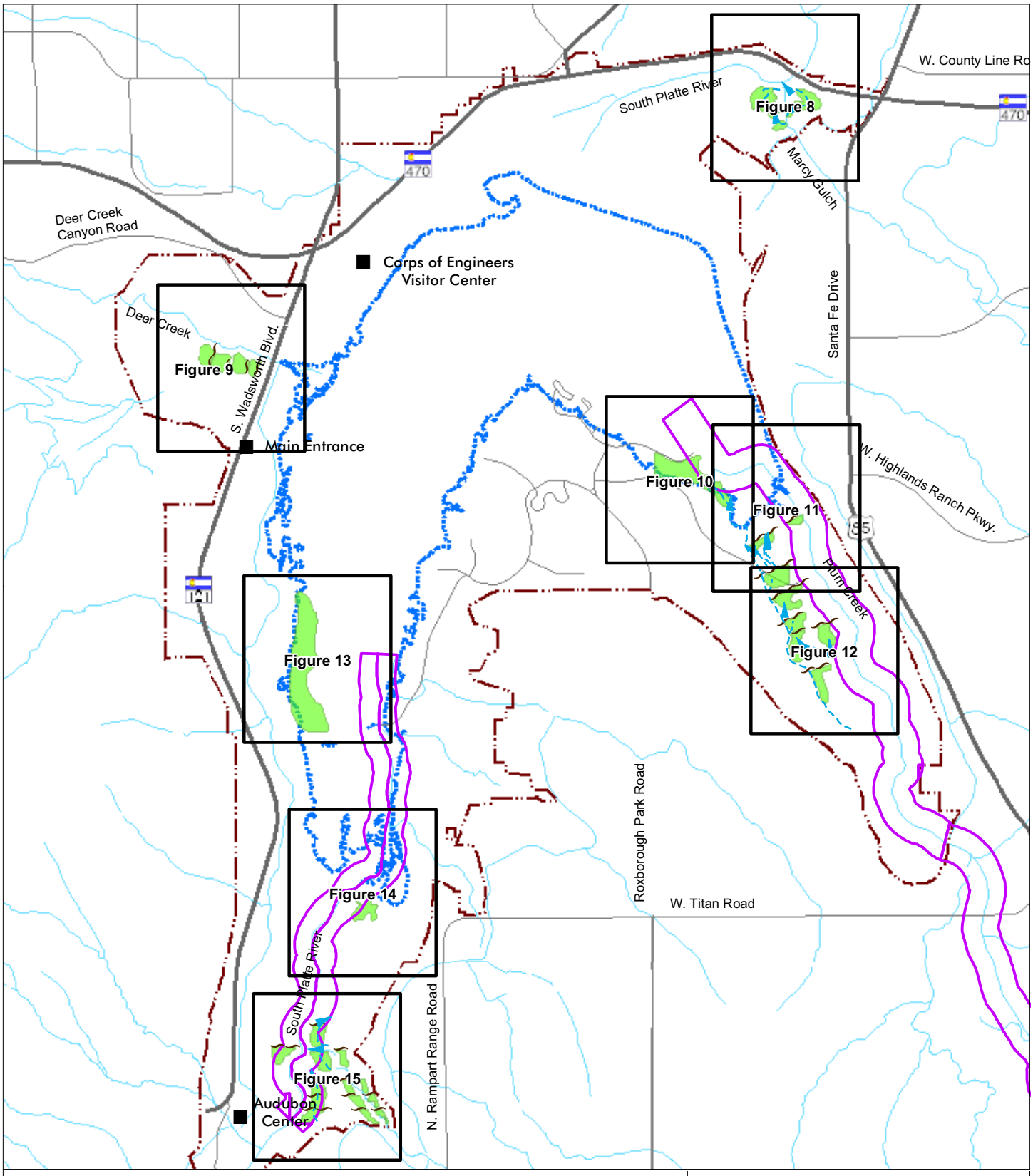
- Stilling basins for culvert rundowns from sediment traps to minimize bank erosion;
- Construction of low head water control structures to raise alluvial ground water levels to provide supportive hydrology to expanded riparian areas; and
- Replacement of road crossings of Sugar Creek with culverts designed to promote fish and small mammal passage.

2.3 Source, Description and Quantities of Fill Material (Subpart G)

Fill material for the modification of recreation facilities would be derived from five borrow sources within the park boundary (Figure 4). Based on detailed analysis in the Recreation Facilities Modification Plan, approximately 65,000 cubic yards of fill material would be needed to make the improvements to the ten recreation areas.

The five borrow areas have varying topographic conditions including flat ground, drainage channel, depression, local knob, and rolling hill. The ground is covered with native grasses, weeds and some trees. All borrow locations are above the current mean reservoir elevation so there would be no impacts to water quality caused by excavation. Three borrow locations are above the 5,444 feet msl elevation and two locations are below this elevation.

Subsurface conditions at the proposed borrow sites were investigated by drilling 34 exploratory borings (CTL Thompson 2009; Appendix 10 in EDAW/AECOM 2010). The borings were drilled to depths of 5 to 10 feet and samples of subsoils were obtained by using California drive and thin-walled, Shelby tube samplers and bulk samples of different soil types were also collected from auger cuttings. Slotted PVC pipe was installed in selected test holes to allow ground water measurement after drilling. Soil samples obtained during drilling were returned to the laboratory and visually examined by a geotechnical engineer. Laboratory testing was then assigned and included moisture content and dry density, swell/consolidation, gradation, Atterberg Limits, Proctor compaction, unconfined compression, pH, resistivity and water-soluble sulfate content. These tests were performed on natural and remolded samples. Results of the laboratory tests are presented in Appendix 10 of the Recreation Facilities Modification Plan (EDAW/AECOM 2010). Analyses of soil samples for pollutants were not conducted since there was no history or physical evidence of chemical usage or disposal.



Chatfield Reallocation Study

Pool Elevations: Tetratech

- Potential Mitigation Area
- Preble's Critical Habitat
- Sheet Pile Cutoffs
- Figure Index
- 5444 Pool Elevation (Maximum Pool Elevation of Alternative 3)
- Chatfield State Park

0 1,750 3,500 feet

1 inch = 3,500 feet

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Figure 3
Locations of Potential On-Site Mitigation Areas

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February 2011

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ERO Resources Corp.

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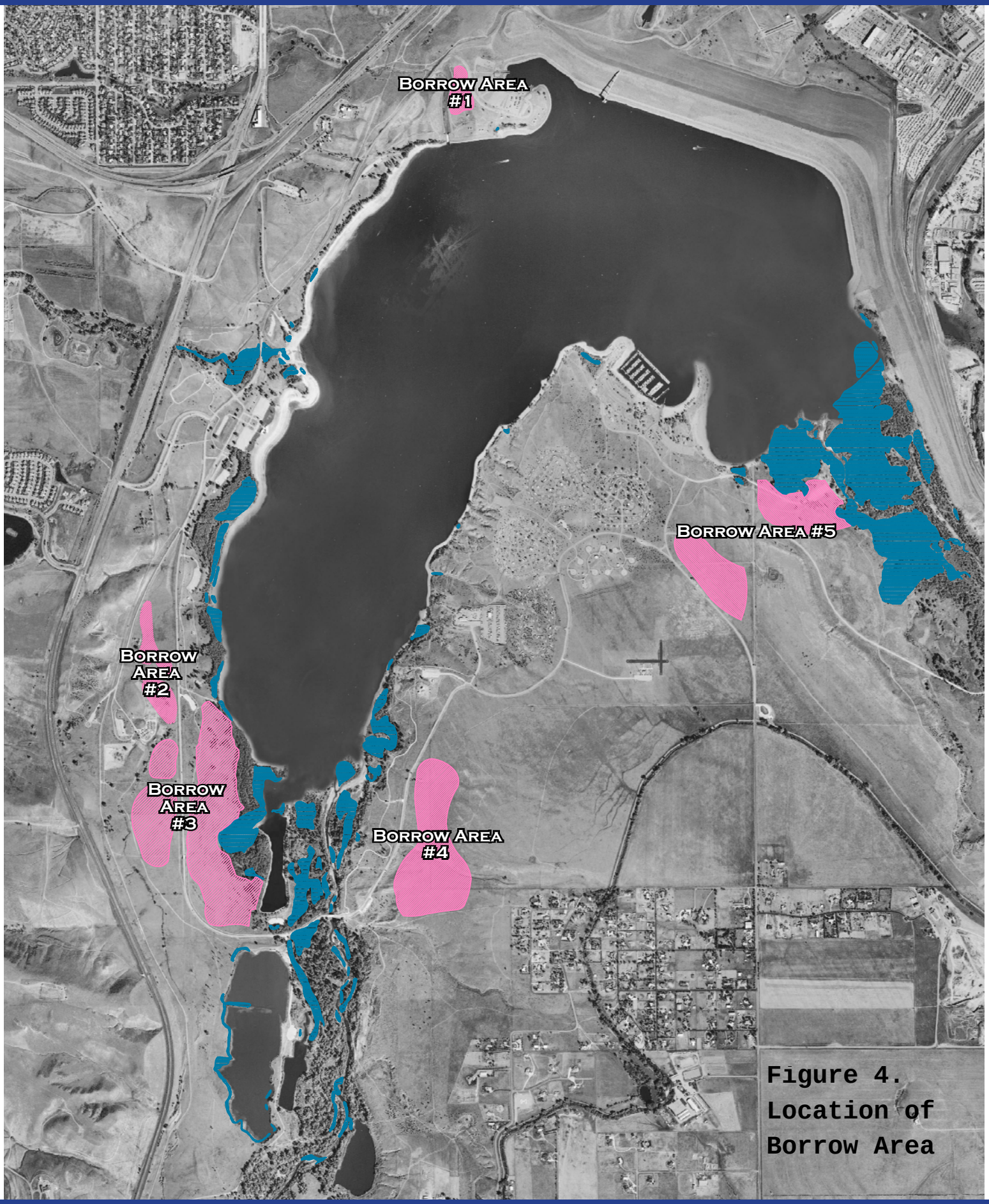

Figure 4. Location of Borrow Area

Overall Borrow Area Location Map

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Key findings of the investigation included:

- Subsoils found in the borings generally consisted of a thin cover of topsoil over clean to clayey sands and sandy clays to the maximum depth explored of 10 feet. The soils encountered in the test holes are suitable for use as structural and non-structural fill material provided that vegetation, debris and other deleterious materials are substantially removed.

- The sand is non-expansive or low swelling and a better fill material for supporting foundations, slabs-on-grade and pavements. The clay may have high plasticity and moderate to high swell potential. The potential swell of the clay fill can be reduced to low if the clay fill is moisture conditioned to moisture contents above optimum or mixed with the sand.

- Ground water was encountered during drilling in one test hole (TH-31) at a depth of 3 feet below the existing ground surface (elevation 5,438 feet msl). When the test holes were checked about two weeks after drilling, no ground water was present in any of the test holes. Therefore, ground water is not expected to be encountered during excavation.

3. FACTUAL DETERMINATIONS – EVALUATION OF POTENTIAL IMPACTS OF PROPOSED DREDGE AND FILL MATERIALS

3.1 Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

3.1.1 Physical Substrate

The substrate of the aquatic ecosystem underlies open waters and constitutes the surface of wetlands. It consists of organic and inorganic solid materials and includes water and other liquids or gases that fill the spaces between solid particles.

Modifications at some of the recreational facilities would involve dredging below the current OHWM of 5,432 feet msl (Table 1). The North Boat Ramp and Riverside Marina would involve limited dredging to shape channels for boat ramps and local boat access. Relocation of the facilities of the Catfish Flats Area (picnic shelters, restrooms, parking lot) would involve dredging below 5,432 feet msl. These dredging activities would be scheduled to occur during low reservoir periods such that there would be minimal impact to the benthic environment during construction.

3.1.2 Suspended Particulates/Turbidity

Suspended particulates in the aquatic ecosystem consist of fine-grained mineral particles, usually smaller than silt, and organic particles. Suspended particulates may enter water bodies as a result of land runoff, flooding, vegetative and planktonic breakdown, resuspension of bottom sediments, and activities including dredging and filling. Particulates may remain suspended in the water column for variable periods of time as a result of such factors as agitation of the water mass, particulate specific gravity, particle shape, and physical and chemical properties of particle surfaces.

Since dredging at the North Boat Ramp, Riverside Marina, and Catfish Flats would be scheduled to occur during low reservoir periods, there would be a very limited localized and temporary increase in suspended particulates and turbidity during construction. Dredging of the marina area would use a coffer dam and lowered reservoir levels to facilitate dry excavation of the marina area. Dry excavation will minimize suspension of particulates and turbidity during the excavation.

Disturbed areas (upland and wetland) between the current OHWM and 5,444 feet msl would be subject to erosion as the reservoir fills, resulting in some potential for suspension of finer grain materials. This impact is expected to be short-term and minimal because the fill material is composed of clayey sands and sandy clays that are suitable for use as structural and nonstructural fill. Best management design and construction practices would be used to minimize erosion during construction.

On-site mitigation will occur in upland areas. The off-site mitigation of designated critical habitat in the Upper South Platte CHU is designed to minimize erosion and sediment into Sugar Creek (CH2M Hill 2009a). Implementation of the mitigation will substantially reduce suspended particulation and turbidity in Sugar Creek.

3.1.3 Water Quality

The proposed dredge and fill activities would have little effect on water quality due to limited dredge and fill footprints of the respective sites relative to the overall area and volume of the reservoir. As previously discussed, the dredge and fill activities associated with the proposed relocation of the recreation facilities will cause some temporary suspension of particulates and turbidity. The fill material used for the recreation facilities will come from Chatfield State Park and will be similar to the materials that are currently within the reservoir (Section 2.5). Clean rock would be used for construction of the stilling basins and low-head check structure at the Sugar Creek mitigation site. The reduction of erosion and sediment to Sugar Creek is expected to improve the water quality of Sugar Creek.

3.1.4 Water Fluctuations and Circulations

No impacts to water fluctuations and circulation would result from the dredging and filling activities associated with the relocation of the recreation facilities due to the limited dredge and fill footprints of the respective sites relative to the overall area and volume of the reservoir. The on-site conversion of uplands to wetlands and riparian habitats will be supported by shallow ground water levels created by excavation and mounding created by driving sheet piles. These actions are intended to alter the current circulation and elevation of ground water to provide a supportive hydrology for the created wetlands and riparian areas. Similarly, the low-head check structures and excavation of upland areas at Sugar Creek will affect the elevation and circulation of surface and ground water to provide a supportive hydrology for expanded riparian habitat for Preble's.

3.2 Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)

3.2.1 Threatened and Endangered Species

Federal threatened and endangered species, state-listed threatened or endangered species, and species of special concern have been identified in the study area. Respective habitats have been mapped as part of the FR/EIS. Preble's, a threatened mouse subspecies, occurs in riparian habitat along the South Platte River and Plum Creek above Chatfield Reservoir. Approximately 2.54 acres of Preble's habitat would be impacted by land disturbance associated with the relocation of the trail at the Plum Creek day use area. This lost habitat would be mitigated as part of the CMP (Appendix K).

Preble's critical habitat has been designated on the Plum Creek arm of Chatfield Reservoir in the West Plum Creek critical habitat unit (75 Fed. Reg. 78430 (December 15, 2010)). The CMP includes full mitigation for impacts to designated critical habitat in the West Plum Creek CHU

A number of species of listed birds were identified, including bald eagles, golden eagle, and ferruginous hawks. Nesting areas for these species are not expected to be in the recreation relocation areas and, therefore, would not be impacted by any of the proposed dredge and fill activities.

3.2.2 Fish, Crustaceans, Mollusks, and other Aquatic Organisms in the Food Web

Chatfield Reservoir is suitable to cold-water fish species as well as cool- and warm-water species. The reservoir maintains a state designation of Class I for recreation and cold-water aquatic life.

Their respective habitat would not be impacted by any of the proposed dredge and fill activities due to limited dredge footprints of the respective sites relative to the overall area and volume of the reservoir. Dredging at the North Boat Ramp, Riverside Marina and Catfish Flats would be scheduled to occur during low reservoir periods ensuring that there would be a very limited localized and temporary increase in suspended particulates and turbidity during construction.

Mitigation associated with on-site and off-site components of the CMP include numerous sediment control measures that would provide a long-term beneficial effect on the aquatic ecosystem.

3.2.3 Other Wildlife

Landscaped and disturbed areas associated with the recreation areas planned for relocation most likely do not provide significant habitat for wildlife although several species may be found in these areas on a temporary basis. However, the recreation trail associated with the Plum Creek day use area crosses through the Plum Creek riparian area and relocation of this trail would result in approximately 2.54 acres of impact to bird habitats that will be mitigated as part of the CMP.

3.3 Potential Impacts on Special Aquatic Sites (Subpart E)

3.3.1 Sanctuaries and Refuges

Chatfield Reservoir is not a designated sanctuary or refuge under State and Federal laws or local ordinances to be managed principally for the preservation and use of fish and wildlife resources.

3.3.2 Wetlands, Mudflats and Vegetated Shallows

The discharge of dredge and fill material into wetlands was previously discussed in Section 2.3. The relocation of recreation facilities and implementation of environmental mitigation will not involve the discharge of dredge and fill material into mudflats and vegetated shallows. Adverse impacts to wetlands associated with the discharge of dredge and fill material are summarized in Table 2. Table 2 does not reflect gains in wetlands associated with these discharges for environmental mitigation on-site and at Sugar Creek.

Table 2. Estimated Adverse Impacts to Wetlands Associated with the Discharge of Dredge and Fill Material for the Relocation of Recreation Facilities and Environmental Mitigation

Activity	Temporary Impact (acres)	Permanent Impact (acres)
Recreation facility relocation	0.03	5.57
On-site environmental mitigation	0.50	0.50
Off-site Preble's critical habitat mitigation	5.00	0.82
Total	5.53	6.89

These wetland impacts would be mitigated as part of the CMP.

3.4 Potential Effects on Human Use Characteristics (Subpart F)

3.4.1 Municipal and Private Water Supplies

The discharge of dredge and fill material associated with the relocation of recreation facilities and environmental mitigation will have no adverse effect on municipal and private water supplies. Chatfield Reservoir currently serves as a component of the water supply system for Denver Water. The measures previously discussed in Section 3.1 will minimize any potential adverse effects to the water supply.

3.4.2 Recreational and Commercial Fisheries

Chatfield Reservoir supports a robust sport fish community. In addition, the reservoir is used as a walleye brood fish and wild egg collection source for statewide stocking needs. There are no commercial fisheries in the study area.

There would be a temporary impact to recreational fishing access during the relocation of the North Boat Ramp and the Riverside Marina. This is discussed in Section 3.4.3. The minimal discharge of fill material would have a minimal temporary effect on water quality and aquatic habitat as discussed in Section 3.1.

3.4.3 Water-related Recreation

The relocation of recreation facilities will affect recreation at Chatfield Reservoir. The analysis of the Recreation Facilities Modification Plan indicated a decrease in recreational user visitation and local economic activity during the estimated three-year period of construction with associated losses in revenues. Chatfield State Park is estimated to lose approximately $300,000 per year as a result of visitation reduction during the construction period, $175,000 per year during the post construction period and $90,000 per year when park management stabilizes. Local reduction in economic activity is estimated at approximately $3.8 million per year during the construction period, $2.1 million per year during the post construction period and $1.1 million per year when park management stabilizes (BBC 2010).

The USACE and Colorado State Parks plan to mitigate visitation loss by developing a construction schedule with minimal impact during high season and extensive impact during low season. This includes allowing the swim beach and marina to remain open from May through September during the entire construction period. There would be a temporary and limited impact to water-related recreation during the relocation of the various recreational facilities. The preliminary construction

implementation concept and schedule indicated that the optimum construction concept would comprise a three year construction season, with maintenance of operations of the North Boat Ramp, Swim Beach and Riverside Marina during each high-use season and with closure for relocation occurring during one off season. The remaining lower use facilities would be sequenced for relocation during high-use and low-use seasons (CH2M Hill 2009b).

3.4.4 Aesthetics

Long-term positive impacts to the aesthetics of the Chatfield Reservoir would be associated with the Recreation Facilities Modification Plan. The relocation and reconstruction of the recreational facilities would comprise modern, well-designed facilities and surrounding landscape. The Recreation Facilities Modification Plan includes sufficient funds for above-standard facilities, and funds have been included for requisite facility and landscape design services.

Short-term impacts to the aesthetics of the Chatfield Reservoir would occur during the anticipated three-year construction program. These impacts include exposure of cut; the use and restoration of borrow, fill and stockpile areas; the visual and sound impacts associated with earthmoving equipment, and the visual and sound impacts associated with facility construction. Much of the earthmoving and construction activities would occur during low-use seasons.

Construction of the on-site environmental mitigation areas will also alter the existing aesthetics of Chatfield State Park. Short-term during construction, the mitigation areas will appear as disturbed areas. Long-term, the on-site mitigation areas will change the targeted areas from upland grasslands to wetlands and riparian habitats.

Long-term, the aesthetics of the off-site environmental mitigation areas will remain as undeveloped lands as properties are protected within a matrix of developing lands. The long-term management of these properties provides the opportunity to improve aesthetics as livestock and weeds are controlled.

During construction, the Sugar Creek mitigation site would have adverse visual and sound effects associated with construction. Long-term, the reduction in erosion and sedimentation of Sugar Creek and its associated wetland and riparian habitats would have a long-term positive effect on aesthetics.

3.5 Secondary Effects on the Aquatic Ecosystem

Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.

The in-kind replacement of recreation facilities would result in similar levels of continued recreation at Chatfield State Park and Chatfield Reservoir. The water-based recreation can have effects on the aquatic ecosystem of Chatfield Reservoir through the introduction of oil and gas from gas motor-powered boats, increased shoreline erosion and turbidity associated with power boats and prop wash, and the potential introduction of nonnative aquatic invasive species (e.g., zebra mussels and Eurasian milfoil). The in-kind replacement of recreation facilities will not increase these secondary effects, but will continue the potential for these effects to occur.

The secondary effects of environmental mitigation are primarily beneficial and consistent with the purpose of environmental mitigation (i.e., creating wetlands and Preble's and bird habitat). The on-

site creation of wetlands and riparian habitat involve the conversion of xeric upland grasslands to these mesic and hydric habitats. The conversion of the upland grasslands will result in fewer upland grasslands, which are common at Chatfield State Park and will provide less habitat for the wildlife that use these upland grasslands.

Similarly, the conversion of upland areas along Sugar Creek to expand the wooded riparian habitats for Preble's will provide less upland habitat for wildlife that use this habitat. The areas along Sugar Creek selected for conversion were historically roadside pullouts and are now dominated by grasses and weeds. Similar upland habitats are common in the area.

3.6 Cumulative Effects on the Aquatic Ecosystem

Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems.

Cumulative impacts of the proposed dredge and fill activities associated with the Recreation Facility Modification Plan are expected to be small. These proposed activities, in total, would have little effect on the aquatic ecosystem due to limited dredge and fill footprints of the respective sites. The reasonably foreseeable future actions involving the discharge of fill in the Chatfield Reservoir watershed involve primarily road and bridge crossings (Douglas County et al. 2006). The discharges and impacts to waters of the U.S. including wetlands of these reasonably foreseeable actions are minor and when combined with discharge of dredge and fill material for the relocation of recreation facilities and environmental mitigation would have minor cumulative effects on the aquatic ecosystem of Chatfield Reservoir and its watershed.

The CMP identified a limited number of areas where habitat conversion would occur on-site to change upland grasslands to wetlands. These activities entail localized in-place excavation and grading in uplands and would not impact long-term water quality or the aquatic ecosystem. In many locations, the proposed activities would provide a beneficial effect on sediment erosion control and riparian habitat preservation.

4. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH RESTRICTIONS ON DISCHARGE

4.1 Adaptation of Section 404(b)(1) Guidelines to the Evaluation

There were no significant deviations from the applicable guidelines made in the preparation of this evaluation.

4.2 Evaluation of Available Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem

4.2.1 Recreation Facilities Modification Plan

Alternatives were considered to avoid and minimize the discharge of fill material into waters of the U.S. associated with relocation of the recreation facilities. The purpose of relocating the recreation infrastructure at Chatfield State Park is to maintain the recreation experience following the

reallocation of storage at Chatfield Reservoir by providing, to the maximum extent feasible, in-kind recreation facilities. The Providers contracted with EDAW to develop a plan for relocation of the recreation facilities. Once a preliminary plan for relocating the recreation facilities was developed, the preliminary plan was presented to the Corps to discuss 404 implications for the proposed relocation of the recreation facilities and how the discharge of fill material into waters of the U.S. could be avoided or minimized. Each recreation-related facility was reviewed and evaluated to determine if it could be located or constructed in a way to avoid or minimize the discharge of fill material into wetlands. Suggestions were made by the Corps, and EDAW revised the plan to minimize the discharge of dredge or fill material into wetlands. Specifically, the following components of the Recreation Facilities Modification Plan were revised to minimize the discharge of dredge or fill material into wetlands.

- **Gravel Pond Area**. The side slopes of the road north of the Gravel Pond were narrowed to 3:1 to minimize wetland loss to 0.17 acre. The road on the east side of the Gravel Pond was realigned to completely avoid the discharge of fill material into wetlands.

- **Catfish Flats**. The Catfish Flats recreation area was redesigned to avoid any discharge of dredge or fill material into waters of the U.S., including wetlands.

- **Marina Area**. The breakwaters of the marina were revised to reduce their footprint and the amount of cut and fill below the OHWM.

- **Plum Creek Area**. The relocation of the Plum Creek Trail went through several iterations to minimize the discharge of fill into wetlands.

- **North Boat Ramps**. The extension of the north boat ramps was revised to minimize the discharge of fill material below the OHWM.

A preliminary plan also was explored that would totally avoid all discharge of fill material into waters of the U.S. (EDAW 2009). While this approach is a feasible alternative to avoid the discharge of dredge or fill material into waters of the U.S., including wetlands, it would result in a greater area of net disturbance and environmental impact, and a significant reduction of the amount of desired in-kind replacement of existing recreational amenities and experiences relative to the proposed recreation facility relocation plan (Table 3). For example, the inability to do cuts and fills below the current OHWM would result in some of the existing recreational facilities needing to be moved in their entirety to be functional (i.e., components of the existing facilities could not be salvaged). For these facilities, existing parking lots, sidewalks, trails, roads, and boat ramps would be entirely relocated and reconstructed, which would result in a greater area of disturbance as previously undeveloped areas are used for the relocated facilities. As recreational facilities are moved farther from the reservoir to avoid cuts and fills below the current OHWM, other existing recreational facilities would be affected. For example, avoiding cuts and fills below the current OHWM for the marina would require moving the parking area and entry road farther south near the existing campground. These effects to the existing campground would trigger additional recreational facility relocation that would result in additional disturbance.

Table 3. Effects to Recreation Facilities for the No Discharge of Fill into Waters of the U.S. Alternative

Recreation Facility	Effects Relative to Proposed Relocation Plan
North Boat Ramp	• None of the existing amenities would be salvaged • The existing size of the parking lot would have to be smaller • The total area of disturbance would increase since none of the existing amenities could be used or salvaged • Costs would substantially increase
Massey Draw	No effects.
Swim Beach and Eagle Cove	• The existing causeway across Deer Creek would remain. At high flows and reservoir levels, the causeway would create a dam on Deer Creek. • The Balloon Launch Area would need to be relocated, which is less desirable due to microclimate conditions. • The existing parking lot, beach, and associated facilities would be moved to the west about 900 feet and would reduce the parking area and beach.
Jamison	• Reduced parking area.
Catfish Flats and Fox Run	No effects.
Gravel Pond Area	• A much longer bridge would need to be constructed, resulting in increased costs.
Platte River Trailhead	No effects.
Marina Area	• The parking lot and restrooms would need to be moved substantially farther to the south and would encroach on the existing campground. • The marina would remain in its current location, but the parking would be three times farther from the marina. • The access road to the marina will need to be moved farther to the south and will impact the existing campground south of the marina. • In order to avoid the discharge of fill material into the reservoir, the breakwaters would need to be a vertical structure. A wall would be less aesthetically pleasing. • The total area of disturbance above the OHWM would be greater. • The beach would be smaller.
Plum Creek	• No effects.

Providing recreation facilities that would maintain the existing recreational experience is an important goal for Colorado State Parks. To help provide the functional equivalency of the relocated recreation facilities, the State of Colorado and the Providers requested from the Corps a waiver of the Corps Land Use Development Policy (LUDP) given the unique and challenging conditions associated with Chatfield Reservoir in preserving "in-kind" recreation facilities and experiences. In January 2009, the Corps granted a waiver for the placement of closed floodable wet floodproofed relocated recreation structures in the upper range of the reallocated Zone 1 of Chatfield Reservoir (elevation 5,447.0 feet msl to 5,453.7 feet msl). This waiver was an important step in providing recreation facilities close enough to the reallocated reservoir elevations to provide in-kind recreational experiences.

Development of the proposed Recreation Facilities Modification Plan required consideration of the following constraints:

- The replaced recreation infrastructure needs to maintain the current recreational experience following reallocation (i.e., in-kind replacement);
- The plan needs to take advantage of the Corps LUDP waiver that will allow in-kind replacement of facilities closer to the new OHWM; and
- The existing recreational uses at the gravel pond need to be maintained by providing continued access and keeping the pond from being inundated by higher reservoir levels.

These constraints made it challenging to avoid all discharge of fill into waters of the U.S. However, the proposed relocation of recreation facilities were reviewed and evaluated to minimize the discharge of fill material into waters of the U.S., particularly wetlands. The discharge avoidance alternative was rejected because it in effect negates the benefits of the LUDP waiver and does not provide recreation facilities that maintain the existing level of recreational experience. The following are examples of how the discharge of fill material into waters of the U.S. were minimized:

- **North Boat Ramp.** Early conceptual alternatives for this area were replaced with a more extensive plan involving reconstruction of the parking lot, entry road, and boat ramps in order to minimize excavation below 5,432 feet msl and to avoid impacts to wetlands.
- **Swim Beach.** Alternative configurations of the beach and causeway were analyzed to ultimately develop an approach that minimizes the amount of wetlands filled.
- **Gravel Pond Area.** The plan includes the rebuilding of the dike with a new park road on top, in the same location as the old road in order to minimize impacts to the surrounding area as well as the preserve pond. The side slopes of the road/dike were steepened to 3:1 and the road was realigned to further reduce the filling of wetlands.
- **Marina Area.** Substantial modifications of this area were designed, including relocation of the entry road, parking lot and facilities, and the reconfiguration of the breakwater.

The proposed Recreation Facilities Modification Plan (EDAW/AECOM 2010) avoids and minimizes the discharge of fill material into waters of the U.S. to the maximum extent practicable while still meeting the objective of providing recreation facilities that maintain the existing recreational experience.

4.2.2 Environmental Mitigation

The Project also will require environmental mitigation that will involve the creation, enhancement, and protection of wetlands, riparian habitat, Preble's habitat, and bird habitat. Implementation of the proposed environmental compensatory mitigation was designed to avoid the discharge of fill material into waters of the U.S. For example, wetlands are proposed to be created at Chatfield State Park by "mounding" ground water by driving sheet pile in selected nonwetland areas to bring ground water to near the surface to support wetlands and Preble's habitat.

The entire upper South Platte Critical Habitat Unit was reviewed to determine which areas of Preble's designated critical habitat had opportunities for habitat restoration or enhancement (CMP, Appendix K). Eight drainages within the upper South Platte Critical Habitat Unit were reviewed.

With the exception of Sugar Creek, the drainages had limited opportunities for Preble's habitat restoration, enhancement, or creation. Restoration and enhancement along the 4.5-mile reach of designated critical habitat of Sugar Creek proved to be the only practicable alternative for providing the needed mitigation for impacts to Preble's designated critical habitat at Chatfield Reservoir. Structures (e.g., stilling basins and low-head water control structures) were sized to the minimum necessary to fulfill the purpose, and have minimal effects on wetlands and riparian habitats along Sugar Creek. Areas selected for excavation to create wetland and riparian habitat were historically pullouts for vehicles along the road. These areas are disturbed uplands and their conversion to riparian and wetland habitats will avoid the discharge of fill into wetlands.

The proposed environmental mitigation could be implemented without the discharge of dredged or fill material into waters of the U.S. At the Sugar Creek mitigation site, culvert rundowns could be shortened and stilling basins could be located outside of wetlands. Additionally, the low head water control structures could be eliminated with increased excavation of the riparian enhancement areas to lower these sites closer to the alluvial ground water table. For on-site wetland and riparian enhancement and creation, the discharge of dredge and fill material into waters of the U.S. could be avoided by increasing the depth of excavation to lower the mitigation sites closer to the ground water table and pumping water from wells to provide a supportive hydrology to the mitigation sites. While these approaches are a feasible alternative to avoid the discharge of dredge or fill material into waters of the U.S., including wetlands, it would result in a greater area of net disturbance and environmental impact; and would complicate the construction, maintenance, and reliability of the mitigation.

The CMP avoids and minimizes the discharge of fill material into waters of the U.S. to the maximum extend practicable while still meeting the objective of fully mitigating the impacts to wetlands, riparian habitat, Preble's habitat, and bird habitat impacted by the Project.

4.3 Compliance with Applicable State Water Quality Standards

Dredge and fill activities associated with the Recommended Plan would not violate any applicable State water quality standards.

4.4 Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act

Dredge and fill activities associated with the Recommended Plan would not violate any Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act.

4.5 Evaluation of Extent of Degradation of the Waters of the United States

Dredge and fill activities associated with the Recommended Plan would not degrade waters of the U.S.

4.6 Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic System

In preparing the plan for the relocation of the recreation facilities, a number of practicable steps were taken to minimize potential adverse impacts of the discharge on the Chatfield Reservoir aquatic system:

- Dredge and fill activities associated with the recreational facility relocation were carefully analyzed and optimized in order to provide the minimum amount of dredge and fill activity and material, and the minimum amount of wetland impact.

- Dredging activities would be scheduled to occur during low reservoir periods such that there would be minimal impact to the benthos of these areas during construction.

- Fill areas above the current OHWM would be subject to erosion as the reservoir fills, resulting in some potential for suspension of finer grain materials. This impact would be minimal because best management design and construction practices would be used to minimize erosion during construction.

5. SUMMARY FINDINGS

The Corps was authorized to implement a reallocation of existing storage space at Chatfield Reservoir to joint flood control-conservation purposes, including storage for municipal and industrial water supply and other named uses if the reallocation was determined to be feasible and economically justified. The Corps initiated a FR/EIS to conduct the analysis required to determine the feasibility and economics of the proposed reallocation as required by the P&Gs (U.S. Water Resource Council 1983). The Chatfield Reservoir reallocation alternative with 20,600 acre-feet of reallocated storage (Alternative 3) was selected as the Recommended Plan. This alternative is the locally preferred plan as well as the federal National Economic Development (NED) plan. The Recommended Plan will result in higher water levels at Chatfield Reservoir that will inundate recreation facilities and environmental resources that have developed around the resources since its construction was completed in 1976. Plans to mitigate these impacts have been proposed as part of the FR/EIS process. The primary mitigation plans include a Compensatory Environmental Mitigation Plan and a Recreational Facilities Modification Plan. Implementation of these proposed plans will involve the discharge of dredge and fill material into waters of the U.S.

The CMP identified and addressed the unavoidable environmental impacts associated with the reallocation of storage under the Recommended Alternative. The CMP identified areas where habitat conversion would occur to change upland grasslands to wetlands. This type of conversion is generally accomplished by manipulating ground surface elevations, and surface water and ground water, to provide hydrology adequate to support mesic riparian and wetland habitat. In most cases, the habitat conversion activities would require heavy equipment and earthwork, including the installation of sheet pile cutoff structures to raise the ground water table closer to the surface, the creation of new secondary channels, ditches, or backwaters to bring surface water to mitigation areas, and the modification of surface topography to lower the ground surface closer to ground water or to better retain surface water.

Modifications to the recreation facilities comprise the vast majority of actions involving dredge and fill activities. The Recreation Facilities Modification Plan identified ten areas where fill material would be obtained for site preparation, such as slope adjustment and general grading. The Plan meticulously considered cut and fill requirements that allowed for minimal impact to the reservoir under the proposed operational high water elevation of 5,444 feet above msl.

Modifications to some of the recreational facilities would involve dredging below the current OHWM of 5,432 feet msl. The North Boat Ramp and Riverside Marina would involve limited dredging to shape channels for boat ramps and local boat access. This dredging would be scheduled to occur during low reservoir periods such that there would be no impact to benthos, turbidity, and general water quality during construction.

Use of the proposed fill sites would have a limited affect on federally listed threatened or endangered species or their critical habitats, as well as other wildlife and aquatic life in and around the reservoir. Approximately 2.54 acres of Preble's habitat and 2.54 acres of bird habitat would be impacted by land disturbance associated with relocation of the Plum Creek Day Use Area. The proposed dredge and fill activities would temporarily impact about 5.53 acres and permanently impact about 6.89 acres of wetlands. These impacts would be fully mitigated as part of the CMP.

Cumulative impacts of the proposed dredge and fill activities on the aquatic ecosystem are expected to be small. These proposed activities associated with the Recreation Facility Modification Plan, in total, would have little effect on the aquatic ecosystem due to limited dredge and fill footprints of the respective sites. Off-site mitigation includes conversion of upland grassland to scrub-shrub wetland primarily on private lands upstream of the Chatfield State Park in the Plum Creek and West Plum Creek watersheds. As with the on-site mitigation activities, there would be no impacts to long-term water quality or the aquatic ecosystem, and the benefit of improved sediment erosion control.

Dredge and fill activities associated with the Recommended Plan would not violate any applicable state water quality standards or any Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act, and it would not degrade waters of the U.S.

Development of the proposed Recreation Facilities Modification Plan and CMP evaluated alternatives to the proposed discharge. The proposed Recreation Facilities Modification Plan and CMP will have less adverse impact on the aquatic ecosystem and avoid and minimize the discharge of fill material into waters of the U.S. to the maximum extent practicable while still meeting the objectives of providing recreation facilities that maintain the existing recreational experience and fully mitigate the impacts to wetlands, riparian habitat, Preble's habitat, and bird habitat.

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