



Draft Environmental Assessment

# Boulder County Wildfire Mitigation Project

Boulder County, Colorado

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**FEMA**

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**FEMA Reviewers, please NOTE:**

**The attached document is a Preliminary Draft:** This document is intended to be an early working document for FEMA to assess whether we are meeting their requirements for the report. We anticipate and encourage comments on the overall content and approach of the report.

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## Acronyms and Abbreviations

APE	Area of Potential Effect
BCPOS	Boulder County Parks & Open Space
CDA	Colorado Department of Agriculture
CDPHE	Colorado Department of Public Health and Environment
CDWR	Colorado Division of Water Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
CR	County Road
CSFS	Colorado State Forest Service
CSU	Colorado State University
CTC	Colorado Tungsten Corporation
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1996
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OAHP	Office of Archaeology and Historic Preservation
PDM	Pre-Disaster Mitigation
PM <sub>2.5</sub>	particulate matter up to 2.5 microns in diameter
PM <sub>10</sub>	particulate matter up to 10 microns in diameter
SH	State Highway
SHPO	State Historic Preservation Officer
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USCB	U.S. Census Bureau
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

## SECTION ONE INTRODUCTION

### 1.1 BACKGROUND

Fire management in the West since the Europeans arrived in the 19th century has increased the quantity of vegetative ground and ladder fuels, resulting in surface fires that today move easily into the tree canopy and fuel destructive crown fires. High density, continuous fuels in many forests allow fires to spread to large areas in a relatively short period of time, making wildfires difficult and dangerous to control (CSFS 2008).

The risk of catastrophic wildfires in Colorado's forests is extremely high because of fuel loading due to closely spaced trees as well as shrubs and dead plant material that have accumulated over time. In addition, the number of homes constructed in forested areas has increased sharply in recent years, and these homes create additional areas that require protection during a wildfire (CSFS 2008).

The greatest wildfire risk is associated with the wildland-urban interface. Boulder County is located in north-central Colorado and encompasses 741 square miles on the eastern slope of the Rocky Mountains (**Appendix A, Exhibit 1**). Boulder County has the largest amount of developed land in the wildland-urban interface of all Colorado counties and ranks 10th among all counties in western states for the amount of wildland-urban interface. According to Colorado State Forest Service (CSFS), Boulder County is the highest priority for wildfire mitigation in Colorado (Boulder County 2011).

Wildfires are a frequent occurrence in Boulder County, with a catastrophic wildfire occurring at least every 4 years. One of the most destructive fire in Colorado history occurred in Boulder County in September 2010. The Fourmile Fire destroyed 169 homes in the County, burned 6,181 acres; and the cost of fighting the fire was \$9.5 million. Without past wildfire mitigation in the County and fire suppression conducted during the fire, hundreds of additional homes could have been destroyed. The Fourmile Fire affected everyone in Boulder County and increased the awareness of the risk of wildfire in the County (Boulder County 2011).

The loss of vegetation can result in rapid runoff (flash floods) and damaging debris flows. Flash floods can affect water quality by contributing a significant amount of sediment and debris to receiving waters. In addition to destroying structures and vegetation, the extreme heat from wildfires can also damage soils. Landslides and debris flows are common following wildfires that occur on steep slopes with soils that have been damaged by wildfires. Elevations in Boulder County vary from the 5,000-foot plains to the 14,000-foot peaks of the Continental Divide. Frequently, the receiving waters of flash floods are used as a potable water source by municipalities, and the increased sediment and debris load can raise conveyance and water treatment costs. The increased sediment and debris load associated with past wildfires and flash floods has significantly increased water treatment costs of potable water used by millions of Colorado citizens.

The Federal Emergency Management Agency's (FEMA) involvement in hazardous fire risk reduction projects triggers the requirements of the National Environmental Policy Act of 1969 (NEPA; 42 U.S. Code [U.S.C.] §§ 4321–4327), which includes an evaluation by Federal

agencies of the potential environmental impacts of proposed actions and a consideration of the impacts during the decision-making process. FEMA has therefore prepared this Environmental Assessment (EA) in accordance with the Council on Environmental Quality's (CEQ's) NEPA implementing regulations (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508) and FEMA's NEPA procedures (44 CFR Part 10).

## 1.2 PURPOSE AND NEED

Boulder County, through the Colorado Division of Emergency Management, has requested financial assistance from the FEMA to implement mitigation measures to reduce the wildfire hazard in Boulder County. The assistance would be provided under FEMA's Pre-Disaster Mitigation (PDM) Program. The purpose of the PDM Program is to substantially reduce the risk of future damage, hardship, loss, or suffering in communities from natural disasters, such as wildfire, by providing the affected communities with cost-share funds for mitigation projects.

Based on the continuing risk of a catastrophic wildfire in the County, Boulder County has identified a need to implement wildfire mitigation in four areas of the County—Betasso Open Space, Mud Lake Open Space, Nederland, and Kossler Reservoir. These areas have been selected because they are at a high risk for wildfires and because of their proximity to critical facilities such as a wastewater treatment plant, reservoirs, housing, and schools.

The purpose of the Proposed Action is to reduce the wildfire hazard in four wildland-urban interface areas of Boulder County by reducing the vegetative fuels in the areas. Fuel reduction also reduces the severity of wildfires, increases the ability to control wildfires, and minimizes potential damage to property, public safety, and the natural environment.

## 1.3 DESCRIPTION OF PROJECT AREAS

The four project areas proposed for fuel reduction activities are Betasso Open Space, Mud Lake Open Space, Nederland, and Kossler Reservoir (**Appendix A, Exhibit 2**).

### 1.3.1 Betasso Open Space

The Betasso Open Space is managed by Boulder County Parks and Open Space (BCPOS) and includes parcels associated with the City of Boulder's Betasso Water Treatment Plant and Boulder Canyon Hydroelectric Facility. The Betasso project area is located approximately 2 miles into Boulder Canyon, west of the City of Boulder, and northwest of the junction of Boulder Canyon Drive and Fourmile Canyon Drive. The Betasso Water Treatment Plant and the Boulder Canyon Hydroelectric Facility are located east and southeast, respectively, of the Betasso Open Space property. The remaining adjacent properties are privately owned, and the majority of them have homes and other buildings. See **Appendix A, Exhibit 3**, and **Appendix B, Photographs 1 and 2**. As shown three treatment areas have been identified and approximately 90 acres would be treated.

The Betasso project area encompasses approximately 1,180 acres of lower montane habitat in the foothills of the Rocky Mountains and offers a variety of open space values. The property consists of a mosaic of native plant communities and important wildlife habitat and movement corridors.

Mule deer, mountain lion, black bear, and Abert's squirrel are a few of the wildlife species that inhabit this landscape, which is blanketed with ponderosa pine woodlands, mixed ponderosa pine and Douglas fir forests, open meadows, and riparian habitat. Onsite drainages include sections of Arkansas Gulch, Fourmile Creek, Boulder Creek, and a number of other unnamed, intermittent, and ephemeral streams (BCPOS 2009).

### 1.3.2 Mud Lake Open Space

The Mud Lake Open Space, which is managed by BCPOS, is located in southwestern Boulder County, about 1 mile north of the Town of Nederland. The property consists includes of an area (approximately 190-acres), which is bounded by Indian Peaks Drive on the south, the Peak-to-Peak Scenic Byway (State Highway [SH] 72) on the east, and County Road (CR) 26 on the north. A second area (approximately 36 acres) is located north of CR 26. See **Appendix A, Exhibit 4**, and **Appendix B, Photographs 4 and 5**. As shown in **Appendix A, Exhibit 4**, five treatment areas have been identified and approximately 70 acres would be subject to vegetation management treatments.

The impacts of past resource use, especially mining, during the 19th and 20th centuries are apparent in the current landscape of the Mud Lake project area. Features such as roads, shafts, adits, pits, and clearings are obvious inheritances, and the condition of the forest is a reflection of past activities. The settlers who arrived upon the discovery of gold in the Gold Rush of 1859 initiated a period of large and intense disturbances to the forests in the area. Tungsten mining became the extractive industry that would dramatically transform the land in the vicinity of Mud Lake. The Mud Lake project area includes a number of mines and shafts, and several of the largest tungsten mines in Boulder County are close to the project area (BCPOS 2004).

Approximately 80 percent of the acreage of the Mud Lake project area is classified as either lodgepole or mixed conifer forest. The majority of the remaining forested vegetation is dominated by ponderosa pine. While a fire would dramatically change the pine forests of Mud Lake project area, the landscape does contain other patches that are less prone to stand-replacing fires, including woodlands, meadows, wetlands, and riparian areas. These areas would provide continuity through the period of recovery following a large-scale fire. The forests of Mud Lake project area have become very dense as a result of fire suppression since the disturbances the turn of the 20th century. Perhaps because the drastic tree loss was so complete and severe disturbances so long-lasting on the Mud Lake project area, the second-growth forests are missing some of their patchiness and mosaic pattern that result from natural disturbances, especially fire (BCPOS 2004).

### 1.3.3 Nederland

The Town of Nederland was established in 1885 in the mountains of southwestern Boulder County and is near the Continental Divide and Barker Reservoir. Nederland is 15 miles southwest of Boulder and 50 miles northwest of Denver. According to the 2010 Census, 1,445 people live in Nederland (USCB 2011a). Land use in Nederland is urban with private residences, a business district, schools, etc.

Facilities requiring protection in Nederland include the Nederland Middle/Senior High School, Nederland Elementary School, and Barker Reservoir. Barker Reservoir provides water to the City of Boulder and the Boulder Canyon Hydroelectric Facility. See **Appendix A, Exhibit 4**, and **Appendix B, Photographs 7 and 8**. Approximately 60 acres would be treated within the eight treatments areas that have been identified within Nederland.

#### 1.3.4 Kossler Reservoir

Kossler Reservoir is managed by the City of Boulder and is the re-regulating reservoir for water delivered from Barker Reservoir to the Betasso Water Treatment Plant or the Boulder Canyon Hydroelectric Facility. Kossler Reservoir is situated on a ridge between South Boulder and Main Boulder Creek at an elevation of about 7,600 feet, and is located south and east of Flagstaff Road. Kossler Reservoir has almost no land tributary as the reservoir is fed entirely by the Barker Gravity Pipeline. Kossler Reservoir is surrounded by private property, which contains several homes (**Appendix A, Exhibit 5**, and **Appendix B, Photograph 3**). Two treatment areas have been identified within the Kossler Reservoir project area and approximately 20 acres would be treated.

The Kossler Reservoir project area contains a mosaic of mountain habitats. Ponderosa pine and Douglas fir forests are interspersed with open meadows and aspen groves. Various small streams dissect the hills before joining either Middle or South Boulder Creeks. The riparian areas contain a diversity of plants and a variety of songbirds. Elk migrate to the area from higher elevations during the winter, and mule deer are year-round residents (GEI Consultants 2002).

## SECTION TWO ALTERNATIVES

### 2.1 ALTERNATIVES NOT RETAINED

The alternatives that were considered but determined to be nonviable include prescribed burning and clear cutting vegetation.

#### 2.1.1 Prescribed Burning

Prescribed burning, which involves setting a controlled fire in a predetermined area, is the most natural way to reduce the fire hazard and promote the growth of native vegetation. However, controlled fires carry the risk of causing damage if the fire spreads beyond the treatment area. With the number of residential and critical structures in Boulder County and the need to reduce fuel loading in the immediate vicinity of these structures, prescribed burning was determined to be nonviable because of the high risk of fire damage to residential and critical structures.

#### 2.1.2 Clear Cutting

Clear cutting involves cutting and removing all or most trees in a stand at the same time, and it promotes the establishment and growth of species that are intolerant to shade. However, clear cutting causes substantial changes to the appearance of the treated area because a mature forest with large trees becomes an area with no trees or very young trees. This change is generally not acceptable to homeowners with homes in or near forested areas because of the aesthetic impact. In addition, most clear cutting has an adverse impact on local wildlife because it removes food and cover and frequently contributes to increased soil erosion, which reduces the water quality of streams and other water bodies downstream of the treatment area. For these reasons, clear cutting was determined to be a nonviable alternative.

### 2.2 ALTERNATIVES CONSIDERED

As required by NEPA, the No Action Alternative was considered. Alternative 2, the Proposed Action, consists of using integrated vegetation management techniques at each of the four project areas.

#### 2.2.1 Alternative 1 – No Action

The No Action Alternative provides a baseline for comparison in determining the potential environmental effects of the Proposed Action. Under the No Action Alternative, Boulder County would not implement any vegetation management treatments to alter vegetation patterns in the project areas. Current management activities in the project areas, including the maintenance of existing facilities, would continue, and the current methods of suppressing wildfires would continue when and where needed. Existing fuel loads and the risk of wildfires in the four project areas would not be reduced.

## 2.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

Land managers would implement practices (treatments) that would reduce the potential of the ignition of a wildfire and/or reduce the spread of a wildfire when they occur. However, wildfires are not completely preventable.

The Proposed Action consists of integrated vegetation management in which targeted trees and other fuels would be removed by hand and/or mechanical methods. Vegetation management treatments on a total of approximately 240 acres would include thinning, creation of defensible spaces, and construction of fuelbreaks.

Mechanical removal would involve use of machines such as Hydro Axes, Bull Hogs, feller bunchers, and brush hogs. The Hydro Axe is a large flail mower powered by hydraulics, and a Bull Hog is a horizontal drum armed with numerous cutting teeth distributed around its outer edge. These machines are usually mounted on a large front-end loader or track vehicle and can cut trees up to 14 inches in diameter on slopes up to 30 percent. The Bull Hog can also be used on downed and dead fuels. Brush hogs are large rotary mowers that can masticate woody materials such as smaller shrubs; the small pieces of shredded vegetation are then left in place on the forest floor. Feller bunchers consist of a standard heavy equipment base with a tree-grabbing device furnished with a chain saw, circular saw, or shear. The machine places the cut tree on a stack suitable for a skidder or forwarder or other means of transport (yarding) for further processing (e.g., delimiting, bucking, loading, chipping). Other similar equipment is also available and could be used to remove vegetation. Mechanical removal and piling would not occur on steep slopes. Operation of off-road equipment is planned to occur only when the soils are frozen or dry. Photographs of some of the equipment that would be used are provided in **Appendix B, Photographs 9 and 10**.

All skid trails, landings, normally unused roads, and other disturbed areas would be reseeded with native species as needed. Noxious weeds would be treated according to the requirements of the Colorado Department of Agriculture (CDA) Noxious Weed Management Program (CDA 2011).

Hand removal of undesired vegetation normally involves individual workers using chain saws to cut trees and shrubs, usually within 6 inches of the ground, followed by hand piling of the slash. Hand removal of undesired vegetation is frequently used on complex terrain, in areas that cannot be accessed by machinery, and adjacent to existing buildings. In areas with severe slopes, trees can be hand cut and removed via helicopters or cable-yarding systems. The vegetation treatment methods that would be used in each project area are described below.

### 2.2.2.1 Betasso Project Area

Treatments in the Betasso project area would include thinning, creating defensible space, and construction of shaded fuelbreaks. Defensible space and fuelbreaks would be created according to CSFS guidance. Treatments would occur on approximately 90 acres, with the goal of reducing tree density by 50 to 70 percent. Because of the severe slopes in the project area, the trees may be hand cut and removed via helicopter or a cable-yarding system. Feller bunchers with rubber-tired skidders would be used in areas accessible to mechanical removal (Boulder County 2011).

To maintain wildlife habitat, clumps of trees would be left, with a goal of having approximately 25 to 30 percent of the area as open space. The tree clumps would be far enough apart to reduce crown density. Individual tree clumps would vary from 2 to 80 trees and could cover up to 1 acre each (Boulder County 2011).

Treatments around the Betasso Water Treatment Plant would include creating defensible space and shaded fuelbreaks by thinning, to increase canopy spacing on the south slopes below the plant. Methods would include some hand (chain saws) and mechanical methods, depending on terrain (Boulder County 2011).

Treatments around the Boulder Canyon Hydroelectric Facility would increase the defensible space around a historic barn located west of the facility. The overall goal is to remove forest understory and open the canopy to break up continuity of fuels. Thinning at the facility would use existing fire breaks (a steep rock cliff and a road) as anchor points. Methods would include hand methods (chain saws) and removal via helicopter. The felled wood from each area would be chipped to be used as heating fuel for Boulder County facilities (Boulder County 2011).

#### 2.2.2.2 Mud Lake Project Area

Treatments in the Mud Lake project area would include thinning approximately 70 acres of the upper montane habitat to break up the continuity of fuels. The focus would be on removing dead and dying lodgepole pines via group selection that would favor aspen and ponderosa pine (Boulder County 2011). Shaded fuelbreaks would be created along roadways. Large trees would be felled using track-mounted feller bunchers. The feller bunchers would use old roads in the Mud Lake project area. No new roads would be constructed. Felled timber would be transported to a landing where it would be chipped for use as fuel in Boulder County heating facilities. When the activities are completed, the old roads would be decommissioned (Boulder County 2011).

#### 2.2.2.3 Nederland Project Area

Treatments around the Town of Nederland would focus on creating defensible space and shaded fuelbreaks around critical facilities and residences. The facilities include Nederland Middle/Senior High School, Nederland Elementary School, Barker Reservoir, and other Town-owned facilities. The parcels in Nederland surround populated areas in the town and are relatively small (from 1 to 34 acres) and urban. Because of the small areas to be treated and their proximity to populated areas, the treatments would be completed by hand, using chain saws. All felled timber would be chipped and left in place (Boulder County 2011).

#### 2.2.2.4 Kossler Reservoir Project Area

Kossler Reservoir serves as a re-regulating reservoir for the Boulder Canyon Penstock. Flow through the Boulder Canyon Penstock is regulated by a valve on the northern side of the reservoir. Treatments around the reservoir would focus on thinning to create larger canopy breaks by removing ponderosa pines with diameters of 4 to 8 inches. Treatments would be completed by hand and all slash from the felled trees would be chipped and left in place. Processing of the felled trees would not occur onsite, and trees would be decked on the northern

side of the reservoir. Felled trees would be taken to Boulder County facilities to be chipped for use as heating fuel (Boulder County 2011).

## SECTION THREE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

This section contains the results of the evaluation of the potential effects of the No Action Alternative and the Proposed Action on the human and natural environment.

### 3.1 PHYSICAL RESOURCES

The physical resources considered in this EA are geology and soils, air quality and climate change, and visual resources.

#### 3.1.1 Affected Environment

The project areas are located in the Front Range of the Rocky Mountains. The Front Range is a transition zone between the Rocky Mountains and the Great Plains. In Colorado, the Front Range is in the north-central portion of the state. The geology and soils, air patterns, and visual resources of the project areas are similar to those in the Rocky Mountains.

##### 3.1.1.1 Geology and Soils

The Rocky Mountains extend from New Mexico to Canada. The geology of the Rocky Mountains is a complex of igneous and metamorphic rock with younger sedimentary rock occurring along the margins of the southern mountains (USGS 2004). The project areas are in the foothills of mountainous areas of the Front Range and have rugged topography.

Soils in the central Rocky Mountains (including soils in the project areas) are very complex, having developed from glacial deposits, crystalline granite rocks, conglomerates, and sandstone. In the Rocky Mountains, soil orders occur in zones corresponding to vegetation zones. Granite weathers to gruss, which is coarse gravel and fine sand composed of potassium feldspar, quartz, weathered biotite, muscovite, and hornblende. This parent material provides weakly developed soils that are highly sensitive to both wind and water erosion (USFS 2005). Most of the soils, especially those at higher elevations, are quite fragile and subject to excessive erosion rates (from water) if the vegetative cover is removed.

##### 3.1.1.2 Air Quality and Climate Change

The National Ambient Air Quality Standards established by the U.S. Environmental Protection Agency (EPA) define the allowable concentrations of air pollutants that may be reached, but not exceeded, in a given period to protect human health (primary standards) and welfare (secondary standards) with a reasonable margin of safety. These standards include maximum concentrations of ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter with a diameter of up to 2.5 microns (PM<sub>2.5</sub>) or up to 10 microns (PM<sub>10</sub>).

Wildfires can generate substantial amounts of fine particulate matter that can affect the health of people breathing the smoke-laden air. Fine particulates (PM<sub>2.5</sub>) are a specific concern because of their potential to adversely affect human respiratory systems, especially in young children, the elderly, and those with lung disease or asthma. Wildfires can also generate substantial amounts of carbon monoxide near the fire, which can be a concern for frontline firefighters.

The Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division, is the primary authority for protecting air quality in Colorado under the Colorado Air Pollution Prevention and Control Act. Boulder County is classified as a nonattainment area for 8-hour ozone and an attainment area for all other criteria pollutants, including PM<sub>2.5</sub> and PM<sub>10</sub> (EPA 2011). The EPA's *Interim Air Quality Policy on Wildland and Prescribed Fires* provides guidance for mitigating the negative effects of air pollution caused by wildland and prescribed fires, while recognizing the current role of fire in resources management (EPA 1998).

The CEQ has recently released guidance on how Federal agencies should consider climate change in their decisions. Guidance for NEPA documents suggests that quantitative analysis should be done if an action would release more than 25,000 metric tons of greenhouse gases per year (CEQ 2010).

### 3.1.1.3 Visual Resources

The project and surrounding areas provide a scenic setting for residents and visitors of Boulder County. Existing visual disturbances in and near the project areas include roads, private residences, water storage facilities, transmission lines, and urban areas. Generally, the residents of Boulder County want to maintain the scenic quality of the project areas, which contributes to the value of their properties. The existing visual quality of the project area is a function in part of the past and present activities including vegetation management conducted in and near the project areas.

## 3.1.2 Environmental Consequences

### 3.1.2.1 Alternative 1 – No Action

#### **Geology and Soils**

The No Action Alternative would have no direct effect on geology or soils in the project areas because no project-related disturbance would occur. However, if any of the project areas experienced a wildfire, soils within the burn area could be adversely affected by the heat of the wildfire. Damaged soils would be more susceptible to soil erosion following precipitation events.

#### **Air Quality and Climate Change**

The No Action Alternative would not include any vegetation management. Without vegetation management, fuel loads in the project areas would continue to accumulate and the potential for wildfires, including catastrophic wildfires, would increase. Large fires would result in high emission rates of air pollutants from smoke, especially high concentrations of particulate matter. If a wildfire occurred during unfavorable meteorological conditions (e.g., gusting winds from a thunderstorm), as is often the case, the meteorological conditions would compound the adverse effects on air quality.

If no wildfires occurred in the project areas, the No Action Alternative would have no effect on the emission of greenhouse gases. If a wildfire occurred over a large area, large quantities of greenhouse gases could be released and adversely affect air quality in the area. Wildfires, even

those encompassing several thousand acres, would not be expected to affect global climate change.

### **Visual Resources**

If vegetation management is not implemented, existing forest conditions in the project areas would likely deteriorate over time. As the health of the trees in the project areas deteriorate, the risk of disease outbreaks, insect infestations, and catastrophic wildfires would increase. Visual quality would be adversely affected as vegetation quality deteriorates and would be substantially impaired if a catastrophic wildfire occurred.

#### 3.1.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

### **Geology and Soils**

The Proposed Action would not adversely affect geology because the treatments would not extend deep enough to disturb geologic resources.

Hand removal of vegetation would have no effect on soils. Mechanical vegetation removal could temporarily disturb soils, but the use of soft rubber tracts on heavy machinery would minimize soil disturbances. Post-project impacts on soils are difficult to predict because the actual impacts would depend on whether the project areas experience a wildfire. If the project areas do not experience a wildfire, the vegetation management treatments would have essentially no impact on soils. However, if a wildfire occurred and the spread of the wildfire was slowed or stalled by the vegetation management treatments (lack of fuels) to the extent that firefighters were able to contain the fire, the Proposed Action would have a beneficial effect on soils in the areas that would have burned if the vegetation management had not occurred. These beneficial effects would not be limited to areas on which vegetation management treatments occurred but to the entire area that would have been burned. Although the beneficial area cannot be quantified, the size of recent wildfires suggests that the size of the beneficial areas could be several thousand acres. The unburned areas would retain their vegetation and during future heavy precipitation events would not experience increased runoff and associated soil erosion, which would adversely affect soils.

### **Air Quality and Climate Change**

During vegetation removal, the Proposed Action would result in low levels of particulate matter and vehicle exhaust emissions. Both types of emissions would represent a temporary minor impact on air quality in the local area.

The Proposed Action has the potential for a long-term beneficial effect on air quality in the project areas by reducing the risk of a wildfire and the associated emission of greenhouse gases. The Proposed Action is not anticipated to affect global climate change.

### **Visual Resources**

A viewshed with an accumulation of dead, diseased, or downed trees is generally seen as negative. Vegetation management would have both short- and long-term effects on visual

resources in the project areas. In a viewshed that includes healthier forested areas, vegetation management could create a high contrast between treated and non-treated area. The contrast would represent a negative visual impact. Additionally, thinning trees would increase visibility in forested areas, which could reduce privacy for residents adjacent to the treated areas.

Removal of trees and understory vegetation would have a direct short-term (temporary) adverse effect on visual resources associated with the accumulation of downed trees and slash until the usable wood and slash is chipped. Once the downed trees and slash are disposed of, the treated areas would be more open and park-like and would appear natural to most observers. If the management treatments reduce the risk of a catastrophic wildfire, the Proposed Action would have a long-term beneficial effect on visual resources by preventing the loss of vegetation from a wildfire.

## 3.2 WATER RESOURCES

Water resources evaluated in this EA include groundwater, surface water, floodplains, and wetlands.

### 3.2.1 Affected Environment

#### 3.2.1.1 Groundwater

The Denver groundwater basin underlies an area of approximately 6,700 square miles. The area extends south from Greeley to approximately 25 miles southeast of Colorado Springs and extends east from the Front Range to Limon. The four major bedrock aquifers in the Denver groundwater basin are Dawson, Denver, Arapaho, and Laramie-Fox Hills. The aquifers provide water to wells constructed for domestic, livestock, industrial, commercial, municipal, and irrigation purposes (CDWR 1985).

#### 3.2.1.2 Surface Water

The project areas are located in the South Platte watershed, which contains approximately 67 percent of Colorado's population. Water storage reservoirs in the watershed have been constructed to store water during high flow periods, which is released (delivered) for domestic use when the demand for water exceeds the amount of water that can be supplied by the streams.

Water quality in the streams and reservoirs in the South Platte watershed is influenced by natural characteristics of the watershed and by past and present activities in the watershed. Water quality parameters that can affect the beneficial uses of the water include sediment, temperature, and heavy metals. Sediment levels are normally measured in terms of total suspended solids (TSS). High levels of TSS can adversely affect the conveyance, diversion, and treatment that is required prior to the water's use as a potable water supply. Increased erosion is frequently the source of high TSS levels in a stream, and increased erosion is normally associated with soil disturbance upstream in the watershed. Soil disturbances can be caused by natural occurrences (e.g., floods, landslides, and wildfires) or man-induced circumstances (e.g., road construction, mining, timber harvest, and urban development).

### 3.2.1.3 Floodplains

Executive Order (EO) 11988, Floodplain Management, requires Federal agencies to take actions to minimize occupancy of and modifications to floodplains. FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands, sets forth the policy, procedures, and responsibilities to implement and enforce EO 11988 and prohibits FEMA from funding construction in the 100-year floodplain (or 500-year floodplain for a critical facility) unless no practicable alternatives are available. To satisfy the requirements of EO 11988 and 44 CFR Part 9, FEMA uses an Eight-Step Decision-Making Process to evaluate projects that have potential to affect a floodplain.

FEMA Flood Insurance Rate Maps (FIRMs) were available for the Betasso project area (08013CO390F, June 2 1995) and Nederland project area (08013CO484F, June 2, 1995). FIRMs are not available for the Kossler Reservoir or Mud Lake project areas. Based on the available FIRMS, no designated floodplains are present within the project areas.

### 3.2.1.4 Wetlands (Executive Order 11990)

EO 11990, Protection of Wetlands, requires Federal agencies to take action to minimize the loss of wetlands. Activities disturbing jurisdictional wetlands require a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act of 1977 (33 U.S.C. § 1344).

The U.S. Fish and Wildlife Service (USFWS) Wetlands Mapper (USFWS 2011a) for the project areas indicates:

- No wetlands in the Betasso project area.
- Two freshwater forested/shrub wetlands are located immediately northeast and east of the Mud Lake project area (Appendix A, Exhibit 6).
- A freshwater forested/shrub wetland more than 500 feet north and northeast of Nederland Middle/Senior High School in the Nederland project area (Appendix A, Exhibit 7).
- Two semi-permanently flooded palustrine wetlands northeast and east of the Kossler Reservoir in the Kossler Reservoir project area (Appendix A, Exhibit 8).

FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands, sets forth the policy, procedures, and responsibilities to implement and enforce EO 11990 and prohibits FEMA from funding construction in a wetland unless no practicable alternatives are available. To satisfy the intent of EO 11990 and 44 CFR Part 9, FEMA uses an Eight-Step Decision-Making Process to evaluate projects that have potential to affect a wetland.

## 3.2.2 Environmental Consequences

### 3.2.2.1 Alternative 1 – No Action

#### **Groundwater**

The No Action Alternative does not have the potential to affect local groundwater resources.

#### **Surface Water**

Under the No Action Alternative, no vegetation management treatments would occur and current fire suppression activities would continue. Fuel loads in the project areas would increase, increasing the risk of a catastrophic wildfire. If such a fire occurred in the project areas, most of the existing vegetation in the burned area would be destroyed, and the burned area would be much more susceptible to soil erosion during future precipitation events. Flash flooding after a wildfire can contribute heavy loads of sediment and debris to streams in the affected watershed. Historically, increased loading of sediment and debris has increased water treatment costs for water suppliers located in affected watersheds. The accelerated erosion of soils in a watershed can also result in damage to other facilities and structures along affected streams including bridges, roads, campgrounds, and residences.

The No Action Alternative would not reduce the risk of a catastrophic wildfire in the project areas. If such a fire occurred, the resulting increase in sediment and debris loading of streams downgradient of the burned area could contribute to degradation of water quality in the affected streams and could adversely affect facilities and structures along those streams. Depending on the amount of sediment carried into the affected streams, it could take several years for streams to return to conditions that existed prior to the wildfire.

#### **Floodplains**

The No Action Alternative does not have the potential to adversely affect floodplains.

#### **Wetlands**

The No Action Alternative does not have the potential to adversely affect wetlands.

### 3.2.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

#### **Groundwater**

The Proposed Action does not have the potential to affect local groundwater resources.

#### **Surface Water**

Under the Proposed Action, the vegetation management treatments would not include the storage or other alterations of stream flows that would affect the quantity of water in streams downstream of the project areas.

EPA's National Pollutant Discharge Elimination System (NPDES) Program requires all construction activities that disturb more than 1 acre to receive a permit. The Water Quality Control Division of the CDPHE administers the NPDES Program in Colorado. However, vegetation management treatments such as the Proposed Action are exempt from the NPDES permitting process because they are considered nonpoint source activities (CDPHE 2011); therefore, a NPDES permit would not be required for the Proposed Action.

The CSFS *Forestry Best Management Practices to Protect Water Quality in Colorado* (CSFS 2010) recommends maintaining a 50-foot-wide buffer on both sides of a stream or wetland. This minimum 50-foot streamside management zone often extends beyond the riparian area. The management zone is critical where slopes near streams are steep, soils are unstable, or the riparian area is narrower than 50 feet. All project activities would be conducted in accordance with the CSFS *Forestry Best Management Practices to Protect Water Quality in Colorado*, and all identified perennial streams and wetlands would have a minimum 100-foot-wide vegetative buffer. Ephemeral streams would be avoided and not used as a travel corridor in any project areas (CSFS 2010).

Post-project impacts on water resources under with the Proposed Action are difficult to precisely predict. Most of the potential effects depend on whether the Proposed Action controls the spread of a wildfire. If no wildfire is prevented or the spread of a wildfire is not controlled, the Proposed Action would have no effect on water quality. However, if the Proposed Action helps to prevent or control a wildfire, especially a catastrophic wildfire, significant degradation in the water quality of the receiving streams would be prevented. Retention of the existing vegetation would also prevent an increase in runoff rates and erosion. Therefore, with the Proposed Action, the risk of damage to facilities and structures along the receiving streams would not increase over current conditions, and water treatment costs to water supplies would not change.

Mud Lake, Barker Reservoir, and Kossler Reservoir are within or near the project areas. The Proposed Action may temporarily affect water quality in these waters. Both mechanical removal and piling have the potential to result in limited soil disturbances. However, as discussed previously, mechanical removal and piling would not occur on steep slopes, and operation of off-road equipment is planned to occur only when soils are frozen or dry. Therefore, the soil disturbance is not anticipated to increase the erosion rates of soils in the project areas enough to adversely affect water quality or aquatic habitats.

### **Floodplains**

No designated floodplains are present in the project areas, and no designated floodplains would be otherwise affected by the Proposed Action; therefore, the Eight-Step Decision-Making Process for Floodplains is not required for this project.

### **Wetlands**

As discussed in **Section 3.2.2.2**, vegetation management best management practices require a 50-foot buffer around streams and wetlands. The Proposed Action would provide a 100-foot buffer around any wetlands within the projects areas; therefore, it would have no effect on any wetland area (jurisdictional or non-jurisdictional). A Section 404 permit and the Eight-Step Decision-Making Process are not required for this project.

FEMA consulted with the USACE Omaha District, Denver Office, regarding the Proposed Action and was advised that USACE consultation would not be necessary (personal communication between Margret Langworthy of USACE Denver Regulatory office and Quentin Bliss of URS on November 16, 2011 [see **Appendix C**]).

### 3.3 BIOLOGICAL RESOURCES

The biological resources considered in this EA are vegetation, terrestrial wildlife, aquatic wildlife, and threatened and endangered species.

#### 3.3.1 Affected Environment

The Betasso, Mud Lake, and Kossler Reservoir project areas are located in the Southern Rockies Crystalline Mid-Elevation Forest Ecoregion (Chapman et al. 2006). The Southern Rockies are composed of high-elevation, steep, rugged mountains where vegetation follows a pattern of elevational banding. The elevation in the ecoregion is between 7,000 and 9,000 feet, and the ecoregion is on crystalline and metamorphic substrates. Typical geomorphology includes partially glaciated mountain ridges, slopes, and outwash fans and moderate-to-high gradient perennial streams with boulder, cobble, and bedrock substrates. Natural vegetation includes aspen, ponderosa pine, Douglas fir, lodgepole pine, and limber pine forests and areas of mountain meadows (Chapman et al. 2006). A diverse understory of shrubs, grasses, and wildflowers occurs in the forests. Land use includes wildlife habitat, livestock grazing, logging, mineral extraction, and recreation, with increasing residential use.

The Nederland project area is located in the Southern Rockies Crystalline Subalpine Forests Ecoregion (Chapman et al. 2006). This ecoregion occupies a narrow elevational band on the steep, forested slopes of the mountains, with an elevation of 8,500 to 12,000 feet, just below the Alpine Zone. Dense forests are dominated by Engelmann spruce, subalpine fir, aspen, and lodgepole pine with areas of subalpine meadows. Soils are weathered from a variety of crystalline and metamorphic materials, such as gneiss, schist, and granite, as well as some areas of igneous intrusive rocks (Chapman et al. 2006). Typical geomorphology includes glaciated, high mountains with steep slopes and high-gradient perennial streams with boulder, cobble, and bedrock substrates. Land use includes recreation, logging, mining, wildlife habitat, and seasonal grazing.

##### 3.3.1.1 Vegetation

As discussed in Section 1.1, Boulder County is in a mountainous area that is heavily forested with a mixed conifer overstory. Ponderosa pine, Douglas fir, and lodgepole pine are the primary components of the overstory, while mountain juniper and grasses compose the understory. Heavy fuel loads exist in many forested areas in Boulder County. The factors that have contributed to fuel loading include decades of fire suppression, sustained drought, and increasing insect, disease, and invasive plant infestations. Mountain beetle infestations have resulted in heavy (almost total) mortality of lodgepole pines in many stands of lodgepole pine in the Mud Lake, Nederland, and Kossler Reservoir project areas. These factors have resulted in an increase in the

number of dead trees in the forests, which greatly increases the potential for a catastrophic wildfire. Photographs of typical vegetation in the project areas are included in **Appendix B**.

### 3.3.1.2 Terrestrial Wildlife

The project and surrounding areas provide habitat for a variety of bird and wildlife species, and much of this habitat occurs in the forested areas. Wildlife are an important component of the project areas and the region in general because they contribute to recreational opportunities, including hunting, bird watching, and hiking, and are a component of the outdoor environment that residents enjoy.

Wildlife frequently occurring in the project areas include big game species such as mule deer and elk; passerine birds including mountain bluebirds, warblers, and robins; various woodpeckers; raptors (hawks and eagles); and depending on climate and elevation, a limited number of amphibians and reptiles.

Because of its location, the Mud Lake project area likely also serves as a buffer between the larger, less fragmented habitats to the north and west (including Caribou Ranch and the Indian Peaks Wilderness Area) and the residential and business areas of Nederland and its adjacent mountain subdivisions to the south. Wildlife use of the project area is limited by adjacent land uses that interrupt connections to nearby habitats. These obstacles include a county road on the north, State Highway 72 (Peak-to-Peak Scenic and Historic Byway) on the east, the Conger mine area on the west, and Indian Peaks Drive and a residential subdivision on the south. As a whole, the Mud Lake project area functions as a fragmented parcel that limits its use as a mammal migration route (BCPOS 2004).

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703–711) prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations. The USFWS consults on issues related to migratory birds.

### 3.3.1.3 Aquatic Wildlife

Mud Lake, Barker Reservoir (located in Nederland), and Kossler Reservoir provide habitat for aquatic species. Runoff from the project areas flows into streams and reservoirs lower in the watershed. The quality of the water being conveyed in these streams can have both a direct and indirect effect on the aquatic resources downstream in the watershed.

Mud Lake is a small, shallow, muddy, and fishless pond. The open water habitat is dominated by crayfish while tiger salamanders, other amphibians, and reptiles use the shoreline of the lake (BCPOS 2004).

Barker Reservoir is stocked regularly with trout. Fish species that are known to occur in the reservoir include brook trout, rainbow trout, brown trout, splake (a cross between brook and lake trout), longnose sucker, and white sucker (City of Boulder 2002).

Kossler Reservoir is closed to the public and recreational use. The reservoir provides habitat for crayfish, frogs, tiger salamanders, and some game fish. Kossler Reservoir is not stocked and there are no data on the fish species present in the reservoir (City of Boulder 2002).

### 3.3.1.4 Threatened and Endangered Species and Critical Habitat

Section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1536) requires Federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of threatened, endangered, or candidate species or cause destruction or adverse modification of their critical habitats.

The USFWS lists 13 threatened or endangered species that may occur or could be affected by projects in Boulder County (USFWS 2011b). **Table 3-1** lists the federally and State-listed threatened and endangered species, their habitat requirements, and whether suitable habitat is present within the project areas.

Colorado has 16 State-listed threatened and endangered animal species that are not also federally listed (CPW 2011a). Of these 16 species, only the boreal toad, western burrowing owl, lesser prairie chicken, and river otter have the potential to occur in Boulder County (CPW 2011b). The habitat preferences for these species and the potential for those habitats to occur in the project areas are summarized in **Table 3-1**. Colorado has no State-level recognition or protection for plant species (CSU 2011).

## 3.3.2 Environmental Consequences

### 3.3.2.1 Alternative 1 – No Action

#### **Vegetation**

Under the No Action Alternative, no vegetation management would occur, and there would be no direct impact on wildlife or wildlife habitat within the project areas. However, if a wildfire burned the project areas, vegetation within the burned area would change in many ways. Most of the existing trees and shrubs could be lost and early revegetation in the burned areas would be early successional species (native and exotic). Returning the burned areas to sapling/pole stands of trees could take more than 35 years without a major revegetation effort. A substantially longer period would be required for the trees to reach maturity.

#### **Terrestrial Wildlife**

Under the No Action Alternative, no vegetation management would occur, and there would be no direct impact on wildlife or wildlife habitat within the project areas. However, if a wildfire burned the project areas, the fire could result in adverse impacts on wildlife populations within the burned areas. Individuals could be lost in the fire, and sizeable quantities of wildlife habitat could also be lost. Many of the existing trees and shrubs could be lost and without major revegetation, returning the burned areas to sapling/pole stands of trees could take more than 35 years. A substantially longer period would be required for the trees to reach maturity.

#### **Aquatic Wildlife**

Under the No Action Alternative, no vegetation management would occur, and there would be no impacts on aquatic resources within the project areas. If the project areas burned in a wildfire, the fire could result in adverse impacts on aquatic resources and habitats located in the

watersheds adjacent to and downgradient of the burned areas. Subsequent precipitation events could result in large quantities of sediment and debris being transported and deposited into downstream habitats, resulting in the loss of individuals and aquatic habitat. Debris could also create barriers that would impede the movement of fish within a stream. Without major revegetation efforts, restoring aquatic habitat in the affected streams would take several years.

### **Threatened and Endangered Species and Critical Habitat**

The No Action Alternative would not affect any federally or State-listed threatened or endangered species or designated critical habitat. If a wildfire burned across the project areas, vegetation and habitats would be adversely affected within the burned areas, including potential habitat for several protected species that may occur in the project areas.

#### 3.3.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

### **Vegetation**

Vegetation management treatments would include thinning vegetation, constructing fuel breaks, and creating defensible space on approximately 240 acres. Creating defensible space would involve removing all woody vegetation within 15 feet of structures and thinning in up to 150 feet from the structures. The purpose of thinning and fuel breaks would not be to change the type of vegetation but to reduce the quantity of fuels that would facilitate the movement of a fire from the ground to the canopy of the forest and slow the advancement of a fire. The Proposed Action would open the canopy of the existing stands of trees, which would hinder the advancement of a wildfire. Opening the stands would also have a beneficial effect on the spread of aspens and understory vegetation, because sunlight encourages their growth. The changes in the openness of the stands and in the productivity and diversification of the understory would also increase the use of the treated areas by many wildlife species.

### **Terrestrial Wildlife**

Although the vegetation management treatments would focus on reducing fuels and therefore a wildfire's rate of advancement, the treatments would also result in changes in vegetative patterns and composition that would benefit many terrestrial wildlife species. Opening the stands (reducing tree density) generally results in more useable space for mule deer and elk and increases the diversification and productivity of the forest's understory, including an increased vigor of grasses, forbs, and shrubs in the treated areas. Where aspen stands presently exist, these treatments would provide favorable conditions for expansion of the stands and the growth of young aspens which are favorite forage of elk. The Proposed Action would result in long-term beneficial impacts on local wildlife populations.

Project activities would need to be completed outside the nesting season of all migratory birds which occur in the project areas in compliance with the MBTA.

Table 3-1: Threatened and Endangered Species that  
May Occur or Could be Affected by Projects in Boulder County

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Habitat Present in the Project Areas?
Canada lynx	<i>Lynx canadensis</i>	T	E	Dense subalpine forest, willow corridors along mountain streams, avalanche chutes Elevations between 9,000 and 14,000 feet	Yes
North American wolverine	<i>Gulo gulo lucus</i>	NL	E	Cold areas with deep, persistent snow late into the year	Yes
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T	T	Wet meadows and well-developed riparian vegetation near a water source Dense combinations of grasses, forbs, and shrubs	Yes
Whooping crane	<i>Grus americana</i>	E	E	Mid-river sandbars and wet meadows along the Platte River in Nebraska	No
Least tern	<i>Sterna antillarum</i>	E	E	Bare sand and gravel bars along rivers and waste sand piles along several rivers in Nebraska	No
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	T	Old growth/mature forests with complex structural components (uneven-aged stands, high canopy closure, multi-storied levels, and high tree density) Canyons with riparian or conifer communities	Yes
Piping plover	<i>Charadrius melodus</i>	T	T	Bare sand and gravel bars along rivers and waste sand piles along several rivers in Nebraska	No
Greenback cutthroat trout	<i>Oncorhynchus clarki ssp. stomias</i>	T	T	Cold water streams and cold water lakes normally high in the watershed Adequate stream spawning habitat present during spring and clear, cold, well-oxygenated water	No
Pallid sturgeon	<i>Scaphirhynchus albus</i>	E	NA	Large turbid rivers including the lower Platte River in Nebraska	No
Western prairie fringed orchid	<i>Platanthera praeclara</i>	T	NA	Wet meadows associated with native prairies and wet riparian areas along the Platte River in Nebraska	No

Table 3-1: Threatened and Endangered Species that  
May Occur or Could be Affected by Projects in Boulder County

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Habitat Present in the Project Areas?
Colorado butterfly plant	<i>Gaura neomexicana</i> var. <i>coloradensis</i>	T	NA	Elevations between 5,000 and 6,400 feet Sub-irrigated, alluvial soils within floodplains and drainage bottoms with periodic disturbance Early- to mid-successional riparian habitat void of dense or overgrown vegetation	No
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	T	NA	Riparian edges, gravel bars, old oxbows, high flow channels, and moist wet meadows along perennial streams	No
Boreal toad	<i>Bufo boreas boreas</i>	NA	E	Elevations between 8,500 and 11,500 feet in areas that are damp and near a water source	Yes
River otter	<i>Lontra canadensis</i>	NA	T	Riparian habitats that traverse a variety of other ecosystems ranging from semi-desert shrublands to montane and subalpine forests	No
Western burrowing owl	<i>Athene cunicularia</i>	NA	T	Grasslands in or near prairie dog towns	No
Lesser prairie chicken	<i>Tympanuchus pallidicinctus</i>	NA	T	Sandsage and sandsage-bluestem grasslands	No

Sources: USFWS (2011b); CPW (2011a)

C = Candidate  
E = Endangered  
NA = Not applicable  
NL = Not listed  
T = Threatened

## **Aquatic Wildlife**

No Proposed Action activities would take place in the 100-foot buffer around wetlands and water bodies. Mud Lake, Barker Reservoir, and Kossler Reservoir are adjacent to the project areas. The water quality in these water bodies may be temporarily affected by the Proposed Action because both mechanical removal and piling have the potential to result in limited soil disturbances. However, as discussed previously, mechanical removal and piling would not occur on steep slopes, and operation of off-road equipment is planned to occur only when soils are frozen or dry. Therefore, the loss of surface cover is not anticipated to increase the erosion rates of soils in the project areas enough to adversely affect water quality and habitats in surface water.

The effect of the Proposed Action on aquatic wildlife in and downstream of the project area is difficult to quantify because most of the potential effects would depend on whether the Proposed Action prevented the ignition or the spread of a wildfire. If a wildfire did not occur, the Proposed Action would have little, if any, effect on downstream aquatic resources. However, if the Proposed Action prevented a wildfire or contributed to the containment of a wildfire, degradation of the soil stability in the affected watershed would not occur or would be minimized. Preventing increased sediment and debris in the affected streams represents a beneficial effect of the Proposed Action on aquatic resources.

The Proposed Action is not expected to have an adverse impact on aquatic resources during the implementation of vegetation management treatments. Once the treatments have been implemented, the Proposed Action is expected to have a neutral or beneficial effect on aquatic resources.

## **Threatened and Endangered Species**

### Federally Listed Species

The USFWS lists 11 threatened or endangered species that may occur in Boulder County or could be potentially affected by projects located in Boulder County (USFWS 2011b). **Table 3-2** lists FEMA's determinations for impacts to the 11 federally listed species and five state listed species.

The whooping crane, least tern, piping plover, pallid sturgeon, and western prairie fringed orchid do not occur in Boulder County but could be affected by flow depletions in the Platte River basin, which includes the South Platte watershed. Because the Proposed Action would have no effect on flows on any stream or river in the Platte River basin, FEMA has determined the Proposed Action would have no effect on these five species.

Potential impacts to the six species that may occur in Boulder County are discussed below.

Table 3-2: Determinations for Federally and State-Listed Species

Common Name	Determination
<b><u>Federal Listed</u></b>	
Canada lynx	May affect, not likely to adversely affect
Preble's meadow jumping mouse	May affect, not likely to adversely affect
Whooping crane	No effect
Least tern	No effect
Mexican spotted owl	May affect, not likely to adversely affect
Piping plover	No effect
Greenback cutthroat trout	No effect
Pallid sturgeon	No effect
Western prairie fringed orchid	No effect
Colorado butterfly plant	No effect
Ute Ladies'-tresses	No effect
<b><u>State Listed</u></b>	
North America wolverine	May affect, not likely to adversely affect
Boreal toad	May affect, not likely to adversely affect
River otter	No effect
Western burrowing owl	No effect
Lesser prairie chicken	No effect

### ***Canada Lynx***

The Canada lynx is found in dense subalpine forest and willow-choked corridors along mountain streams and avalanche chutes, the home of its favored prey species, the snowshoe hare. The Colorado Parks and Wildlife (CPW) indicates the Canada lynx appears to be restricted to extremely isolated areas of the mountains in the central portion of the state and generally occurs at elevations of between 8,000 and 14,000 feet (CPW 2011c). The elevation of the project areas ranges from 5,900 to 8,600 feet. The CPW reports the lynx is known to occur in Boulder County but is extremely rare (CPW 2011c). The Canada lynx may on occasion occur in habitat in the project areas, but because the species generally avoids human contact and all of the project areas are near residential areas, use of the project areas by Canada lynx is unlikely. Based on the low potential of the Canada lynx to occur in the project areas, FEMA has determined the Proposed Action may affect but is not likely to adversely affect the Canada lynx. In a letter dated January 27, 2012, the USFWS concurred with this determination.

### ***Preble's Meadow Jumping Mouse***

The distribution range of the Preble's meadow jumping mouse includes the northern Front Range of Colorado and southeastern Wyoming. Typical habitat for the mouse is wet meadows and well-developed riparian vegetation in the vicinity of a water source. Generally, their preferred habitat

includes a relatively dense combination of grasses, forbs, and shrubs. However, the species regularly ranges out from the riparian/wet meadow habitat into adjacent upland habitat to feed and hibernate.

Hibernation extends from September/October to May. Hibernation nests occur underground both within and outside the 100-year floodplain. Hibernacula have been located under willow, chokecherry, snowberry, skunkbrush, sumac, clematis, cottonwoods, Gambel's oak, thistle, and alyssum.

These mice feed on a wide range of vegetation depending on the habitat they are occupying and the season. Reported food items in their diet include insects, seeds, fungus, and fruit.

The USFWS listed the species primarily because of the rapid loss of their habitat along the Front Range in Colorado, which was associated with development on private lands. Development activities involving wetlands, wet meadows, and closure of irrigation canals and ditches represent potential loss of habitat for the Preble's meadow jumping mouse. Critical habitat designated by the USFWS is present in southeastern Boulder County (outside of the project areas) along South Boulder Creek from El Dorado to the Baseline Reservoir (USFWS 2011a).

The species has been identified in Tom Davis Gulch on Walker Ranch (BCPOS property), which is approximately 1.25 miles southwest of Kossler Reservoir. Potential habitat may be present in the project area around Kossler Reservoir.

Proposed vegetation management treatments would occur during the winter when the mice are usually hibernating, and no activities would occur within 100 feet of any riparian areas. Therefore, FEMA has determined the Proposed Action may affect but is not likely to adversely affect the Preble's meadow jumping mouse. In a letter dated January 27, 2012, the USFWS concurred with this determination.

### ***Mexican Spotted Owl***

Old growth or mature forests that contain complex structural components (uneven-aged stands, high canopy closure, multi-storied levels, and high tree density) are the primary habitat used by the Mexican spotted owl. Canyons with riparian or conifer communities also represent important habitat for the spotted owl. The USFWS and CPW indicate the Mexican spotted owl has the potential to occur in Boulder County (USFWS 2011c; CPW 2011c); however, no critical habitat designated by the USFWS (USFWS 2001) is present in Boulder County.

The type of habitat used by the Mexican spotted owl may be present in the Betasso project area. However, because of the high level of disturbance associated with housing and State Highway 119 near the project area, Mexican spotted owls are not likely to be present. Wildlife surveys conducted in the Betasso project area have not detected the presence of Mexican spotted owls (BCPOS 2009).

FEMA has determined the Proposed Action may affect but is not likely to adversely affect the Mexican spotted owl. In a letter dated January 27, 2012, the USFWS concurred with this determination.

***Greenback Cutthroat Trout***

Greenback cutthroat trout inhabit cold water streams and cold water lakes normally located high in the watershed. Occurrence is frequently upstream of a barrier that restricts the upstream movement of fish (CPW 2011c). The presence of such a barrier isolates the greenback cutthroat trout from other subspecies of cutthroat trout as well as rainbow trout. Habitat requirements include adequate clear, cold, well-oxygenated water for spawning habitat present during spring (CPW 2011c). These habitats are not found within or downstream of the project areas. FEMA has determined the Proposed Action would have no effect on the greenback cutthroat trout.

***Colorado Butterfly Plant***

The Colorado butterfly plant occurs at elevations of between 5,000 and 6,400 feet on sub-irrigated, alluvial soils in floodplains and drainage bottoms (USFWS 2011c). The species requires early- to mid-successional riparian habitat with no dense or overgrown vegetation. It is an early successional species that is adapted to stream channel sites that are periodically disturbed. In fact, without periodic disturbances, occupied habitat can become choked with willows, grasses, and exotic species, causing loss of the species in that location. The USFWS indicates the most immediate and severe threat to the species is residential and urban development (USFWS 2011c).

The project areas are above the preferred elevations and do not contain suitable habitat for this species. Therefore, FEMA has determined that the Proposed Action would have no effect on the Colorado butterfly plant.

***Ute Ladies'-Tresses***

The Ute ladies'-tresses is a perennial terrestrial orchid that occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist wet meadows along perennial streams. As discussed previously, the project areas do not include any perennial streams or wet meadows (USFWS 2011c). FEMA has determined the Proposed Action would have no effect on the Ute ladies'-tresses.

**State-Listed Threatened and Endangered Species**

The State-listed species for Boulder County that are not also federally listed are the North American wolverine, boreal toad, western burrowing owl, lesser prairie chicken, and river otter. **Table 3-2** lists the determinations for State-listed species.

***North American Wolverine***

The North American wolverine does not appear to prefer specific vegetation or geological habitat aspects but instead requires areas that are cold and that receive enough winter precipitation to maintain deep persistent snow late into the warm season. The requirement of cold, snowy conditions means that in the southern portion of the species range where ambient temperatures are warmest, wolverine distribution is restricted to high elevations; at more northern latitudes, wolverines are present at lower elevations and even at sea level in the far north. Deep, persistent, and reliable spring snow cover (April 15 to May 14) is the best predictor of wolverine occurrence in the contiguous United States.

Wolverines are opportunistic feeders and consume a variety of foods depending on availability. They scavenge primarily carrion but also prey on small animals and birds and eat fruits, berries, and insects (USFWS 2011c).

According to CPW, in spring 2009, researchers with the Greater Yellowstone Wolverine Program tracked a wolverine from the Grand Teton National Park south into north-central Colorado, the first wolverine confirmed in Colorado in 90 years (CPW 2011c). Although wolverines may occur in the project areas during the winter when deep snow is present, they are not likely to be present in the warmer months at the lower elevations. Based on the low potential of occurrence in the project area, FEMA has determined the Proposed Action may affect but is not likely to adversely affect the North American wolverine. The wolverine is candidate for federal listing and the in a letter dated January 27, 2012 (**Appendix C**), the USFWS concurred with FEMA's determination

#### ***Boreal Toad***

The boreal toad is generally located in areas with an elevation of between 8,500 and 11,500 feet that are damp and near a water source. The Mud Lake and Nederland project areas are at approximately 8,500 feet and 8,300 feet, respectively. The toad typically lives in damp conditions in the vicinity of marshes, wet meadows, streams, beaver ponds, glacial kettle ponds, and lakes interspersed in subalpine forest (lodgepole pine, Engelmann spruce, subalpine fir, and aspen) (CPW 2011c). These habitats have the potential to occur in the Mud Lake Open Space and Nederland project areas. However, the proposed vegetation management treatments would occur during the winter when the toads are hibernating, and no activities would occur within 100 feet of any riparian areas. Therefore, FEMA has determined the Proposed Action may affect but is not likely to adversely affect the boreal toad.

#### ***Western Burrowing Owl***

The western burrowing owl occurs in grasslands in or near prairie dog towns (CPW 2011c). There are no prairie dog towns in the project areas and FEMA has determined the Proposed Action would have no effect on the Western burrowing owl.

#### ***Lesser Prairie Chicken***

The lesser prairie chicken occurs in sandsage and sandsage-bluestem grasslands (CPW 2011c). There are no grasslands present in the project areas and FEMA has determined the Proposed Action would have no effect on the lesser prairie chicken.

#### ***River Otter***

The river otter inhabits riparian habitats that traverse a variety of other ecosystems ranging from semi-desert shrublands to montane and subalpine forests. River otters require permanent water of relatively high quality and with an abundant food base of fish or crustaceans. They occur in the Colorado, Gunnison, Piedra, and Dolores Rivers and tracks and other signs of otters have also been found in the Poudre and Laramie drainages in Larimer County (CPW 2011c). The project areas are located outside of these areas and do not contain habitat used by the species. Therefore, FEMA has determined the Proposed Action would have no effect on the river otter.

### 3.4 CULTURAL RESOURCES

The National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470 et seq.) constitutes the primary Federal policy protecting historic properties and promoting historic preservation, in cooperation with States, tribal governments, local governments, and other consulting parties. The NHPA established the National Register of Historic Places (NRHP) and designated the State Historic Preservation Officer (SHPO) as the entity responsible for administering State-level programs. The NHPA also created the Advisory Council on Historic Preservation, the Federal agency responsible for overseeing the process described in Section 106 of the NHPA (16 U.S.C. § 470f) and for providing commentary on Federal activities, programs, and policies that affect historic properties.

Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) contain the procedures for Federal agencies to follow to take into account the effect of their actions on historic properties. The Section 106 process applies to any Federal undertaking that has the potential to affect historic properties, defined at 36 CFR § 800.16(l)(1) as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.” Although buildings and archaeological sites are most readily recognizable as historic properties, the NRHP contains a diverse range of resources that includes roads, landscapes, and vehicles. Under Section 106, Federal agencies are responsible for identifying historic properties in the Area of Potential Effects (APE) for an undertaking; assessing the effects of the undertaking on those historic properties, if present; and considering ways to avoid, minimize, or mitigate any adverse effects. Because Section 106 is a process by which the Federal Government assesses the effects of its undertakings on historic properties, it is the primary regulatory framework that is used in the NEPA process to determine impacts on cultural resources.

#### 3.4.1 Affected Environment

Gordon C. Tucker, Jr., a URS archaeologist, qualified under the Secretary of the Interior’s Professional Qualification Standards for archaeology (36 CFR Part 61), conducted an assessment of the Proposed Action’s potential to affect historic properties in the APE.

The project locations are found on the eastern slopes of the Rocky Mountains in western Boulder County, at elevations ranging between approximately 5,800 and 8,600 feet above mean sea level. The 20 discontinuous parcels composing the project are concentrated within four general areas: Nederland, Mud Lake, Betasso Open Space, and Kossler Reservoir. The general project area is located approximately 30 minutes west of Boulder and 1.5 hours northwest of Denver.

The project area is a heavily forested, mountainous area which is principally drained by Boulder Creek and its tributaries. The defensible space treatments would help protect more than 3,000 residences and the following critical facilities: Betasso Water Treatment Facility, Boulder Canyon Hydroelectric Plant, Kossler Reservoir Gatehouse, Boulder Canyon Penstock Butterfly Valve House, Nederland Middle-High School, and Nederland Elementary School. The APE for direct effects encompasses the individual treatment areas, ranging in size from 20 to 90 acres (**Table 3-3**). The APE for indirect effects extends from the treatment areas to the nearest ridgeline or one-half mile (whichever comes first), as shown on the attached maps (**Appendix A**,

**Exhibit 9).** The mountainous landscape effectively reduces or eliminates the visual effects of the treatment activities.

Table 3-3: Locations of Boulder County Wildfire Mitigation Treatment Areas

Treatment Location	Latitude	Longitude	Elevation (feet)	Approx. Size of Treatment Area (acres)	Treatment Type
Nederland	39.961694	-105.49722	8,200	60	Hand
Mud Lake Open Space	39.97806	-105.50867	8,380	70	Mechanical
Betasso Open Space	40.01222	-105.34278	6,480	90	Hand and Mechanical
Kossler Reservoir	39.97972	-105.33222	7,720	20	Hand
Total				240	

The town of Nederland is located at the crossroads of SH 119 and the Peak-to-Peak Scenic and Historic Byway (SH 72). The town of Nederland sits in a glacial valley 16 miles southwest of the City of Boulder. The valley was often visited by Native Americans and fur trappers in the years before the 1859 Colorado Gold Rush, which began approximately 20 miles to the south. Gold was found that same year in Left Hand Canyon, approximately 19 miles to the northeast. By 1861, a small group of prospectors had established a small settlement called Dayton on the western edge of the valley, and were finding small amounts of gold. Ten years later, silver was found at two sites, Caribou Hill and Poor Man Mine, near Nederland, and a brief silver rush began, bringing in thousands of prospectors (NAHS 2012).

By 1871, when a post office was opened, the town had changed its name twice, being known for a short period as Brown's Crossing and then as Middle Boulder, named after the creek that runs through the area. That same year, a mill was constructed to process the silver ore at the Caribou Mine (NAHS 2012). In 1873, a group of Dutch investors purchased the Caribou Mine and the attendant mill and facilities in town. Many of the miners at the Caribou works, noting the 2,000-foot difference in elevation between the town and mine, had begun calling the town Nederland, which means "lower lands" in Dutch. In 1874, the town's residents voted to incorporate, and chose the name Nederland as the name of their community (NAHS 2012).

Mining continued in the area for several years, but the silver deposits in the area were becoming depleted and the gold ore found in the area was often dark in color and considered unsuitable for mining or processing. The population of the town shrank, from 331 in 1880 to 182 by 1900 (NAHS 2012). In 1910, Barker Reservoir was built in the valley, and tourists began coming up the rough road that led to Boulder to visit the natural wonders that distinguish the valley.

Sam Conger, the prospector who had opened the Caribou Mine, realized that this dark ore was rich in tungsten, which was used by the growing American steel industry, to harden steel and iron products. In 1904, the Wolf Tongue Mining Company was formed, and the former silver mill in Nederland was converted to tungsten processing. The population began to grow again, and by 1915, 22 mines were operating in the area (NAHS 2012). Production peaked in the years of World War I (1914-1918), when the price of tungsten ore jumped from \$9.00 per unit

(approximately 20 pounds) in 1914 to \$93.90 per unit in 1916 (Ubbelohde et al. 2001). The population grew to more than 3,000, but demand for tungsten dropped sharply after World War I ended and, by 1920, the town's population had dropped again to 200 (NAHS 2012).

For the next four decades (the 1920s until the 1960s) Nederland was a small community that served the ranches and farms in the surrounding area, and tourists coming to fish at Barker Reservoir. Tungsten mining in the area enjoyed another brief period of prosperity during World War II, but the town remained quiet until the late 1960s when young people (often called "hippies" in popular culture) began moving into the area seeking an alternative lifestyle. The new residents brought a renewed energy to the community, and others began moving there. The town enjoyed steady population growth and became a bedroom community for Boulder. According to the 2010 census (City of Nederland), the community has approximately 1,445 full-time residents, as well as many more part-time residents who come to the reservoir and to access the many outdoor activities in the region, including nearby Eldora Ski Area (NAHS 2012).

#### 3.4.1.1 Aboveground Resources

The potential for previously unidentified above-ground historic resources to be located within the APE is high, given the intensity of historic mining activities in this area during the last 150 years. A search of the NRHP Database (<http://www.nps.gov/nr/research/>) revealed that Boulder County has 78 above-ground historic properties listed in the NRHP, of which five are located within one mile of the project area. Two of these properties, the Nederland Super Market (5BL7870) and the Walker Ranch Historic District (5BL235), occur within the indirect APE for the Nederland, Mud Lake, and Kossler treatment areas (**Table 3-4**).

A search of COMPASS for the four treatment areas revealed only one NRHP-eligible property within the APE. The Boulder Canyon Hydroelectric Plant (5BL754) was first recorded in 1980 and re-evaluated by the consultant as eligible for listing in the NRHP. The NRHP-eligible property is located within the indirect APE for the Betasso Open Space treatment area (**Table 3-5**).

According to the Boulder Valley School District web page, the Nederland Middle-High School was constructed in 1971. The Nederland Elementary School building appears to date to the late 1960s or early 1970s, as it reflects a similar form and style. The treatment area south-southwest of Barker Reservoir consists of single-family residential dwellings that appear to date to the last quarter of the twentieth century, and condominiums that appear to have been built within the last 10 to 15 years.

Table 3-4: NRHP-listed and NRHP-eligible Properties Near the Boulder County Wildfire Mitigation Treatment Areas.

Site No.	Site Name	Age	Description	Location	Evaluation Date
<b>NRHP-Listed Properties</b>					
5BL235	Walker Ranch Historic District	1890-1930	Historic ranch building complex with several dozen buildings and features	Located ¼ mile west of Kossler treatment area. <b>Within APE.</b>	6/14/1984
5BL7870	Nederland Super Market	1948	One-story, flat-roofed concrete block commercial building. Replaced Tanner Grocery Store, which was destroyed by fire.	Located 500 ft northwest of Nederland treatment area. <b>Within APE.</b>	1/13/2009
5BL358.1	Denver, Boulder & Western Railway (formerly Colorado & NW Railroad Company); also known as Switzerland Trail of America)	1919-1920	The DB&W built the line from Boulder, through Ward, to Eldora between 1894 and 1904. It served small mining communities in the region for several decades, until the tracks were removed in 1919-1920.	Located on western edge of Nederland/Barker Reservoir and approximately 1 mile west of Nederland Elementary School and Nederland Middle-High School. <b>Outside APE.</b>	9/18/1980
5BL758	Eldora Historic District	Late 19 <sup>th</sup> -early 20 <sup>th</sup> century	Collection of Rustic Tourist buildings in Eldora, a former mining town, including 55 contributing and 12 non-contributing buildings.	Located approximately 2 miles west of Nederland Middle-High School, at the extreme western edge of Nederland/Barker Reservoir. <b>Outside APE.</b>	10/4/1989
5BL7902	Boulder Creek Bridge	1953	Located on SH 119 where it crosses Boulder Creek.	Located approximately one-half mile east of the Betasso treatment area. <b>Outside APE.</b>	3/11/2003
<b>NRHP-Eligible Properties</b>					
5BL754	Boulder Canyon Hydroelectric Plant	1909-1910	Large, rectangular steel-framed and brick building with eight associated buildings	Located within Betasso treatment area. <b>Within APE</b>	11/22/2010
5BL7649	Woodbury/ Nederland Drug	1909-1932	One-story, rectangular plan, false-front, front-gabled commercial building	Located in Town of Nederland, approximately 1/4-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	12/22/2008

Table 3-4: NRHP-listed and NRHP-eligible Properties Near the Boulder County Wildfire Mitigation Treatment Areas.

Site No.	Site Name	Age	Description	Location	Evaluation Date
5BL7671	McRae Hotel	1916	Two-story, front-gabled wood frame commercial building	Located in Town of Nederland, approximately ¼-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	12/22/2008
5BL7748	MacKenzie Residence	1930	1.5-story, cross-gabled T-plan dwelling	Located in Town of Nederland, approximately ¼-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	8/27/2009
5BL7797	Not Assigned	1920	One-story, wood frame hipped-roof dwelling	Located in Town of Nederland, approximately ¼-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	12/22/2008
5BL7813	McKenzie Transfer Company	1935	Two-story, gambrel roof barn and auto garage	Located in Town of Nederland, approximately ¼-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	8/27/2009
5BL10968	Not Assigned	1953	One-story, front-gabled roof dwelling	Located in Town of Nederland, approximately 1/2-mile southeast of Nederland Elementary School. <b>Outside APE.</b>	8/27/2009

#### 3.4.1.2 Archaeological Resources

The potential for previously unidentified archaeological historic properties to be located within the APE is high. To date, no NRHP-listed or NRHP-eligible (as determined by the SHPO) archaeological sites have been documented in Boulder County.

#### 3.4.1.3 Summary

A search of COMPASS, Colorado's On-line Cultural Resource Database, for the four treatment areas produced the following results for each treatment area.

#### **Nederland**

For the Nederland treatment areas in Township 1 South, Range 73 West, Sections 11, 12, 13, 14, and 23, 6th P.M., 15 surveys have been conducted and 324 sites recorded. None of the parcels in the Nederland/Barker Reservoir project areas has previously been surveyed. The Peak to Peak

Scenic and Historic Byway (5BL10528.1) intersects SH 119 in the center of Nederland and continues north for approximately 55 miles to Estes Park. Built in 1918, it is Colorado's oldest scenic byway. As described in COMPASS, the Colorado SHPO officially determined on September 18, 2008, that more data on the highway are needed before a determination of NRHP eligibility can be made.

### **Betasso Open Space**

For the Betasso treatment area in Section 34 of Township 1 North, Range 71 West, 6th P.M., eight cultural resources surveys have been conducted between 1986 and 2009. One of these projects, completed in 2008 by RMC Consultants Barclay, Dulaney and King, Class III Cultural Resources Inventory of the Betasso Preserve, Tinsley and Williams Open Space Properties, Boulder County, Colorado) surveyed a total of 408 acres, which encompassed all of the proposed Betasso Open Space treatment area (**Appendix A, Exhibit 9**). This survey documented 10 historic sites, 2 prehistoric sites, and 32 historic isolated finds. Five sites (two prehistoric stone circles, one historic foundation, one historic structure, and one historic log cabin) were unevaluated for NRHP eligibility, while the other seven sites (two historic roads, a historic pipeline, a burned historic structure, a historic artifact scatter, and a historic mine adit) were recommended as not eligible for listing in the NRHP. None of the isolated finds was considered eligible for listing in the NRHP. The Betasso Water Treatment Facility and Boulder Canyon Hydro Facility were not included in this survey. The Boulder Hydroelectric System (5BL752), which connects Barker Reservoir near Nederland with the Boulder Canyon Hydroelectric Plant (5BL754), was first recorded in 1980 and re-evaluated by the consultant as eligible for listing in the NRHP. The historic Boulder Canyon Road (5BL622), also known as SH 119, runs through the middle of the indirect APE, between the Betasso treatment areas.

### **Kossler Reservoir**

The Kossler Reservoir and the Boulder Canyon Penstock Butterfly Valve House are located in Section 10 of Township 1 South, Range 71 West, 6th P.M. In 1995, the Bureau of Land Management surveyed a large parcel of land approximately one-quarter mile west of Kossler Lake but did not record any cultural resources. Surveys of historic sites in Boulder County were conducted in 1981 and 2003 and recorded the Kossler Ranch/Malcolm Residence/Kossler Burial Grounds (5BL497/5BL603), which dates from the mid-1880s. The cemetery is still in use, with headstones dating between 1887 and 1995. The site is located approximately one-quarter-mile northeast of Kossler Lake. The Barker Gravity Pipeline (5BL752.3), also first recorded in 1980, runs between Barker Reservoir and Kossler Reservoir, along the same alignment as the Boulder Hydroelectric System (5BL752). Consultants have recommended both linear resources as eligible for listing in the NRHP. Surveys conducted nearby at the Walker Ranch identified nine historic isolated finds, all related to historic mining activities, and one prehistoric isolated find.

### **Mud Lake Open Space**

In 2004, Native Cultural Services conducted an "Archaeological Reconnaissance of the Mud Lake Parcel," which may correspond to a portion of the proposed Mud Lake treatment area, which is located in Section 12 of Township 1 South, Range 73 West, 6th P.M. The reconnaissance described this parcel as a "mining landscape, with numerous prospect pits and

trenches, as well as mine shafts and waste rock piles. Two track roads and trails accessing the mines are common.” Native Cultural Services concluded that “significant archaeological sites are not present in the Mud Lake parcel.” None of the mining features noted during the reconnaissance have been formally recorded.

### Determination of Effects

While historic properties are present in the APE, FEMA has considered the manner in which the undertaking will be implemented in determining whether additional cultural resources investigations within the APE are necessary and what effects the proposed undertaking may have on historic properties. This analysis is summarized in **Table 3-5**.

Table 3-5: Summary and Recommendations

Treatment Location	Treatment Method	Previous Cultural Resources Survey	Additional Investigation Proposed	Determination of Effects
Nederland	Hand	No	No	No adverse effect
<b>Mud Lake Open Space</b>	<b>Mechanical</b>	<b>Reconnaissance</b>	<b>Yes</b>	<b>To Be Determined</b>
Betasso Open Space	Hand and Mechanical	Yes	No	No adverse effect
Kossler Reservoir	Hand	No	No	No adverse effect

### Nederland

The Nederland treatment areas have not been previously surveyed, but only hand treatment is proposed for this area, which should result in little or no ground disturbance. Project activities are unlikely to affect any unrecorded archaeological properties. Several NRHP-listed and NRHP-eligible above-ground historic properties are located within the indirect APE, but all of them are found in Nederland, at least one-quarter-mile from the treatment areas. They are screened from view by hilly terrain and numerous modern and historic buildings that do not appear to be eligible for listing in the NRHP. The Peak to Peak Scenic and Historic Byway (SH 72) passes near one of the treatment areas, but the proposed hand treatment will not diminish the scenic vistas for which the road is considered historically significant. Therefore, FEMA has determined that the proposed undertaking will have no adverse effect on archaeological or aboveground historic properties in the Nederland treatment areas.

### Betasso Open Space

Hand and mechanical treatments are proposed for the Betasso Open Space. With the exception of the treatment area around the Boulder Canyon Hydroelectric Plant (5BL754), this area has been previously surveyed and no additional historic properties were identified. Previous effects to the Boulder Canyon Hydroelectric Plant have been treated to Level II HABS/HAER standards and further treatment is considered unnecessary. Therefore, FEMA has determined that the proposed undertaking will have no adverse effect on archaeological or aboveground historic properties in this area and no further cultural resources investigations are required.

### **Kossler Reservoir**

The Kossler Reservoir treatment areas have not been previously surveyed, but only hand treatment is proposed for these areas, which should result in little or no ground disturbance. Any unrecorded archaeological properties are not likely to be affected by these activities. Water from Barker Reservoir is conveyed to the Boulder Canyon Hydroelectric Plant through a 36-inch steel pipe, which runs downhill through the forest, into Kossler Reservoir, and ends at the Boulder Canyon Hydroelectric Plant. The proposed treatment will not diminish those qualities (conveyance of municipal water) for which the Boulder Hydroelectric System (5BL752) is considered historically significant. Therefore, FEMA has determined that the proposed undertaking will have no adverse effect on archaeological or aboveground historic properties in this area and no further cultural resources investigations are required.

### **Mud Lake Open Space**

Mechanical treatment is proposed for the Mud Lake Open Space and only a reconnaissance level survey has been previously conducted here. Therefore, FEMA has determined that additional cultural resources investigations are required to identify archaeological and aboveground historic properties in this area.

Based on the information provided above, FEMA determined that the proposed activities at Nederland, Betasso Open Space and Kossler Reservoir would have no adverse effect on archaeological or aboveground historic properties in a letter dated April 25, 2012 (**Appendix C**). The SHPO concurred with FEMA's determination of effects on May 11, 2012 (**Appendix C**). Therefore, the proposed further evaluation of the Mud Lake Open Space project area was completed.

On June 1, 2012, URS conducted another search of COMPASS, the Colorado Cultural Resource On-line Database, provided by the Office of Archaeology and Historic Preservation (OAHP) at History Colorado, for Section 12 of Township 1 South, Range 73 West 6th P.M. The results show that one cultural resources inventory was conducted in 2003 (**Table 3-6**) and no cultural resources were documented within the project APE. A total of 21 cultural resources are located within Section 12: none are within the project APE, and five are adjacent to the project APE (**Table 3-7**). In 2004, the Inactive Mine Reclamation Program of the Colorado State Division of Minerals and Geology reclaimed 13 areas within the Mud Lake Open Space, deemed unsafe due to the presence historic-era mining features.

Given the high likelihood of archaeological resources in the Mud Lake project area, an intensive pedestrian survey was conducted in this area. The survey resulted in the documentation of four new cultural resources (5BL11872, 5BL11873, 5BL11874, and 5BL11875). All of these sites are associated with the historically significant process of tungsten mining and was one of the few locations in the United States where it was possible to extract the tungsten mineral that was used to make metals for weapons during World War I and World War II. It is also associated with an early significant company, the Colorado Tungsten Corporation (CTC). Each of these cultural resources is described below.

Table 3-6: Previous Cultural Resources Within the Mud Lake Open Space Project Area

Report Title	Author(s)	Institution	Completion Date(s)
Unincorporated Boulder County Historic Sites, Survey Report Vol. 1 and 2	Carl McWilliams	On Behalf of Boulder County Parks and Open Space	February 2003

Table 3-7: Known Cultural Resources Adjacent to the Mud Lake Open Space Project Area

ID	Resource Name	Original Recording Date	Doc. ID	Site Type	Age	Within APE	NRHP Eligibility*
5BL1603	Crow Mine No. 1; 1 1/2; 1 3/4	1986	MC.CN.R1	Abandoned Tungsten Mine	1940-1955	No	Officially Not Eligible
5BL9386	None	2003	N/A	Isolated Tungsten Mine Feature	Unknown	No	Field Not Eligible
5BL9387	None	2003	N/A	Isolated Tungsten Mine Feature	Unknown	No	Field Not Eligible
5BL9388	None	2003	N/A	Isolated Tungsten Mine Feature	Unknown	No	Field Not Eligible
5BL9394	None	2003	N/A	Isolated Tungsten Mine Feature	Unknown	No	Field Not Eligible

\* NRHP eligibility, with concurrence from OAHP. "Field Not Eligible" means that OAHP has accepted the field eligibility determination.

**5BL11872**

This site is the remnant of a tungsten mine, most likely the Greenhorn Mine. Encompassing an area measuring approximately 1,200 feet by 1,200 feet (approximately 33 acres), the site consists of a main central mine area and five outlying prospect pit areas. The main mine area measures 450 feet by 150 feet and consists of a reclaimed mine area with berms or tailings piles and graded area and some associated historic-era artifacts. The five outlying areas of varying sizes are all located within 300 feet of the main mine area and contain prospect pits, a prospect trench, a tailings berm, and associated historic-era artifacts.

The CTC, which was organized in 1905 by R. Quay, G. Gillespie, and H. Martin from Pittsburg, Pennsylvania, and G. Burke from Cleveland, Ohio, established the Greenhorn Mine (SCMMFB 1960). The company took over the older Dick Crow patent, which encompassed 480 acres, and purchased an additional 80 acres. This mine also includes patents for the Crow Nos. 5, 9, 15, and 16. Additional nearby claims, the Crow No. 12 and 22, are also related. The company also purchased the old Boyd Mill, located in Boulder, in order to process their ore and other miner's ores into a concentrate. The firm did not last long, and folded in 1908 after the end of the first mining boom (Twitty 2007). The Greenhorn Mine produced approximately 4,000 units (80,000 pounds) of ore over its lifetime (1905-1960), with the majority being produced before 1915. Cobb and Weldon were the last known operators in the 1950s (SCMMFB 1960).

This site does not retain sufficient integrity to convey its association with this significant historical context, and is therefore recommended as not eligible under Criterion A. It is not known to be associated with any historically significant person (Criterion B), nor is it architecturally distinctive (Criterion C), and it is not likely to provide any additional important information about tungsten mining or local history (Criterion D).

**5BL11873**

The site is marked with an adit symbol on the 1942 Nederland, Colorado 7.5' USGS topographic quadrangle map. The adjacent, abandoned road is also shown leading to this site, but not beyond. This information, coupled with artifactual evidence, suggests that this site dates from the 1940s to the 1960s. This site consists of two areas of adjacent mining features found within an area measuring approximately 600 feet by 300 feet, located on a bench on a shallow east-facing slope of a small hill along Conger Road. Both areas are less than an acre in size and contain numerous prospect pits, several tailings piles, a large pit or crevice with rock outcrop cuts, a small open adit, and a few associated artifacts. One of areas is marked as a prospect pit on the 1969 Nederland, Colorado 7.5' USGS Geologic Quadrangle Map. The base map is dated 1942, but the geological features shown were mapped in 1963-1965.

This site does not retain sufficient integrity to convey its association with this significant historical context, and is therefore recommended as not eligible under Criterion A. It is not known to be associated with any historically significant person (Criterion B), nor is it architecturally distinctive (Criterion C), and it is not likely to provide any additional important information about tungsten mining or local history (Criterion D).

**5BL11874**

This site is most likely related to the historic-era mine (Crow No. 1, 1 ½, 1 ¾ - 5BL1603), which is located on the east side of SH 72. The CTC initially owned and operated this mine (SCMMFB 1960). The 1910 Central City, Colorado 15' USGS topographic quadrangle map depicts a mine shaft 300 feet east of site 5BL11874, which corresponds to the location of site 5BL1603.

The site consists of two areas of adjacent mining features found within an area approximately 3.7 acres in size and is located on flat bench in a small valley between two small hills. State Highway 72 is adjacent to the site to the east. One area is approximately 1.4 acres in size while the second area is approximately 0.2 acre in size. The two areas contain prospect pits, prospector trenches, tailings piles, and no associated artifacts.

This site does not retain sufficient integrity to convey its association with this significant historical context, and is therefore recommended as not eligible under Criterion A. It is not known to be associated with any historically significant person (Criterion B), nor is it architecturally distinctive (Criterion C), and it is not likely to provide any additional important information about tungsten mining or local history (Criterion D).

**5BL11875**

This site contains four areas of adjacent mining features located within an area (approximately 6 acres in size), located on a shallow, southwest-facing slope. This site corresponds to an unnamed mine shaft that is depicted on the 1972 Nederland 7.5' USGS topographic quadrangle map. The mine shaft is not shown on the 1942 version of the Nederland topographic quadrangle map.

The four areas range between 0.1 and 0.6 acres in size and contain prospect pits and associated tailings piles, prospect trenches with tailing berms, a large tailings pile, and a long 6 inch diameter metal pipe.

This site does not retain sufficient integrity to convey its association with this significant historical context, and is therefore recommended as not eligible under Criterion A. It is not known to be associated with any historically significant person (Criterion B), nor is it architecturally distinctive (Criterion C), and it is not likely to provide any additional important information about tungsten mining or local history (Criterion D).

### 3.4.2 Environmental Consequences

#### 3.4.2.1 Alternative 1 – No Action

The No Action Alternative would have no impact on cultural resources. Therefore, FEMA has determined that no historic properties would be affected by the No Action Alternative.

#### 3.4.2.2 Alternative 2 – Vegetation Management (Proposed Action)

No historic properties will be adversely affected in the Nederland, Betasso Open Space, and Kossler Reservoir project areas. An intensive cultural resources survey of the Mud Lake Open Space project area was required to ascertain if any historic properties are adversely affected. The

survey documented four archaeological sites, all of which are related to tungsten mining in the Nederland area. FEMA has determined that none of the identified Mud Lake Open Space sites retain sufficient integrity to be eligible for listing in the NRHP. Thus, FEMA has determined that the proposed undertaking at Mud Lake Open Space will result in no effect to historic properties.

In a letters to the SHPO dated April 25 and October 10, 2012 (**Appendix C**), FEMA communicated the finding of no historic properties affected for this undertaking. The SHPO responded in a letters dated May 11 and October 15, 2012 (**Appendix C**), concurring with these determinations of eligibility and effect.

On October 22, 2012, FEMA sent letters to the following tribes seeking their comments on potential impacts to archaeological sites, burials, and traditional cultural properties in or near the project area:

- Cheyenne and Arapaho Tribes, Oklahoma
- Arapaho Tribe of the Wind River Reservation, Wyoming
- Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Montana
- Eastern Shoshone Tribe of Wind River Indian Reservation

The letters are included in **Appendix C**. If unexpected discoveries are made during the course of project execution, FEMA will proceed in compliance with State and Federal laws protecting cultural resources, including Section 106 of the NHPA, and all work will cease in the immediate vicinity of the find until appropriate parties are consulted and a treatment plan is established.

## 3.5 SOCIOECONOMICS RESOURCES AND ENVIRONMENTAL JUSTICE

### 3.5.1 Affected Environment

#### 3.5.1.1 Socioeconomics

Population growth in areas around Colorado's population centers has been high in recent years in areas with a 30- to 60- minute commute to jobs in the city. Also, the ability to do many jobs from home with the advancement of computer and communication systems has led to increased development within the project areas.

Population growth has many implications related to wildfire hazards and the need for vegetation management. With more people, there is a greater risk of human-caused wildfires and a greater need for protection from wildfires. Increased population growth tends to raise property values and encourage development, resulting in increased potential losses from wildfires. The number of residents (294,567) and average value of homes (\$350,600) in Boulder County is an example of this trend (USCB 2011a).

According to the U.S. Census Bureau (USCB), the population of Boulder County in 2010 was 294,567, a 1.1 percent increase in the County's population since 2000. The increase is lower than the increase in the State for the same period. The average household size in 2010 was 2.48

people, and 50.2 percent of the population was males and 49.8 percent were females (USCB 2011a).

Approximately 93 percent of the people over 25 years of age in the County in 2010 were high schools graduates and over half (56.6 percent) were college graduates. In 2010, the per capita income for Boulder County residents was \$36,047, and the median household income was \$63,757. The per capita income for the County was 21.4 percent higher than the State average, and the median household income for Boulder County was 14.4 percent higher than the State average (USCB 2011a).

### 3.5.1.2 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs Federal agencies to “make 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.”

Based on the 2010 population census (USCB 2011a), Boulder County has a population of 294,567. Approximately 87.2 percent are white. Minorities are Hispanics or Latinos of any race (13.3 percent), Asians (4.1 percent), and all other minorities (less than 1 percent). In 2010, 12.9 percent had incomes below the poverty level (USCB 2011a), which is higher than the 9.5 percent that were below the poverty level in 2000 (USCB 2011b).

According to the 2000 census for Nederland, 8.3 percent of the residents of Nederland had incomes that were below the poverty level, which is less Colorado’s poverty level of 12.2 percent (USCB 2011c).

## 3.5.2 Environmental Consequences

### 3.5.2.1 Alternative 1 – No Action

#### **Socioeconomics**

The No Action Alternative would have no direct impact on the economics of local communities or Boulder County in general because the risk of a wildfire would not change from present conditions.

However, if a large wildfire occurred, there would be a negative economic impact on Boulder County and on residents living in or in the vicinity of the burned area. Communities downstream of the burned area that obtain water from the affected watershed(s) could also be adversely affected. These potential negative economic impacts would affect residents with homes in the burned area most severely, but indirect effects would extend to everyone in the community, county, and State.

### **Environmental Justice**

Under the No Action Alternative, all populations within the project areas and Boulder County would continue to be at risk of a catastrophic wildfire. The No Action Alternative would not have a disproportionately high and adverse human health or environmental effect on minority or low-income populations and meets the requirements of EO 12898.

#### 3.5.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

### **Socioeconomics**

The Proposed Action would have little effect on the economics of local communities or Boulder County in general unless a large wildfire occurred. Depending on the location of a wildfire, the vegetation management treatments would help control the spread of the wildfire and reduce the cost of fighting a catastrophic wildfire. Thus, the Proposed Action could have a beneficial impact on Boulder County and its residents.

### **Environmental Justice**

The Proposed Action would have a beneficial effect on all people living and working in the vicinity of the project areas, including low-income and minority persons, as it would reduce the risk of harm to personal property and persons from wildfire. No disproportionately high and adverse impacts to low-income or minority populations would result from the Proposed Action. Therefore, the Proposed Action would comply with EO 12898.

## **3.6 COMMUNITY RESOURCES**

The community resources considered in this EA are public health and safety, traffic and circulation, public services and utilities, and noise.

### **3.6.1 Affected Environment**

#### 3.6.1.1 Public Health and Safety

The risk of catastrophic fires in Colorado's forests is extremely high because of heavy fuel loading (closely spaced trees and shrubs and dead material on the forest floor) that has accumulated over time. Flash flooding following wildfires contributes sediment and debris to area waterways that can affect downstream water quality and damage structures, roads, and utilities critical to the safety and well-being of citizens in and downgradient of the project areas. During recent wildfires and associated flooding in Colorado, thousands of people required evacuation because of safety concerns, and some fatalities occurred. The number of residences in the forested areas of Colorado has increased dramatically in recent years, substantially increasing concerns regarding the safety of these residents if a catastrophic wildfire occurs.

#### 3.6.1.2 Traffic and Circulation

**Appendix A, Exhibits 3, 4, and 5**, show the major roads in the project areas.

**Betasso Project Area**

SH 119 is a paved, two-lane highway immediately south of the Betasso Open Space project area. SH 119 provides access to the Betasso Open Space via Sugarloaf Road/CR 122, which is also a paved, two-lane road. Betasso Road is the ingress and egress road in the project area. Betasso Road is paved and extends from the intersection with Sugarloaf Road/CR 122 to the Betasso Water Treatment Plant.

**Mud Lake Project Area**

SH 72 is a paved, two-lane highway east of the Mud Lake project area. CR 128W and CR 126 provide access into the Mud Lake project area; both are paved, two-lane roads. There are several dirt and gravel roads that provide access to trail heads around the Mud Lake and Caribou Ranch Open Space properties.

**Nederland Project Area**

SH 119 and SH 72 are paved, two-lane highways that provide the main ingresses and egresses to the Nederland project area. In the Town of Nederland, several paved streets provide access to Nederland Middle/Senior High School (Eldora Road), Nederland Elementary School (Sundown Trail), and the other areas in Nederland.

**Kossler Reservoir Project Area**

Kossler Reservoir and the associated valve house are located along Flagstaff Road, which is a paved, two-lane road that extends from Baseline Road in Boulder to SH 72.

**3.6.1.3 Public Services and Utilities**

Colorado One Call (1-800-922-1987) provides a utility location service throughout the State of Colorado.

**Betasso Project Area**

The Betasso Water Treatment Facility includes the Betasso Water Treatment Plant, Betasso Hydroelectric Plant, Betasso 800 Megahertz Digital Trunked Radio System Site, and the Lakewood Hydroelectric Plant. The facility was constructed in 1964. The City of Boulder's North and Middle Boulder Creek basin water supplies are treated at the Betasso Water Treatment Plant. Water from the North Boulder Creek basin passes through the Lakewood Hydropower Plant or a pressure-reducing valve and flows into the treatment plant. Water from the Middle Boulder Creek basin passes through the Betasso Hydroelectric Plant or a pressure-reducing valve and flows into the treatment plant. The Betasso and Lakewood hydroelectric plants generate power that is sold to Xcel Energy; the power is fed to a transmission line that supplies power to Nederland, Ski Eldora, Ward, Jamestown, and parts of west Boulder. In 2001, the City of Boulder purchased the Boulder Canyon Hydropower Facility from the Public Service Company of Colorado and operates the facility primarily as a municipal water supply system and secondarily for power generation.

Emergency responders for the Betasso project area include the Boulder Fire Department (fire and medical responses), which has seven stations around Boulder, the Boulder Police Department, and the Boulder County Sheriff (main office in Boulder).

### **Mud Lake Project Area**

Presently, limited utilities (electricity and telephone) are located in the Mud Lake project area, but no overhead distribution lines are present.

Emergency responders for the Mud Lake project areas include the Nederland Fire Protection District (fire and medical responses), which has stations in Nederland, Eldora, and along Ridge Road; the Nederland Police Department; and the Boulder County Sheriff (main office in Boulder).

### **Nederland Project Area**

Nederland is primarily residential, and utilities are present throughout the town. Utility providers include Xcel Energy (electricity and natural gas), Northern Energy (propane), Nedernet (fiber optic cable for Internet and telephone), and Left Hand Water.

Emergency responders for the Nederland project area include the Nederland Fire Protection District (fire and medical responses), which has stations in Nederland, Eldora, and along Ridge Road; the Nederland Police Department; and the Boulder County Sheriff (main office in Boulder).

### **Kossler Reservoir Project Area**

Kossler Reservoir is used for both municipal water supply and hydropower generation and serves as a re-regulating reservoir for the Boulder Canyon Penstock and water from Middle Boulder Creek. The inlet to the Boulder Canyon Penstock is a gatehouse on the northern side of the reservoir. Flow through the Boulder Canyon Penstock is regulated by a butterfly valve in the valve house on the northern side of the reservoir. A power transmission line is on the northeastern side of the reservoir.

Emergency responders for the Kossler Reservoir area include the Boulder Fire Department (fire and medical responses), which has seven stations around Boulder, the Boulder Police Department, and the Boulder County Sheriff (main office in Boulder).

#### **3.6.1.4 Noise**

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. Noise events that occur during the night (9 p.m. to 7 a.m.) are more annoying than those that occur during normal waking hours (7 a.m. to 9 p.m.). Noise events in the project vicinity are presently associated with climatic conditions (wind, thunder), transportation noise (traffic on roads, airplanes), and “life sounds” (people talking, children playing).

## 3.6.2 Environmental Consequences

### 3.6.2.1 Alternative 1 – No Action

#### **Public Health and Safety**

Under the No Action Alternative, no vegetation management treatments would occur and people with urban/forest interfaces in the project areas would remain at risk of a wildfire. If a wildfire occurred, people and structures downgradient of the burned area would be at risk from sediment and debris flows if a major precipitation event occurred before the burned area was revegetated. Structures at risk would include houses, roads, bridges, water intakes, and water treatment facilities.

Wildfires can generate substantial amounts of fine particulate matter, which can affect the health of people breathing the smoke-laden air. Therefore, the health of people downwind of a wildfire, especially young children, the elderly, and people with lung disease or asthma, could be adversely affected. Wildfires can also generate substantial amounts of carbon monoxide, which can pose a health concern for frontline firefighters.

#### **Traffic and Circulation**

Under the No Action Alternative, existing levels of local traffic would not change in the short-term, and no additional costs would be incurred from road construction or maintenance. Existing levels of traffic are likely to increase as residential development occurs.

Roads could be closed if a wildfire approached or encompassed the road. A wildfire near the project areas could close SH 119 and SH 72, Flagstaff Road, and other access roads. Depending on location and wind direction, smoke from a wildfire could close sections of U.S. 36 (Denver-Boulder Turnpike), located approximately 6 miles east of the Betasso project area. Short-term traffic congestion could occur during highway closures caused by a wildfire.

#### **Public Services and Utilities**

The No Action Alternative would not directly affect any utilities in the project areas. The potential for wildfires would continue to be high in the project areas, and electrical service provided via overhead lines would have the potential to be adversely affected by a wildfire. Response time of emergency responders would not change. A wildfire in the vicinity of the project areas would involve local law enforcement and firefighters. During the wildfire, these personnel would not be available to respond to other emergencies in their service area.

#### **Noise**

Under the No Action Alternative, no construction or vegetation management-related activities would occur, and there would be no effect on noise levels in the project areas.

### 3.6.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

#### **Public Health and Safety**

The primary focus of the vegetation management treatments would be to create defensible space around existing structures, construct fuel breaks, and to thin existing vegetation beyond the buffer associated with the defensible space, which would reduce the rate of spread and intensity of a wildfire in the treatment areas. The treatments would create a safer environment from which firefighters could fight a wildfire, would reduce the rate at which the fire spreads, and make it easier to control. Wildfires cannot be prevented, but if they can be more readily controlled and contained, the chance that a small wildfire will grow into a catastrophic fire would be greatly reduced. Reducing the intensity and frequency of wildfires lowers the risk factor for people living in the urban/forest interface because wildfires would threaten fewer houses. In addition, when wildfires are controlled more quickly, a smaller area is burned, resulting in less sediment and debris being transported downstream during future precipitation events. Proposed vegetation management treatments would also help protect and maintain municipal water supplies for communities that obtain their water from the treated watershed.

#### **Traffic and Circulation**

Vehicle traffic would be generated by work crews traveling to and from work sites and trucks carrying felled trees and chipped wood from the project areas into Boulder County facilities. The amount of additional traffic would be minimal and would not interfere with local residents or people traveling in the vicinity of the project areas.

The vegetation management treatments would reduce the risk of a wildfire encompassing a road near the project areas. Thus, the potential for SH 119, SH 72, Flagstaff Road, or U.S. 36 to be closed due to a wildfire would be reduced.

#### **Public Services and Utilities**

No utility lines (or their service) or the response time of emergency responders would be directly affected during the implementation of the vegetation management treatments in the project areas. However, if the vegetation management activities reduced the risk of a wildfire or contributed to the containment of a catastrophic wildfire, the Proposed Action would prevent potential damage to utilities and allow emergency responders to remain available to respond to other emergencies. In addition, when wildfires are controlled quickly, a smaller area is burned, which results in less sediment and debris being transported downstream during future heavy precipitation events. For the same reasons, the Proposed Action would also help protect and maintain municipal water supplies for communities that obtain water from the treated watershed.

#### **Noise**

Operation of chain saws, chippers, heavy machinery, trucks, and helicopters during the creation of defensible space and thinning would increase noise levels in the vicinity of the treatment areas. No sensitive noise receptors are known to be within or in the vicinity of the project areas. Noise associated with the operation of the equipment would be limited to the implementation period. Therefore, noise impacts would be temporary.

## 3.7 HAZARDOUS SUBSTANCES / WASTES

### 3.7.1 Affected Environment

A substance is classified as hazardous if it has the potential to damage the environment and/or be harmful to humans and other living organisms. The presence of a hazardous substance/waste within, in the vicinity of, and/or upgradient of a project area is important in determining development constraints and the viability of an action.

To determine whether any facilities in the vicinity or upgradient of the project areas have known and documented environmental issues or concerns, Environmental Data Resources, Inc. (EDR) searched 74 Federal and State environmental databases for the four project areas. The EDR report includes environmental database records for the project areas, immediately adjacent properties, and the standard EDR search radius (EDR 2011a; EDR 2011b; EDR 2011c; EDR 2011d).

The EDR was reviewed for the following types of environmental issues:

- Presence of a hazardous substance/waste within or in the immediate vicinity of the project areas.
- Presence of an upgradient leaking underground storage tank that is not considered “closed” or does not have a “no further action” status.
- Presence of an upgradient solid waste landfill.

The databases did not identify any sites that would potentially affect the project areas.

### 3.7.2 Environmental Consequences

#### 3.7.2.1 Alternative 1 – No Action

No sites were identified in any of the databases that would potentially affect the project areas. Therefore, the presence of a hazardous substance/waste does not represent a concern for the No Action Alternative.

#### 3.7.2.2 Alternative 2 – Integrated Vegetation Management (Proposed Action)

No sites were identified in any of the databases that would potentially affect the project areas or be affected by the implementation of the Proposed Action. Therefore, the presence of a hazardous substance/waste does not represent a concern for the Proposed Action.

## 3.8 CUMULATIVE IMPACTS

Section 1508.7 of the CEQ regulations defines cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions,” Cumulative effects are not wholly different effects from direct or indirect effects of an action. Cumulative effects are merely a way of placing

seemingly isolated or insignificant direct and indirect effects in context with respect to overall impacts, both over time and in an area larger than that evaluated for direct and indirect effects. Cumulative effects are discussed in terms of being additive, synergistic, or reductive.

In the vicinity of the project areas, several large-scale vegetation management activities have occurred or are planned in Boulder County. The USFS completed the following projects in Boulder County in 2009:

- Sugarloaf Fuels Reduction project, which covered approximately 5,000 acres.
- Thinning or under contract to be thinned (747 acres).
- James Creek Fuels Reduction Project, in which approximately 2,185 acres were thinned.

The St. Vrain Project is a Healthy Forests Restoration Act project with a total of 2,650 acres proposed for treatment; treatment on approximately 798 acres was completed in 2009. In 2009, the CSFS Boulder District treated a total of 1,210 acres under numerous projects throughout Boulder County and adjacent Gilpin County. The total acres treated included 441 acres of fuels thinning. The National Park Service completed several fuels reduction projects in the wildland-urban interface at Rocky Mountain National Park, a section of which is located in northwestern Boulder County. More than 500 acres were treated at Rocky Mountain National Park in 2009.

More than 4,000 acres of forest land have been treated in Boulder County in 2009 alone. In addition to the Proposed Action, at least five additional vegetation management projects are underway in Gilpin County, the Arapaho and Roosevelt National Forests, and the CSFS Fort Collins, Golden, and Granby districts, which are adjacent to Boulder County. These projects combined represent more than an additional 21,000 acres of forestland managed to reduce wildfires. To maximize the potential benefits of these projects, fuelbreaks will extend from and/or connect to features such as rock outcropping, aspen stands, and/or other vegetation management areas.

Vegetation management activities along the Front Range of the Rocky Mountains in Colorado have been and will continue to be important in the management of forestlands located on both by public and private lands. All of the vegetation management activities have a cumulative effect regarding the location and connectivity of fuelbreaks and fuel reduction areas across lands managed by different agencies and individuals. In addition, the construction of fuelbreaks, creation of defensible space, and thinning to reduce fuel loads by the different agencies would cumulatively affect how a wildfire would advance, how fast the wildfire would advance, and the areas from which firefighters could marshal resources to fight and control a wildfire.

Cumulative effects from the Proposed Action and other actions are anticipated to be beneficial to the project area, County, and State because the risk of a catastrophic wildfire would be reduced.

### 3.9 COORDINATION AND PERMITS

The agency coordination and permits that would be required under the Proposed Action are described below.

- **U.S. Fish and Wildlife Service.** No additional coordination or permits would be required regarding federally listed threatened and endangered species. If trees are going to be removed during the nesting period of migratory birds, Boulder County would need to coordinate with the USFWS regarding the MBTA.
- **U.S. Army Corps of Engineers.** No water bodies or wetlands would be affected; therefore, no additional coordination or permits would be required.
- **Natural Resource Conservation Service.** No farmland occurs in the project areas. Therefore, no additional coordination would be required.
- **Colorado State Historic Preservation Officer.** No additional coordination would be required regarding cultural resources unless resources are discovered during project activities.
- **Colorado Parks and Wildlife.** No additional coordination would be required regarding State-listed threatened and endangered species.
- **Colorado Department of Public Health and Environment.** Vegetation management treatments, such as those in the Proposed Action, are exempt from the NPDES permitting process because they are considered nonpoint source activities; therefore, a NPDES construction permit would not be required. No additional coordination would be required.
- **Boulder County Floodplain Administrator.** The project areas do not contain a designated floodplain; therefore, a Floodplain Development Permit would not be required.
- **Tribal Coordination.** No additional coordination would be required regarding tribal cultural resources unless resources are discovered during project activities.

## SECTION FOUR SUMMARY OF IMPACTS

**Table 4-1** contains a summary of the potential environmental impacts of the two alternatives described in Section 3.

Table 4-1: Summary of Impacts

Environmental Resource	Resource Subcategory	Alternative 1: No Action	Alternative 2: Integrated Vegetation Management (Proposed Action)
<b>Physical</b>	Geology and soils	No direct effect on geology or soils. Adverse impact from soil damage and increased erosion if a wildfire occurred.	No direct impact on geology. Beneficial impact if a wildfire was prevented or was smaller in magnitude by avoiding the soil damage that occurs in a wildfire and the erosion that occurs after a wildfire.
	Air quality	No direct impact on air quality. Adverse impact from emissions of pollutants and greenhouse gases if a wildfire occurred.	Minor, short-term adverse effect from equipment exhaust. Beneficial effect if a wildfire was prevented or was smaller in magnitude by avoiding the emission of pollutants and greenhouse gases.
	Visual	Adverse impact from deterioration of vegetation quality Adverse impact from loss of vegetation if a wildfire occurred.	Short-term adverse effect from the accumulation of downed trees and slash until the wood and slash are chipped. Long-term adverse effect by increasing visual contrast in the treated/non-treated areas and from thinning. Beneficial effect by improving the health of the treated areas. Beneficial effect if a wildfire was prevented or was smaller in magnitude by avoiding loss of vegetation.
<b>Water</b>	Surface water	No direct impact on surface water. Adverse impact from increased sediment and debris if a wildfire occurred	Beneficial effect if a wildfire was prevented or was smaller in magnitude by avoiding increased sediment and debris.
	Groundwater	No impact.	No impact.
	Floodplains	No impact.	No impact.
	Wetlands	No impact.	No impact.
<b>Biological</b>	Vegetation	No direct impact on vegetation. Adverse impact from loss of vegetation if a wildfire occurred.	Beneficial effect from thinning and from opening the canopy, which would slow the spread of a wildfire. Beneficial effect on the spread of aspens and understory vegetation as opening the stands to sunlight encourages growth.

Table 4-1: Summary of Impacts

Environmental Resource	Resource Subcategory	Alternative 1: No Action	Alternative 2: Integrated Vegetation Management (Proposed Action)
<b>Biological (cont.)</b>	Terrestrial wildlife	No direct impact on terrestrial wildlife. Adverse impact from loss of individuals and habitat if a wildfire occurred.	Long-term beneficial effect by increasing useable space for mule deer and elk and by increasing the diversification and productivity of the understory.
	Aquatic wildlife	No direct impact on aquatic wildlife. Adverse impact from increased sediment that could result in the loss of individuals and aquatic habitat if a wildfire occurred.	Beneficial effect if a wildfire was prevented or was smaller in magnitude by avoiding increased sediment and debris.
	Threatened and endangered species	No direct impact on threatened and endangered species. Adverse impact from loss of vegetation if a wildfire occurred.	May affect but not likely to adversely affect the Canada lynx, Preble's meadow jumping mouse, Mexican spotted owl, North American wolverine, and boreal toad.  No effect on the whooping crane, least tern, piping plover, greenback cutthroat trout, pallid sturgeon, western prairie fringed orchid, Colorado butterfly plant, Ute ladies'-tresses, river otter, western burrowing owl, and lesser prairie chicken.
<b>Cultural</b>	Aboveground		
	Archaeological		
<b>Socioeconomics and Environmental Justice</b>	Socioeconomics	Adverse impact on Boulder County and residents living in or near the burned areas if a wildfire occurred.	Beneficial effect if a wildfire was prevented or was smaller in magnitude by avoiding the cost of fighting the fire.
	Environmental justice	No disproportionately high and adverse impacts on any minority or low-income population.	No disproportionately high and adverse impacts on any minority or low-income population.  Beneficial effect on all Boulder County residents, including low-income and minority populations as it would reduce the risk of harm to personal property and persons from wildfire.
<b>Community</b>	Public health and safety	No direct impact on public health and safety. Adverse impact if a wildfire occurred from sediment and debris flows that could damage houses, roads, bridges, water intakes, and water treatment facilities.  Adverse impact if a wildfire occurred from smoke-laden air that could affect public health, especially young children, the elderly, and people with lung disease or asthma.	Beneficial effect by creating a safer environment for firefighters. Beneficial effect by reducing the intensity and frequency of wildfires. Beneficial effect by making wildfires easier to control and reducing the area that is burned.  Beneficial effect by avoiding increased sediment and debris if a wildfire was prevented or was smaller in magnitude. Beneficial effect by avoiding smoke-laden air if a wildfire was prevented.

Table 4-1: Summary of Impacts

Environmental Resource	Resource Subcategory	Alternative 1: No Action	Alternative 2: Integrated Vegetation Management (Proposed Action)
<b>Community(cont.)</b>	Traffic and circulations	Adverse impact if a wildfire occurred and road closings were needed.	Beneficial effect by avoiding road closings if a wildfire was prevented or was smaller in magnitude.
	Public services and utilities	No direct impact on public services and utilities. Adverse impact if a wildfire occurred and overhead utility lines were damaged. Adverse impact if a wildfire occurred and emergency responders responding to the fire became unavailable to respond to other emergencies in their service area.	Beneficial effect by avoiding damage to overhead utility lines if a wildfire was prevented or was smaller in magnitude. Beneficial effect by allowing emergency responders to remain available to respond to emergencies in their service area if a wildfire was prevented or was smaller in magnitude.
	Noise	No impact.	Short-term impact from the operation of chain saws, chippers, and heavy equipment during the vegetation management treatments.
<b>Hazardous Substances/Wastes</b>	—	No impact.	No impact.

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**SECTION FIVE PUBLIC INVOLVEMENT****5.1 PUBLIC NOTICES**

The Initial Public Notice was published in the Daily Camera on December 8, 9, and 10, 2011 and The Mountain Ear, on December 8, 2011. The Final Public Notice (Section 9.1.2) was published in the *Daily Camera on January XX, 2012.*

**5.1.1 Initial Public Notice**

Public notification is hereby given by the Department of Homeland Security's Federal Emergency Management Agency (FEMA) of the intent to prepare an Environmental Assessment (EA) for a proposed project submitted by Boulder County to reduce future wildfire hazards within the Betasso Preserve, Kossler Reservoir, Mud Lake Open Space, and parcels in Nederland. A portion of the funding would be provided by FEMA's Pre-Disaster Mitigation Program. This program assists State and local governments with implementing cost-effective hazard mitigation planning and project activities that complement a comprehensive mitigation program.

Betasso Preserve is located approximately two miles up Boulder Canyon, west of the City of Boulder (latitude: 40.011700, longitude: -105.337900). The City of Boulder's Betasso Water Treatment Plant borders the property on the southeast.

Kossler Reservoir is the staging reservoir for water delivered from Barker Reservoir to the Betasso Water Treatment Plant or the Boulder Canyon Hydro plant. The Reservoir is located on a ridge between South Boulder and Main Boulder Creek (latitude: 39.979700, longitude: -105.332200) and is surrounded by private property and some private homes.

Mud Lake Open Space is located in western Boulder County, about one mile north of the Town of Nederland. This property consists of two separate parcels (latitude: 39.976200, longitude: -105.515100).

Nederland is located 15 miles southwest of Boulder and 50 miles northwest of Denver (latitude: 39.958300, longitude: -105.512700). Facilities proposed for protection in Nederland include Nederland Middle-Senior High School, Nederland Elementary School, Barker Reservoir, residential areas, and several Town-owned maintenance facilities.

The President's Council on Environmental Quality (CEQ) has developed regulations to implement the National Environmental Policy Act (NEPA). These regulations require an investigation of the potential environmental impacts of a proposed federal action, and an evaluation of alternatives as part of the environmental assessment process. FEMA also has regulations that establish the agency-specific process for implementing NEPA. An EA will be prepared in accordance with both FEMA and CEQ NEPA regulations. Two alternatives will be considered in the EA:

The NO ACTION ALTERNATIVE which considers the consequences of taking no action to implement vegetation management procedures to reduce the fuel load within the project area and/or create defensible space adjacent to the critical facilities located in the project areas in Boulder County.

The PROPOSED ACTION ALTERNATIVE would include the implementation of established vegetation management procedures that would reduce the potential of ignition and/or spread of a wildfire within the project areas. Proposed activities include creation of defensible space around several facilities and forest thinning using mechanical and hand methods. Mechanical methods will include feller bunchers, Hydro Axes, Bull Hogs, and brush hogs. In the Betasso project area where steep slopes are present, cut trees will likely be removed via helicopter. In other project areas, the removed trees will be placed on landings and chipped or the trees will be taken to Boulder County facilities for processing. Removed trees and slash will be chipped and used as heating fuel for Boulder County facilities. No burning or clear cutting would occur with this alternative. Overall, these two vegetation management treatments are expected to involve approximately 240 acres.

Other alternatives considered, but dismissed due to cost considerations, safety, and environmental impacts, include the prescribed burning and clear cutting.

The President of the United States has issued Executive Orders that require Federal Agencies to focus attention on the environment and on human health and safety when considering the funding of an action. Executive Order 11988 – Protection of Floodplains requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Executive Order 11990 – Protection of Wetlands requires Federal agencies to take action to minimize the loss of wetlands. Neither of the alternatives has the potential to adversely affect floodplains or wetland areas as no floodplains or wetland areas have been identified within the project area. With this public notice, FEMA is informing the public that the EA for the identified project is in the process of being prepared.

During the NEPA review process FEMA will also evaluate potential impacts to other environmental resources and compliance with other laws and regulations, such as, the Endangered Species Act, the National Historic Preservation Act, and EO 12898 – Environmental Justice.

A public comment period related to the alternatives as outlined above or other possible alternatives will end on December 27, 2011. In addition to this initial comment period, a final comment period will be opened for public review of the Draft EA.

Interested parties may obtain more detailed information about the alternatives from Boulder County by calling Mr. Jim Webster at (303) 441-3930 or by email [jwebster@bouldercounty.org](mailto:jwebster@bouldercounty.org). Additionally, comments or question regarding the NEPA compliance process can be directed to Richard Myers, FEMA Region VIII Deputy Regional Environmental Officer by calling (303) 235-4926 or by email at [richard.myers@dhs.gov](mailto:richard.myers@dhs.gov).

### 5.1.2 Final Public Notice

Will be added during preparation of Draft EA.

## 5.2 PUBLIC COMMENTS

No comments were received during the initial public comment period.

SECTION SIX      AGENCIES CONSULTED

**U.S. Fish and Wildlife Service, Lakewood, CO**

Susan C. Linner, Field Supervisor	(303) 236-4774
Leslie Ellwood, Endangered Species Specialist	(303) 236-4747

**Colorado Department of Wildlife, Denver, CO**

Steve Yamashita, Northeast Regional Manager	(303) 291-7227
Mike Sherman, Wildlife Conservation Biologist	(970) 472-4345

**U.S. Army Corps of Engineers, Littleton, CO**

Margaret Langworthy, Project Manager	(303) 979-4120
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**Colorado Department of Emergency Management, Centennial, CO**

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APPENDIX A  
EXHIBITS

APPENDIX B  
SITE VISIT PHOTOGRAPHS

APPENDIX C  
AGENCY CORRESPONDENCE