# Wildfire Mitigation Projects in the State of Colorado

*Draft Programmatic Environmental Assessment*
*Colorado | **March 2017***


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## Acronyms And Abbreviations

| | |
|---|---|
| APCD | Air Pollution Control Division |
| ASL | Above sea level |
| BGEPA | Bald and Golden Eagle Protection Act |
| BLM | Bureau of Land Management |
| BLS | U.S. Bureau of Labor Statistics |
| BMNA | Butterflies and Moths of North America |
| BMP | Best Management Practices |
| CAA | Clean Air Act |
| CAAQS | Colorado Ambient Air Quality Standards |
| CATEX | Categorical Exclusion |
| CDBG-DR | Community Development Block Grant – Disaster Recovery |
| CDNR | Colorado Department of Natural Resources |
| CDOT | Colorado Department of Transportation |
| CDOW | Colorado Division of Wildlife |
| CDPHE | Colorado Department of Public Health and Environment |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CGS | Colorado Geological Survey |
| CIMC | Cleanups in My Community |
| CLOMR | Conditional Letter of Map Revision |
| CNHP | Colorado Natural Heritage Program |
| CPW | Colorado Parks and Wildlife |
| CSFS | Colorado State Forest Service |
| CSU | Colorado State University |
| CWA | Clean Water Act |
| CWCB | Colorado Water Conservation Board |
| DEN | Denver International Airport |
| DHS | Department of Homeland Security |
| DOC | dissolved organic carbon |
| DOLA | Colorado Department of Local Affairs |
| DWR | Colorado Department of Water Resources |
| EA | Environmental Assessment |
| EIA | U.S. Energy Information Administration |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| ESA | Endangered Species Act |
| EWP | Emergency Watershed Protection |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |

| | |
|---|---|
| FONSI | Finding of No Significant Impact |
| FWCA | Fish and Wildlife Coordination Act |
| GIS | Geographic Information System |
| HMA | Hazard Mitigation Assistance |
| HMGP | Hazard Mitigation Grant Program |
| HUD | Department of Housing and Urban Development |
| IBA | Important Birding Areas |
| LAA | Likely to Adversely Affect |
| LOMR | Letter of Map Revision |
| LOMR-F | Letter of Map Revision Based on Fill |
| M | Million |
| MBTA | Migratory Bird Treaty Act |
| MHI | Mean Household Income |
| NA | Not Applicable |
| NAAQS | National Ambient Air Quality Standards |
| NASA | National Aeronautics and Space Administration |
| NEPA | National Environmental Policy Act |
| NFIP | National Flood Insurance Program |
| NHA | National Heritage Area |
| NHL | National Historic Landmark |
| NHPA | National Historic Preservation Act of 1996 |
| NIH | National Institute of Health |
| NLAA | Not Likely to Adversely Affect |
| NMFS | National Marine Fisheries Service |
| $NO_2$ | nitrogen dioxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| NPS | National Park Service |
| NRCS | Natural Resources Conservation Service |
| NREL | National Renewable Energy Laboratory |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| NWP | Nation Wide Permit |
| $O_3$ | ozone |
| OFA | Other Federal Agency |
| OSHA | Occupational Safety and Health Administration |
| PAWSD | Pagosa Area Water and Sanitation District |
| Pb | Lead |
| PCN | Pre-Construction Notification |
| PDM | Pre-Disaster Mitigation Program |
| PEA | Programmatic Environmental Assessment |

| | |
|---|---|
| PIF | Partners in Flight |
| PM | particulate matter |
| PPE | Personal Protective Equipment |
| RCRA | Resource Conservation and Recovery Act |
| ROW | Right of Way |
| SEA | Supplemental Environmental Assessment |
| SFHA | Special Flood Hazard Area |
| SGCN | Species of Greatest Conservation Need |
| SHPO | State Historic Preservation Officer |
| $SO_2$ | sulfur dioxide |
| STATSGO2 | State Soil Geographic |
| TCP | Traditional Cultural Property |
| THPO | Tribal Historic Preservation Officer |
| TRI | Toxics Release Inventory |
| TSCA | Toxic Substances Control Act |
| UFR | Unified Federal Review |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |
| USC | U.S. Code |
| USDA | U.S. Department of Agriculture |
| USEPA | U.S. Environmental Protection Agency |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| WUI | Wild Land-urban Interface |

# 1 Introduction

## 1.1 OVERVIEW

*This Programmatic Environmental Assessment was prepared in accordance with Unified Federal Review (UFR) as outlined in The Sandy Recovery Improvement Act, Section 6: Unified Federal Review mandates the establishment of an "…expedited and unified interagency review process to ensure compliance with environmental and historic requirements under Federal law relating to disaster recovery projects, in order to expedite the recovery process, consistent with applicable law"* (Sandy Recovery Improvement Act of 2013, 2013) (FEMA, 2015b) (FEMA, 2016e).

The Federal government, through multiple agencies and their programs, proposes to perform wildfire mitigation actions through integrated vegetation management in which thinning, pruning, limb removal, sawing, or brush cutting; and removal of downed, dead, or dry vegetation material or targeted trees will occur. These actions will be implemented under Federal Emergency Management Agency (FEMA) funding programs, such as, but not limited to, the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, and other public assistance grant programs. The HMGP and the PDM program are authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (Stafford Act) (FEMA, 2016c). The Federal Highway Administration (FHWA) may provide funding as part of the Emergency Relief program or Emergency Relief Federally Owned program and the Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA) may provide funding as part of the Emergency Watershed Protection (EWP) Program (FHWA, 2016b) (FHWA, 2016a) (NRCS, 2016a). The Department of Housing and Urban Development (HUD) may provide funding as part of the Community Development Block Grant Disaster Recovery (CDBG-DR) program (HUD, 2016). Other Federal Agency (OFA) grant programs may also be applicable. The U.S. Army Corps of Engineers (USACE) will be responsible for issuing appropriate Clean Water Act (CWA) Section 404 permits as required.

This Programmatic Environmental Assessment (PEA) has been prepared to analyze the potential environmental consequences associated with the proposed actions while providing a permanent (until the time that this PEA is superseded) framework for the evaluation of Federal and State laws and regulations. This PEA reviews the proposed action and no action alternative in accordance with the National Environmental Policy Act of 1969 (NEPA),[1] the Council on Environmental Quality (CEQ) implementing regulations,[2] and the Emergency Management and Assistance Code of Federal Regulations (CFR).[3] This analysis is programmatic in nature, and is not limited to a specific disaster event or Federal grant program nor does it address individual site-specific impacts as these will be evaluated for individually prior to approval (FEMA, 2016d). This PEA is intended

[1] 42 United States Code (USC) 55 Parts 4321 et seq., 2000
[2] 40 CFR 30 Parts 1500 et seq., 2004
[3] 44 CFR Chapter 1 Part 10, and 23 CFR Part 771, 2013

to provide the public and decision-makers with the information required to understand and evaluate the potential environmental consequences of these actions and to consider these impacts in decision-making.

This PEA evaluates typical actions undertaken by Federal agencies, or any entity responsible for Federal level environmental compliance, to provide financial support or technical assistance to any wildfire mitigation project. Typical actions include:

- Integrated vegetation management in which thinning, pruning, limbing, sawing, or brush cutting; removal of downed, dead, or dry vegetation material or targeted trees.
- Fuel breaks created by removing vegetation from an area, usually along existing roads.
- Hazardous fuels reduction including thinning vegetation, removing ladder fuels, reducing flammable vegetative materials, and replacing flammable vegetation with fire-resistant vegetation for the protection of life and property.

NEPA and its implementing regulations direct Federal agencies to take into consideration the environmental consequences of proposed actions during the decision-making process. Federal agencies must comply with requirements identified in the NEPA process before making Federal funds available. Federal agencies have determined through experience that the majority of the typical recurring actions proposed for funding, and for which an Environmental Assessment (EA) is required under NEPA, can be grouped by type of action or location. These groups can be evaluated in a PEA for compliance with NEPA without the need to develop project-specific EAs. In accordance with the UFR process, other Federal agencies may use this document to demonstrate NEPA compliance at their discretion and under their own authorities and implementing procedures. In this way, the purpose of this PEA is to streamline the Federal environmental review process.

### 1.1.1 Background

Wildfires are any uncontrolled fires that spread through vegetative fuels such as forests, shrubs, or grasslands, exposing and possibly consuming structures. These unpredictable fires can jump gaps such as roads, rivers, and fuel breaks, allowing the fires to reach the built environment before they can be contained.

The risk of catastrophic wildfires in Colorado's forests is extremely high because of the fuel load and the recent decline in forest health, resulting from dry conditions and mountain beetle infestations (CSFS 2008). Continued population growth into wild land-urban interface (WUI) areas and an increasing frequency of elevated fire weather conditions present major challenges to Colorado residents. Statistics from the Colorado State Forest Service (CSFS) from 1960-2009 show increases in the number and size of wildfires for the last several decades (CSFS, Undated).

There are many ways that individuals and local, State, and Federal levels of government work to minimize the impacts of wildfires. These include outreach and education for individuals and communities, maintenance of defensible space, hazardous fuels reduction, structural protection

through the use of ignition-resistant materials and construction methods, and measures to respond to wildfires and facilitate wildfire suppression. These actions may occur on public and private lands in any area where vegetation intermingles with the built environment. For example, the Healthy Forest Restoration Act directs at-risk communities to create community wildfire protection plans that may include buffer zones around towns, civic infrastructure, and evacuation routes (Healthy Forest Restoration Act of 2003, 2003).

### 1.1.2 Area of Study

The project area of this PEA encompasses the State of Colorado and the Ute Mountain Indian Reservation and Southern Ute Indian Reservation (Figure 1-1).

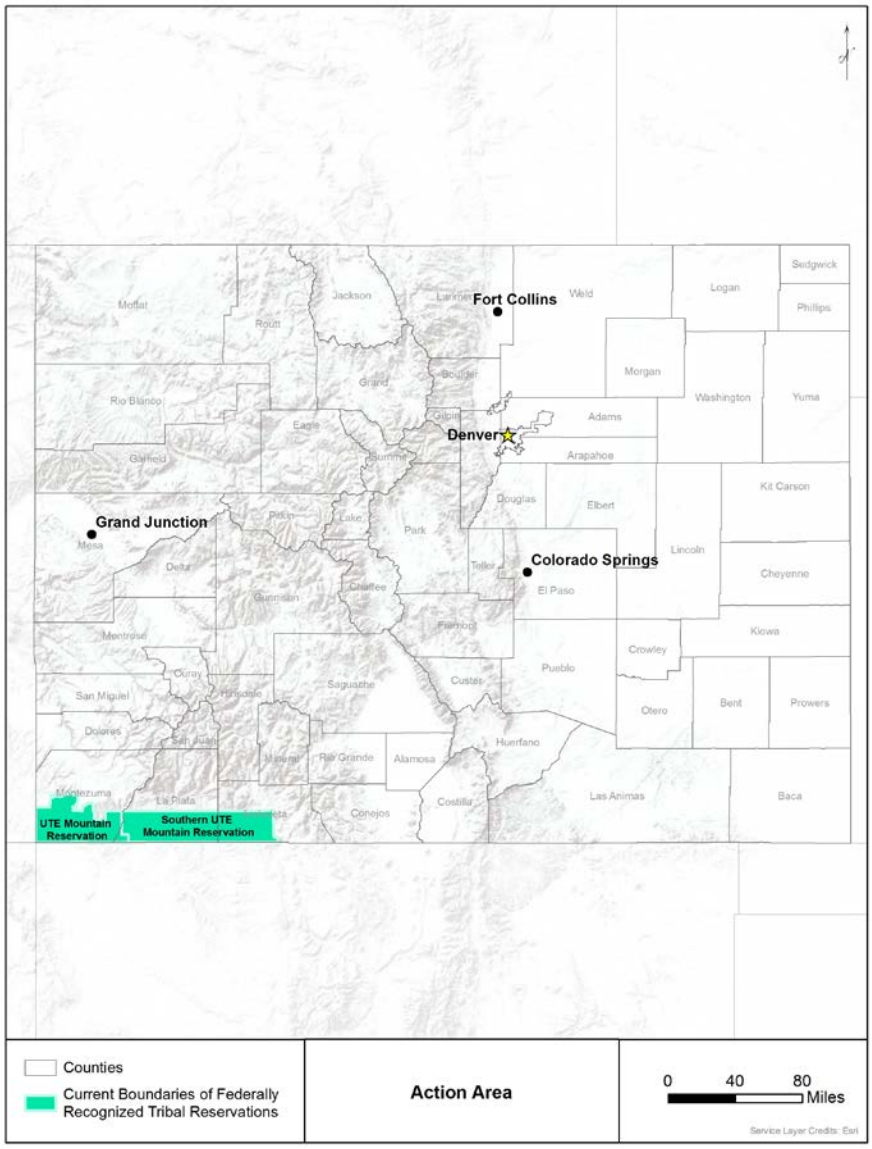


**Figure 1-1: Action Area**

### 1.1.3 Process for Use of this PEA

A PEA is utilized to address a group of projects that are similar in scope, scale, magnitude, and the nature of impact that are recipients of Federal funding. This PEA is regional in scope, covers numerous ecosystems and political boundaries, and focuses on a range of wildfire mitigation actions. The use of a PEA can reduce redundant analytical undertakings and identify cumulative impacts created by these actions. In contrast, an EA typically assesses impacts on a specific project site and the immediate surroundings.

For a project to qualify under this PEA, the scope of the project and the nature of impacts must be evaluated by this document and findings documented using the Compliance Checklist in Appendix A. Additional analysis and project-specific analysis may be required by this document as the context and intensity of proposed project impacts become apparent. All projects using this PEA must undergo standard Federal environmental compliance procedures to verify the project is consistent within the scope of this PEA. Federal agencies will use this PEA to determine the level of environmental analysis and documentation required under NEPA for the projects being evaluated. If the description of the site-specific nature of the project and the levels of analysis are fully and accurately described in this PEA, Federal agencies will take no further action other than to document that conclusion using the Appendix A−Compliance Checklist.

It is expected that some wildfire mitigation projects will be more complicated and involve larger-scale efforts than those contemplated for grouping in this PEA. If a specific action is expected to (1) create impacts not described in this PEA; (2) create impacts greater in magnitude, extent, or duration than those described in this PEA; or (3) require mitigation measures to keep impacts below significant levels that are not described in this PEA; then a Supplemental Environmental Assessment (SEA) would be prepared to address the specific action. The SEA would be tiered from this PEA in accordance with CEQ's NEPA implementing regulations. Actions that are determined during the preparation of the SEA to require a more detailed or broader environmental review would be subject to the stand-alone EA or other applicable process.

Wildfire mitigation activities can be more complex than the actions addressed by this PEA. The Colorado Resiliency Framework was created to guide and assist complex and long-term projects (Colorado Resiliency and Recovery Office, 2013). While projects that are covered by this PEA are intended to increase wildfire resiliency, these projects could also unintentionally have a detrimental effect on comprehensive local, State, or Federal land management plans and should be integrated into existing plans to ensure consistency. Projects that are not part of comprehensive land management plans may not be suitable for establishing forest health or wildfire resiliency and may need a more complicated site-specific EA or an Environmental Impact Statement (EIS).

Any official use of this PEA, supporting documentation, project compliance checklists, and potential SEAs must be submitted to Colorado FEMA Region VIII, Richard Myers (Richard.Myers2@fema.dhs.gov) to document cumulative wildfire mitigation project impacts.

# 2 Purpose and Need

The purpose of this PEA is to facilitate environmental review for wildfire mitigation projects and track subsequent natural and cultural resource cumulative impacts in Colorado.

Wildfire mitigation projects protect the built environment in fire-prone areas of forests, ranges, and grasslands through wildfire hazard reduction. Fuel reduction in areas prone to wildfire reduces the severity of potential wildfires, increases the ability to control wildfires, and minimizes potential damage to property, public safety, and the natural environment.

There is an increasing need to provide for effective wildfire hazard mitigation, which arises from the following factors:

- The WUI is expanding;
- Development in the WUI is increasing;
- The frequency and intensity of wildfires are predicted to increase; and
- The potential for loss of life and property damage is increasing.

# 3 Alternatives

## 3.1 INTRODUCTION

The following Alternatives are being considered for further evaluation in this PEA. These alternatives represent classes of actions that may be implemented individually or in combination with one another. Depending upon the response action FEMA determines is necessary to reduce the wildfire hazard, there may be only one viable option to be implemented. The following list of alternatives may not be available at all site-specific locations.

Land managers can implement practices (treatments) to 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. Eligible wildfire mitigation projects must clearly demonstrate mitigation of the risk from wildfire to residential and non-residential buildings and structures, including public and commercial facilities. Projects must be located in a Wildland Urban Interface (WUI), adjacent to or intermingled with the built environment, and must provide protection to life and the built environment from future wildfires. Appropriate Best Management Practices (BMP) will be implemented and all actions must comply with applicable Federal, Tribal, State and local regulations and requirements.

FEMA has developed training related to wildfire mitigation projects. FEMA's Emergency Management Institute's *Wildfire Mitigation Basics for Mitigation Staff* (IS 320) training course provides instructions on how to communicate the risks of wildfires to the public. In addition, the course details mitigation measures that can be implemented to increase safety of homeowners and to reduce structural and personal property damage. (FEMA, 2015)

## 3.2 ALTERNATIVES CONSIDERED

### 3.2.1 Alternative 1: No Action

The No Action Alternative is required to be included in this PEA in accordance with CEQ regulations implementing NEPA. The No Action Alternative is defined as maintaining the status quo without any Federal Agency involvement. This alternative is used to evaluate the effects of not performing wildfire mitigation projects and provides a benchmark against which other alternatives may be evaluated.

Under this alternative, wildfire mitigation projects could still be completed by local or private landowners and may be approached in an uncoordinated manner that does not appropriately consider environmental impacts. For the purpose of this PEA, under the No Action Alternative, the State of Colorado and individual project proponents would have to rely on savings, insurance, loans, or other forms of assistance to mitigate wildfire threats. Current management activities,

including maintenance of existing facilities and methods of suppressing wildfires would continue. Accumulation of hazardous fuels and the risk of catastrophic wildfires would not be reduced.

### 3.2.2 Alternative 2: Vegetation Management

Alternative 2 consists of an integrated vegetation management process in which targeted trees and other fuels would be removed by hand and/or mechanical methods in order to create defensible space and/or reduce hazardous fuels. Fuel breaks would be created by thinning tree stands along existing roads to protect evacuation routes, provide quick access for fire suppression and to serve as a line of defense from which personnel and equipment can be deployed.

Mechanical removal could involve use of machines, such as feller bunchers. 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, forwarder, or other means of transport (yarding) for further processing (e.g., delimbing, bucking, loading, or chipping). Other equipment such as chippers, tractors, brush hogs, skid loaders, and all-terrain vehicles could also 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.

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 (branches, treetops). Removal of undesired vegetation is frequently necessary on complex terrain, areas that cannot be accessed by machinery, or areas adjacent to existing buildings. In areas with severe slopes, trees can be hand cut and removed via helicopters or cable-yarding systems.

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 Noxious Weed Management Program.

All treatments would be implemented using the guidelines described in Colorado State Forest Service (CSFS) BMPs to Protect Water Quality in Colorado (2010), which are intended to ensure minimum risk of adverse impacts on physical, natural, socioeconomic, cultural, and historic resources (further detailed in Section 5, BMPs and Mitigation Measures).[4] All treatment areas would be accessed using existing roads to the extent possible. No project activities would occur within 50 feet of a wetland or stream, or in Streamside Management Zones / Exclusion Zones, which are site-specific buffers designated to protect sensitive riparian areas. All streams would be crossed at existing stream crossings to the extent possible. No new stream crossings or other activities with the potential to impact natural or cultural resources would occur without additional site-specific environmental review and approval.

[4] CSFS BMPs are available at http://static.colostate.edu/client-files/csfs/pdfs/ForestryBMP-CO-2010.pdf.

#### *3.2.2.1 Defensible Space*

A defensible space is created by removing the woody vegetation around a structure. The purpose of defensible space is to provide a buffer that limits the spread of a wildfire and to establish an area in which firefighters can safely protect structures through fire suppression activities.

The required radius of defensible space around a building is related to the degree of the hazard, and the radius that is needed for an effective defensible space may therefore vary from one jurisdiction or building to another. In addition, topography, specifically slope steepness and direction, and the arrangement, amount, and flammability of the vegetation may require extending the perimeter of defensible space. When the proposed perimeter extends beyond what is required, the effectiveness of the proposed defensible space must be demonstrated in the project application.

Defensible space projects for residential structures, commercial buildings, public facilities, and infrastructure must be implemented in conformance with local code requirements for defensible space. FEMA recommends that projects use the design guidance in the *Homebuilder's Guide to Construction in Wildfire Zones* (FEMA P-737) or the *Wildfire Hazard Mitigation Handbook for Public Facilities* (FEMA P-754), following the guidance presenting a stricter standard (FEMA, 2014a) (FEMA, 2014b).

#### *3.2.2.2 Hazardous Fuels Reduction*

Hazardous fuels reduction includes thinning vegetation, removing ladder fuels, reducing flammable vegetative materials, and replacing flammable vegetation with fire-resistant vegetation for the protection of life and property. Vegetation may include excess fuels or flammable vegetation.

Hazardous fuels reduction projects would be conducted not more than 2 miles from homes and other structures to reduce stem density, basal area, canopy continuity, and ladder fuels by removing trees and shrubs (live and dead) from the forest stand, helping to reduce the spread of a wildfire both horizontally and vertically. Hazardous fuels reduction can also increase the health of remaining trees, which creates a more fire-resistant forest. Healthy trees are more resistant to insect attacks and diseases, which can kill trees.

#### *3.2.2.3 Project Schedule and Equipment*

All project activities would be conducted during time periods when the ground is frozen or dry. Logging systems used to implement the Proposed Action would be limited to ground-based systems and mastication/chipping systems. Ground-based systems (chain saws, tractors) would be used to sever and remove trees from the treatment areas and mastication/chipping would be used to eliminate slash (branches, treetops) onsite. Equipment required for activities (tractors, chippers) would be fitted with high flotation/low ground pressure tires or tracks to reduce or eliminate ground disturbance.

## 3.3 ALTERNATIVES NOT CONSIDERED

FEMA policy does not allow funding of the following types of projects; therefore, they were not retained as alternatives for consideration under this PEA. However, Federal agencies that do fund these types of actions can apply this PEA to the extent allowed under their own authorities.

- Projects that do not protect homes, neighborhoods, structures, or infrastructure;
- Projects on federally owned land and land adjacent to Federal lands when the proposed project falls under the primary or specific authority of another Federal agency;
- Projects for hazardous fuels reduction in excess of two miles from structures;
- Projects to address ecological or agricultural issues related to land and forest management (e.g., insects, diseases, infestations, damage from extreme weather events affecting the forest-wide health);
- Irrigation of vegetation to avoid disease or drought-related infestation;
- Projects to protect the environment or watersheds;
- Projects for prescribed burning or clear-cutting activities;
- Projects for maintenance activities, deferred or future, without an increase in the level of protection;
- Projects for the creation and maintenance of fire breaks, access roads, and staging areas;
- Purchase of equipment to accomplish eligible work (e.g., chainsaws, chippers);
- Projects for vegetation irrigation systems installed on the ground and designed to moisten the surface; and
- Activities intended solely to remedy a code violation without an increase in the level of protection.

FEMA has determined that some actions have no significant effect on the human environment and are, therefore, categorically excluded from the preparation of an EIS or EA except where extraordinary circumstances are present, as defined in the U.S. Department of Homeland Security's *Implementation of NEPA* under Instruction Manual 023-01-001-01, Revision 01 (2014) and FEMA Directive 108-1 (August 22, 2016) (DHS, 2014) (FEMA, 2016a). Projects that may be funded by FEMA, but fall into a Categorical Exclusion (CATEX) review, include:

- Projects for the purchase of fire-related equipment (e.g., vehicles, fire trucks) or communications equipment;[5]

[5] Federal Assistance for Construction or Installation of Structures, Facilities, or Equipment to Ensure Continuity of Operations. Federal assistance for the construction or installation of measures for the purpose of ensuring the continuity of operations during incidents such as emergencies, disasters, flooding, and power outages involving less than one acre of ground disturbance. Examples include the installation of generators, installation of storage tanks of up to 10,000 gallons, installation of pumps, construction of structures to house emergency equipment, and utility line installation. This CATEX covers associated ground disturbing activities, such as trenching, excavation, and vegetation removal of less than once acre, as well as modification of existing structures.

- Development or enhancement of fire-suppression capability through the purchase of equipment or resources (e.g., water supply or sources, dry hydrants, cisterns not related to water hydration systems, dip ponds);[6]

- Structural protection through ignition-resistant construction using noncombustible materials, technologies, and assemblies on new and existing buildings and structures that are in conformance with local fire-related codes and standards (e.g., roof assemblies, wall components, and external water hydration and thermal insulation systems);[7, 8] and

- Federal assistance for wildfire hazard mitigation actions involving the creation of defensible space or hazardous fuel reduction within 100 feet of at risk structures which includes the selective removal of vegetation less than 12 inches in diameter through thinning, pruning, limbing, sawing, or brush cutting; removal of downed, dead, or dry vegetation material as part of the overall action. The actions cannot exceed 100 acres of vegetation removal either individually or when combined with other reasonably foreseeable private or public actions and follow appropriate best management practices.[9]

[6] Ibid.

[7] Federal Assistance for Structure and Facility Upgrades. Federal assistance for the reconstruction, elevation, retrofitting, upgrading to current codes and standards, and improvements of pre-existing facilities in existing developed areas with substantially completed infrastructure, when the immediate project area has already been disturbed, and when those actions do not alter basic functions, do not exceed capacity of other system components, or modify intended land use.

[8] Federal Assistance for New Construction Activities of Less Than One Acre in Undisturbed or Undeveloped Areas. Federal assistance for new construction and associated site preparation activities in undisturbed or undeveloped areas when the activities comprise less than one acre and follow best management practices to control noise, water, and air pollution. This category does not apply to new construction in undisturbed or undeveloped floodplains, wetlands, or seaward of the limit of moderate wave action (or V zone when the limit of moderate wave action has not been identified). This CATEX covers the range of activities typically necessary for new construction, including field work (e.g., borings, site inspection) and temporary staging and use of construction equipment and vehicles.

[9] Federal Assistance for Wildfire Hazard Mitigation Actions. Federal assistance for wildfire hazard mitigation actions involving the creation of defensible space or hazardous fuel reduction for up to 100 feet of at-risk structures which includes the selective removal of vegetation less than 12 inches in diameter through thinning, pruning, limbing, sawing, or brush cutting; removal of downed, dead, or dry vegetation material as part of the overall action. The actions must be limited to less than 100 acres of vegetation removal either individually or when combined with other reasonably foreseeable private or public actions and follow appropriate best management practices.

# 4 Affected Environment And Environmental Consequences

## 4.1 PHYSICAL RESOURCES

### 4.1.1 Affected Environment

#### *4.1.1.1 Geology*

Colorado has a diverse geology, ranging from the western mountains lifted and folded by tectonics and sculpted by glaciers to the eastern plains partly overlain by glacial till and dissected by wind and water (CGS, 2016a).

Physiographic regions are areas of distinctive topography, geography, and geology. "Important physiographic differences between adjacent areas are, in a large proportion of cases, due to differences in the nature or structure of the underlying rocks." Regions are further sub-divided into physiographic provinces based on differences observed on a more local scale (Fenneman, N., 1916). Colorado is composed of three physiographic regions: eastern Colorado falls within the Interior Plains Region (Great Plains Province); central Colorado is within the Rocky Mountain System (Wyoming Basin, Middle Rocky Mountains, and Southern Rocky Mountains Provinces); and western Colorado is within the Intermontane Plateaus Region (Colorado Plateaus Province) (USGS, 2003). A generalized State geological map for Colorado is included in Figure 4-1.

Eastern Colorado's plains include more than 30,000 square miles of wind-blown (eolian) deposits. These deposits contain fine-grained dust particles, which form loess deposits, and coarse-grained sands, which form dunes. Great Sand Dunes National Park and Preserve features some of the country's largest sand dunes, with several and measure over 700 feet tall. (CGS, 2016b)

Colorado has roughly a dozen glaciers, which formed approximately 500 years ago. The maximum extent of the glaciers occurred about 1850. As the climate began warming, the ice began to melt and the glaciers retreated. (CGS, 2016c)

At 6,800 feet above sea level (ASL), Colorado has the highest average elevation of any State nationwide. Close to one-third (31%) of Colorado’s land area is above 8,000 feet; the difference between Colorado's lowest point at 3,313 ASL (at the border with Kansas along the Arikaree River) and highest point at 14,440 ASL (at the peak of Mount Elbert in Central Colorado) is more than 2 miles. Colorado has 58 named peaks greater than 14,000 feet ASL. (CGS, 2016d)

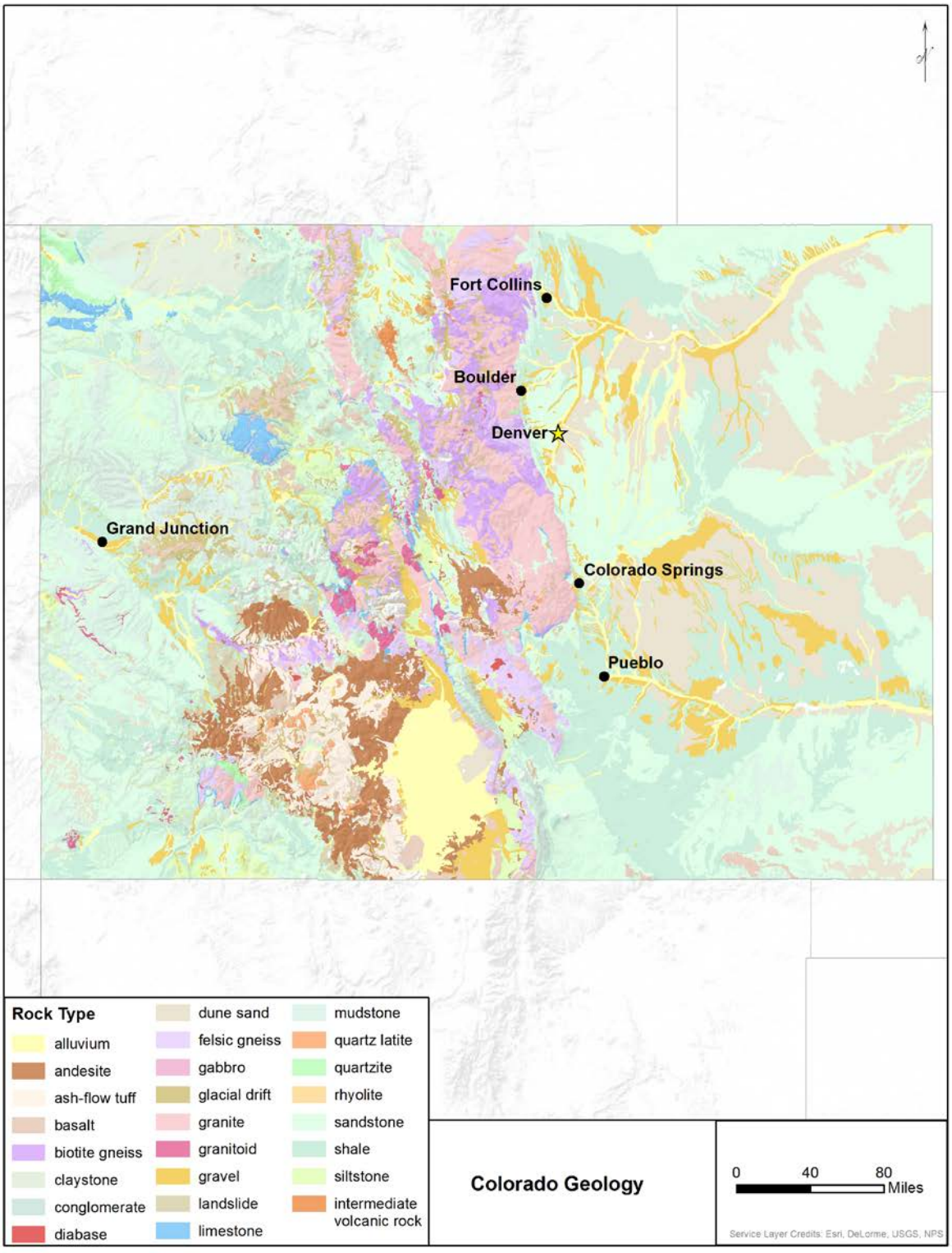


**Figure 4-1: Generalized Bedrock Geology for Colorado**

#### *4.1.1.2 Soils*

Soil types are classified as part of the soil taxonomy (i.e., a classification system used to make and interpret soil surveys). Soil orders are the highest level in the taxonomy; there are 12 soil orders in the world, which are distinguished by texture, color, temperature, and moisture regime. Soil suborders are the next level down, and are differentiated by soil moisture and temperature regimes, as well as physical and chemical properties (NRCS, 2015). The STATSGO2[10] soil database identifies 21 soil suborders in Colorado (NRCS, 2016d), which are depicted in Figure 4-2.

Colorado's State soil is "Seitz soil," which is found throughout roughly 350,000 acres in Colorado. "The Seitz series consists of very deep, well drained, slowly permeable soils that formed in colluvium or slope alluvium derived from igneous, sedimentary, and volcanic rocks. Seitz soils are on mountains, mainly in southwestern and central Colorado" (NRCS, Undated).

Soil compaction and rutting occurs when soil layers are compressed by machinery or animals, which decreases soil pore spaces and reduces infiltration rates (NRCS, 1996). Moist soils are particularly susceptible to compaction and rutting, as they lack the strength to resist deformation caused by pressure. When rutting occurs, channels form and downslope erosion typically occurs (USFS, 2009). Loam, sandy loam, and sandy clay loam soils are most susceptible to compaction and rutting; silt, silty clay, silt loam, silty clay loam, and clay soils are more resistant to compaction and rutting (NRCS, 1996). Soils with the highest potential for compaction and rutting in Colorado include those in the Albolls, Aquents, Aquepts, Aquolls, Hemists, and Ustolls suborders, which are found mostly in western and northeastern alpine areas of Colorado (Figure 4-2).

[10] STATSGO2 is the Digital General Soil Map of the U.S. that shows general soil association units across the landscape of the nation. Developed by the National Cooperative Soil Survey, STATSGO2 supersedes the State Soil Geographic (STATSGO) dataset.

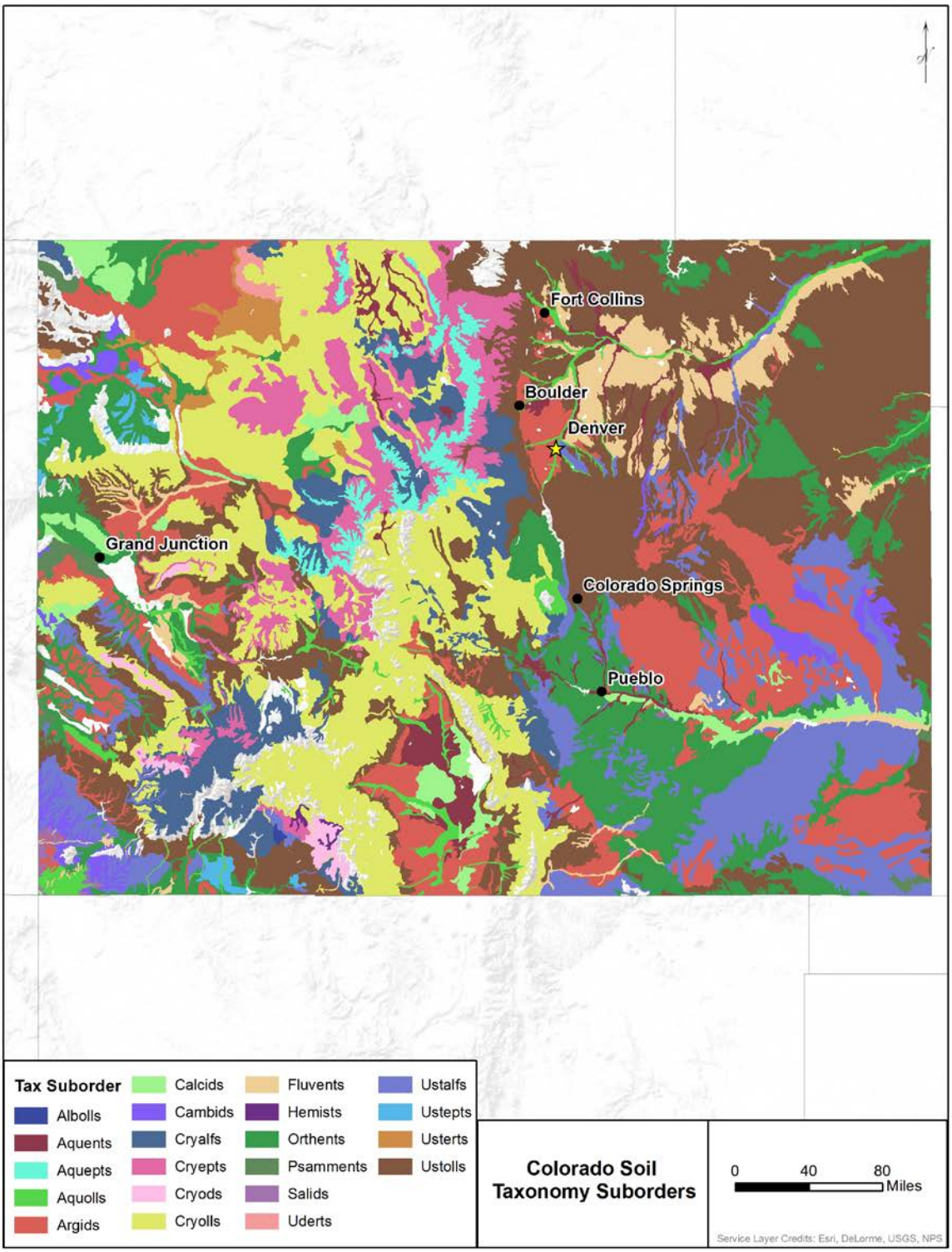


**Figure 4-2: Colorado Soil Taxonomy Suborders**

#### *4.1.1.3 Land Use*

Colorado is the 8th largest State by land area with 103,642 square miles (U.S. Census Bureau, 2012b). The U.S. Federal government manages 37,721 square miles (USGS, 2014), while the State oversees 5,052 square miles (CDNR, 2015), and 1,781 square miles of land are tribal (USGS, 2012b).

Table 4-1 identifies the major land coverage types in Colorado. Forest and woodlands comprise the largest portion of land use (31%), followed by agriculture (20%), and developed lands (1%). The remaining percentage of land includes public land, surface water, and other land cover that are not associated with specific land uses (USGS, 2012a) (Figure 4-3).

**Table 4-1: Major Land Use in Colorado by Coverage Type**

| Land Use | Square Miles[a] | Percent of Land |
|---|---|---|
| Forest and Woodland | 32,166 | 31% |
| Agricultural Land | 20,373 | 20% |
| Developed Land | 1,225 | 1% |
| Public Land, Surface Water, and other Land Cover | 49,878 | 48% |
| **TOTAL** | **103,642** | **100%** |

[a] Square miles are rounded to the nearest whole number. The maps and tables are prepared from the analysis of Geographic Information System (GIS) data and imagery; a margin of error may result in the use of imagery. The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data, and the amount of ground truth verification work conducted. Other Federal or State data sources may have slightly different totals.

Source: (USGS, 2011)

There were more than 31.8 million acres of farmland and 36,180 farms in Colorado as of 2012 (USDA, 2016b). Prime farmland, defined as land that is best suited to food, feed, forage, fiber, and oilseed crops, is found throughout Colorado on over nearly 1.7M acres, which accounts for more than two percent of the State's total area. In Colorado, 93 percent of the soils classified as prime farmland are used as cropland. Approximately 53,300 acres of prime farmland were developed between 1982 and 1997 (NRCS, 2016b) (NRCS, 2016c).

##### *4.1.1.3.1 Recreational Land Use*

Colorado is a diverse state. The Rocky Mountains encompass the western portion of Colorado; the remainder is mesas, deserts, and plains. In northwestern Colorado, the White River National Forest is the country's most visited forest; this area includes ski resorts, wilderness areas, rivers, reservoirs, hot springs, and over 2,500 miles of trails (USFS, 2015). The State's main population centers, including Denver, Colorado Springs, Aurora, and Fort Collins, are along the eastern edge of the Rocky Mountains. Denver is renowned as a hub for outdoor recreational enthusiasts. The city maintains over 85 miles of paved multi-use trails, as well as dirt trails used for mountain biking (The Colorado Trail Foundation, 2016).

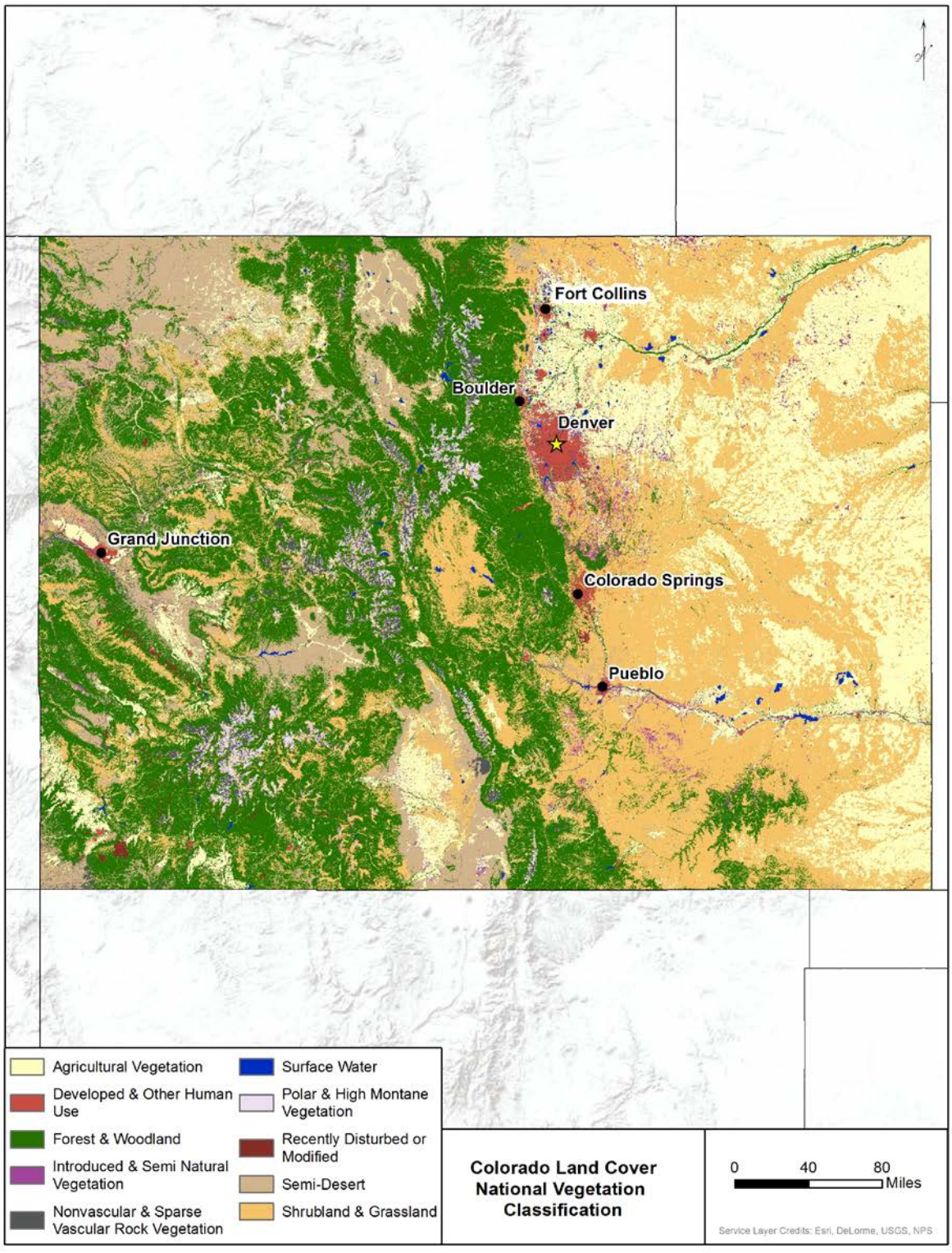


**Figure 4-3: Major Land Use Distribution by Coverage Type in Colorado**

## 4.1.2 Environmental Consequences

This section describes potential impacts to physical resources associated with the alternatives, as discussed below. There is potential for physical resources impacts to occur when an activity:

- Significantly increases soil erosion;
- Significantly increases soil compaction and rutting; or
- Eliminates or significantly restricts access to recreational lands or activities.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-2 presents the impact summary for physical resources.

**Table 4-2: Impact Significance Criteria for Physical Resources**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Soil erosion | No Impact | Less than Significant |
| Soil compaction and rutting | No Impact | Less than Significant Beneficial |
| Access to recreational lands or activities | No Impact | Less than Significant Beneficial |

### *4.1.2.1 Alternative 1: No Action*

Under the No Action Alternative, no Federal action would be completed by FEMA and the potential for a catastrophic wildfire would not change. Alternative 1 would not change geology and soils; however, Alternative 1 has the potential to significantly affect land use if a wildfire occurs, particularly loss in agricultural and recreational land use. Wildfire could adversely affect soils by removing existing vegetation and exposing soils to potential erosion from future heavy precipitation events. There is also a likelihood of rapid fire growth and spread in some areas due to steep topography, fast burning or flashy fuel components, and other topographic features that contribute to channeling winds and the promotion of extreme fire behavior.

### *4.1.2.2 Alternative 2: Vegetation Management*

Alternative 2 would not adversely affect geology because the treatments would not extend deep enough to disturb geologic resources. Alternative 2 could involve the use of some heavy equipment, but the equipment would have large tires or tracks and would be used only when the ground is frozen or dry. Therefore, soil disturbance would be minimal. Post-project impacts on soils are difficult to predict because the actual impacts would depend on whether the project area experiences a wildfire. If the project area does not experience a wildfire, Alternative 2 would have

no impact on soils. If a wildfire occurs and the advancement of the wildfire is slowed or stalled by the vegetation management activities to the extent that firefighters are able to contain the fire, Alternative 2 would have a significant beneficial effect on the soils in the areas that would have burned if the vegetation management had not been implemented. The beneficial effects would extend to adjacent areas that otherwise would have burned. Although the exact area of benefit cannot be quantified, the size of recent wildfires in Colorado suggests that several thousand acres could benefit. The unburned areas would retain existing vegetation and during future heavy precipitation events would not experience increased runoff and associated soil erosion, which would adversely affect soils.

Land use (such as recreation and agriculture) could be maintained or the impact reduced through Alternative 2 if a wildfire did occur as the vegetation management practices would likely retain land use in its present conditions.

## 4.2 TRANSPORTATION RESOURCES

### 4.2.1 Affected Environment

Colorado has an extensive and complex transportation system, which includes roadways, railroads, and aviation facilities (Figure 4-4). There are no harbors or ports in Colorado (U.S. Harbors, 2016). Colorado's extensive road network consists of 88,565 miles of public roads (FHWA, 2014) (including 4,881 miles of Federal public roads (FHWA, 2015a)), and 8,668 bridges (FHWA, 2015b). Colorado's three major interstates connect its major metropolitan areas to one another, as well as to other States (Table 4-3). Travel outside the metropolitan areas is conducted on interstates, State, and county roads (FHWA, 2016c).

**Table 4-3: Colorado Interstates**

| Interstate | Southern or Western Terminus in CO | Northern or Eastern Terminus in CO |
|---|---|---|
| **I-25** | NM line near Starkville | WY line near Norfolk |
| **I-70** | UT line near Mack | KS line near Burlington |
| **I-76** | I-70 in Arvada | NE line near Julesburg |

Railroads actively transport goods and people throughout the State with more than 2,800 miles of track, inclusive of passenger rail and freight rail, remain operational (CDOT, 2012). In 2011, Amtrak served close to 206,000 riders in Colorado on the Zephyr and Chief lines (CDOT, 2012). The California Zephyr route extends from Fort Morgan to Denver, Glenwood Springs, and Grand Junction, whereas the Southwest Chief route passes between Lamar and Trinidad (CDOT, 2012). In the Denver area, the Regional Transportation District provides light rail service operating over 48 miles of rail service (RTD, 2016). Freight railroads operate in 48 of 64 counties (CDOT, 2012).

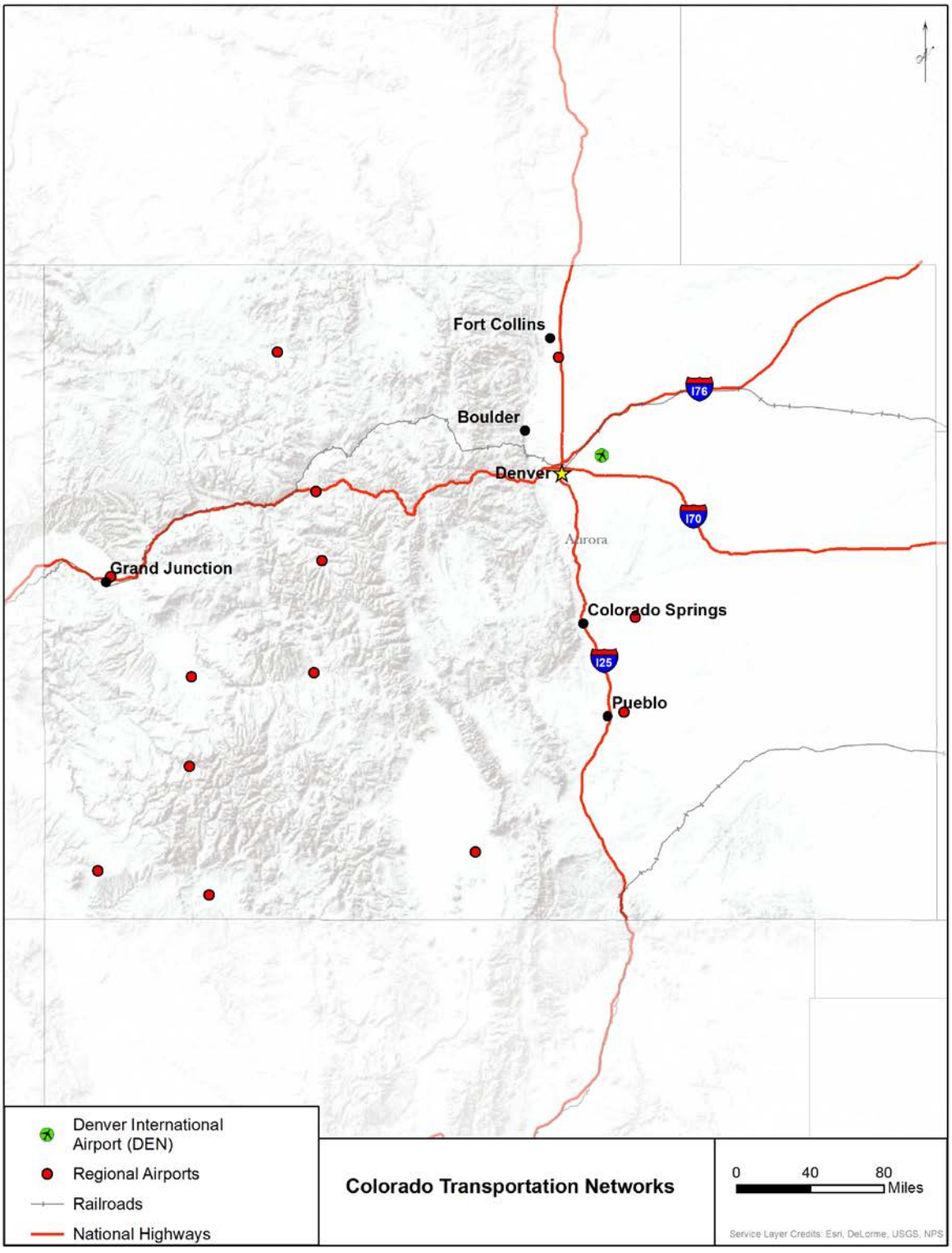


**Figure 4-4: Colorado Transportation Networks**

As illustrated in Figure 4-4, Colorado has 14 commercial airports, including regional and municipal airports (CDOT, Undated). Denver International Airport is Colorado's only major international airport and the 5th busiest nationwide (DEN, 2016). In 2015, the airport served 54,014,502 passengers, facilitated 547,648 aircraft operations, and handled 490,788,388 pounds of cargo (DEN, 2015).

## 4.2.2 Environmental Consequences

This section describes potential impacts to transportation associated with the alternatives, as discussed below. There is potential for transportation impacts to occur when an activity:

- Creates substantial traffic congestion, delay, or increase in incidents (e.g., accidents).

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-4 presents the impact summary for transportation resources.

**Table 4-4: Impact Significance Rating Criteria for Transportation Resources**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Traffic congestion, delay, or incidents | No Impact | No impact |

### *4.2.2.1 Alternative 1: No Action*

Under the No Action Alternative, the proposed action would not be conducted. Mobility in regional areas is critical for social, recreational, and economic activities. Commuting is a part of daily life and truck transportation plays a vital role in Colorado's economy. If a wildfire occurred, there is potential that roads or railways could be blocked, damaged, or destroyed. This could be detrimental for single ingress/egress roadway areas and could prevent evacuations or prevent firefighters from entering into an area. The No Action Alternative may result in significant adverse impacts due to increased travel times and increasing traffic volumes if travel patterns change as a result of a wildfire. Wildfires also have the potential to disrupt air traffic as smoke reduces visibility.

The No Action Alternative may result in a significant adverse impact for Colorado's railways. During the 2012 Waldo fire, wildfires severed north/south transportation causing coal trains to and from Texas to re-route over 600 miles via Kansas City. East/west freight trains have detour options on parallel lines, but are limited by load capacities, speed, tunnel limitations, clearances, and crew availability. While the two Amtrak trains have well established detour routes, the smaller tourist

operators, if severed, are basically shut down, severely impacting the economy until returned to operation. (CDOT, 2012)

#### *4.2.2.2 Alternative 2: Vegetation Management*

Under Alternative 2, short-term temporary vehicle traffic would be generated by movement of equipment (chippers) to the project area and from work crews traveling to and from work sites. The amount of traffic generated would be minimal and would not interfere with local residents or other people traveling in the vicinity the project area.

Alternative 2 would reduce the risk of a wildfire encompassing roads or railroads. Thus, the potential for roads or railways to be blocked, by a wildfire would be reduced. Alternative 2 also would reduce the potential for disruption in air traffic throughout the State due to wildfires. Wildfire mitigation projects may be completed in conjunction with projects falling under consideration of the PEA for Post-Disaster Road, Bridge and Trail Replacement, Relocation and Upgrade in the State of Colorado, May 2014 (FEMA, 2014d).

## 4.3 SAFETY AND OCCUPATIONAL HEALTH

### 4.3.1 Affected Environment

The risk of catastrophic wildfires in Colorado's forests (Figure 4-5) is extremely high due to the heavy fuel loading (closely spaced trees and shrubs and dead material on the forest floor). "Due to natural fuels build-up and increased population in wildland-urban interface areas, wildfires that exceed the control efforts of local and county resources are becoming more common and more complex" (Colorado State Forest Service, 2012). Flash flooding following large wildfires can contribute sediment and debris to area waterways, which can damage structures, roads, and utilities critical to the safety and well-being of citizens in and down gradient of the project area. "Locations downhill and downstream from burned areas are very susceptible to Flash Flooding and Debris Flows, especially near steep terrain. Rainfall that would normally be absorbed will run off extremely quickly after a wildfire, as burned soil can be as water repellant as pavement. As a result much less rainfall is required to produce a flash flood" (NOAA, 2016). Residents, visitors, and emergency personnel can experience safety concerns during a forest fire.

During recent wildfires and associated flooding in Colorado, thousands of people have required evacuation because of safety concerns. For example, in 2002, the Hayman fire, which started about 95 miles south of Denver, burned over 136,000 acres, and resulted in the destruction of nearly 600 structures (National Interagency Fire Center, 2016a). In 2010, during the Four Mile Canyon Fire, which occurred just a few miles northwest of Boulder, thousands of people were forced to abandon their homes (NASA, 2010), and 170 structures were destroyed (National Interagency Fire Center, 2016a). In 2012, at least 32,000 people were forced to evacuate their homes due to the Waldo Canyon Fires near Colorado Springs (NASA, 2012); 346 homes burned during this event (National Interagency Fire Center, 2016a). “The fire killed two people, destroyed

approximately 500 structures and caused the evacuations of thousands. With 16,000 acres burned, the fire was finally contained nine days after it started. The Rocky Mountain Insurance Information Association estimates the insured losses from the fire at $420.5 million" (FEMA, 2016f). Between 1995 and 2013 (not including the 2013 Black Forest Fire), there were 14 wildfire related deaths in Colorado (National Interagency Fire Center, 2016b). Table 4-5 summarizes significant fires within Colorado between 1994 and 2013, and Figure 4-5 illustrates the locations of significant historic Colorado wildfires. Figure 4-6 shows

**Table 4-5: Significant Colorado Wildfires–1994-2013**

| Date | Name | Land Acres Impacted | Other Impacts |
|---|---|---|---|
| July 1994 | South Canyon Fire | 1,856 | 14 lives lost |
| July 2002 | Hayman Fire | 136,000 | 600 structures destroyed |
| 2010 | Four Mile Canyon | 6,250 | 170 structures destroyed |
| June 2012 | Waldo Canyon | 18,947 | 346 homes destroyed |
| June 2013 | Black Forest Fire | 16,000 | 2 lives lost and 500 structures destroyed |

Source: (National Interagency Fire Center, 2016a) (FEMA, 2016f)

### 4.3.2 Environmental Consequences

This section describes potential impacts to safety and occupational health associated with the alternatives, as discussed below. There is potential for impacts to safety and occupational health to occur when an activity:

- Significantly increases exposure to occupational hazards as a result of natural and man-made disasters.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-6 presents the impact summary for safety and occupational health.

**Table 4-6: Impact Significance Rating Criteria for Safety and Occupational Health**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Exposure to occupational hazards | No Impact | Less than Significant |

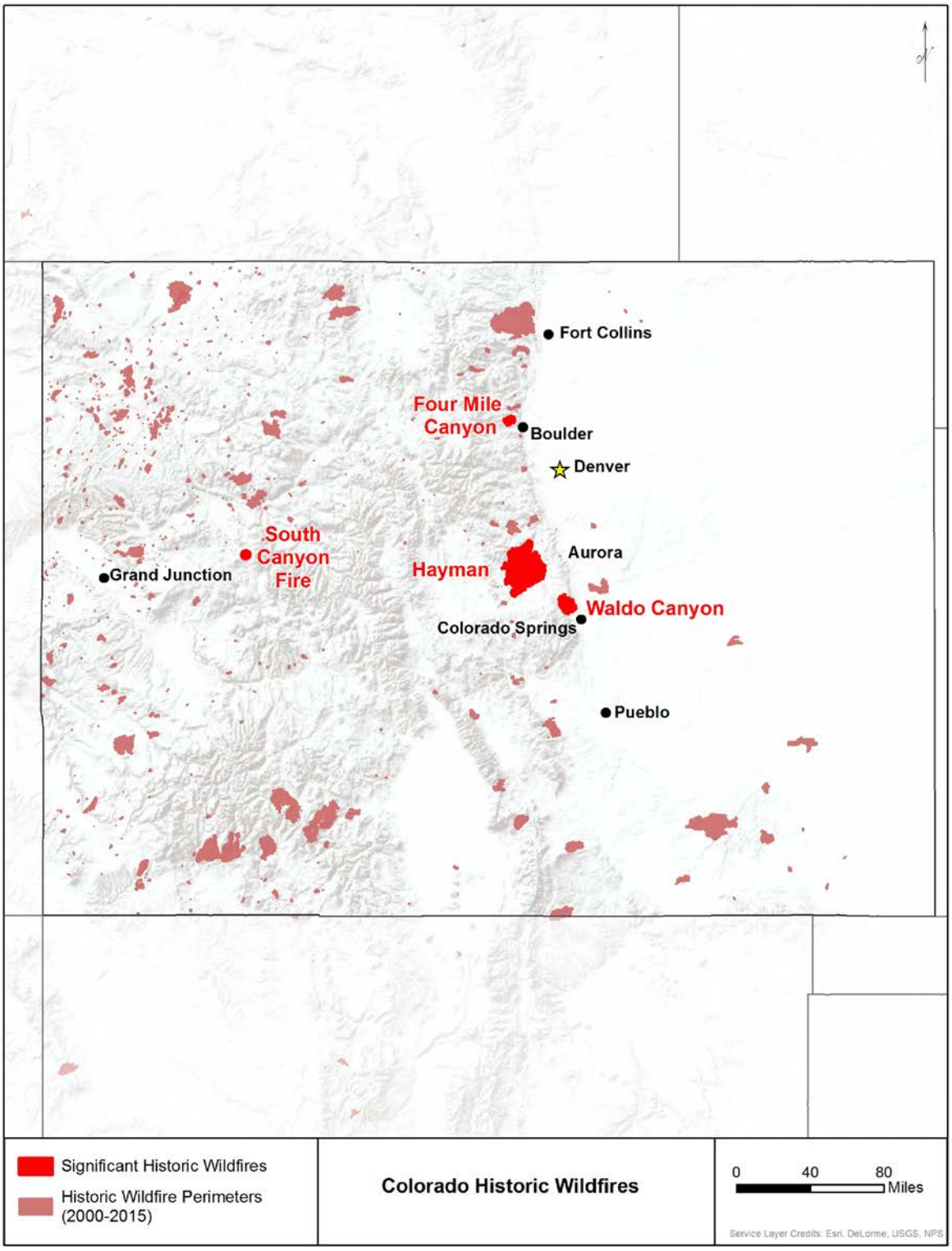


**Figure 4-5: Colorado Historic Wildfires**

#### *4.3.2.1 Alternative 1: No Action*

Safety and occupational health issues include one-time and long-term exposure. Examples include short/long-term exposure to environmental conditions, such as smoke inhalation, and injuries or deaths resulting from a one-time accident. Safety and occupational health concerns could impact personnel working on the project and in the surrounding area, as well as travelers using the project sites.

Under the No Action Alternative, fuel loads in the project area would continue to accumulate and the potential for wildfires, and associated direct impacts, would increase. People living near unmanaged areas would be at an increasing risk to the impacts of wildfires over time. People and structures down gradient of the burn area would be at risk from sediment and debris flows if a major precipitation event occurred prior to revegetation of the burn area. Structures at risk would include houses, roads, bridges, railroads, water intakes, and water treatment facilities.

Under the No Action Alternative, people would be at increased risk of experiencing adverse health impacts due to wildfires. 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 from a wildfire, especially young children and people with lung disease or asthma, could be adversely affected if the Proposed Action were not implemented. At close range, wildfires can generate substantial amounts of carbon monoxide, which can pose a health concern for frontline firefighters. Air quality impacts are discussed in Section 4.5.

#### *4.3.2.2 Alternative 2: Vegetation Management*

Alternative 2 consists of an integrated vegetation management process in which targeted trees and other fuels would be removed by hand and/or mechanical methods in order to create defensible space and/or reduce hazardous fuels. This work entails the use of machinery such as feller bunchers, chippers, tractors, brush hogs, skid loaders, and chainsaws, and the use of transport vehicles including all-terrain vehicles. Any equipment is inherently dangerous and could lead to occupational accidents if operators are unprepared, untrained, or do not have the appropriate equipment. Preparation for both hand and mechanical vegetation removal methods would include personal protective equipment (PPE) and proper attire for operators. BMPs in Section 5 would minimize these effects.

Alternative 2 is designed to reduce the rate of spread and intensity of a wildfire within the treatment areas, which would improve the safety of residents and firefighters and make it easier to bring a wildfire under 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 is greatly reduced. Reducing the intensity and frequency of wildfires lowers the risk for people living or working in the urban/forest interface because wildfires would threaten fewer buildings.

# 4.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

## 4.4.1 Affected Environment

According to the U.S. Census, the population of Colorado in 2014 was 5,456,574 (U.S. Census Bureau, 2015e). The five largest cities in Colorado at the time of the 2010 Census were Denver/Aurora with 2,374,203; Colorado Springs with 559,409; Fort Collins with 264,465, Pueblo with 136,550, and Grand Junction with 128,124 (U.S. Census Bureau, 2012a). Figure 1-1 displays the location of each of these cities.

The majority of the Census respondents in Colorado (96.4%) identified themselves as being of one race. These respondents identified as White (83.8%), Black/African American (4%), American Indian/Alaskan Native (0.8%), Asian (2.9%), Native Hawaiian /Pacific Islander (0.2%), Some Other Race (4.8%), or Two or more races (3.6%) (U.S. Census Bureau, 2015b).

There are two federally recognized American Indian tribes in Colorado: Southern Ute Indian Tribe of the Southern Ute Reservation and Ute Mountain Tribe of the Ute Mountain Reservation (Colorado, New Mexico, and Utah). "The Southern Ute Tribe has approximately 1,400 tribal members, with half the population under the age of 30" (Southern Ute Indian Tribe, 2016). "The [Ute Mountain Ute] Tribe has 2,060 enrolled members who reside both on and off the reservation" (Colorado Commission of Indian Affairs, 2016).

The per capita income in Colorado in 2013 ($31,421) was $3,893 higher than that of the region ($27,528), and $3,237 higher than that of the nation ($28,184) (U.S. Census Bureau, 2015f). Counties with a Mean Household Income (MHI) above the national median were located in the central, north central, and northwest portions and southwest corner of Colorado. The remaining areas had MHI levels below the national average (U.S. Census Bureau, 2015d). An estimated 13 percent of the population was living in poverty in Colorado as of 2013 (U.S. Census Bureau, 2015c).

According to the U.S. Census Bureau, in 2013, 2,593,798 civilian personnel were employed in Colorado. By industry, the seven largest employment sectors in Colorado included: educational services, and health care and social assistance (20.2%), professional, scientific, management, administrative, and waste management services (13.6%), retail trade (11.3%), arts, entertainment, and recreation, and accommodation and food services (11.0%), construction (7.2%), manufacturing (7.1%), and finance and insurance, and real estate and rental and leasing (7.0%) (U.S. Census Bureau, 2015a). Unemployment in Colorado was 5 percent as of 2014 (U.S. Bureau of Labor Statistics, 2015).

## 4.4.2 Environmental Consequences

This section describes potential impacts to socioeconomics and environmental justice associated with the alternatives, as discussed below. There is potential for impacts to socioeconomics and environmental justice to occur when an activity:

- Significant shift in the real estate or rental market; or
- Significant economic changes in spending, income, or tourism observed through a county or region.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-7 presents the impact summary for socioeconomics and environmental justice.

**Table 4-7: Impact Significance Rating Criteria for Socioeconomics and Environmental Justice**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Shift in real estate or rental market | No Impact | Less than Significant Beneficial |
| Change in spending, income, or tourism | No Impact | Less than Significant Beneficial |

#### *4.4.2.1 Alternative 1: No Action*

Under the No Action Alternative, no assistance from FEMA would occur and present day conditions would remain. This could potentially result in significant adverse impact to economics of a community if a wildfire were to occur. The potential negative economic impacts would affect residents with homes in burned areas, particularly in cases in which residents are displaced; agricultural lands could be threatened directly by fires, while businesses could be impacted directly or indirectly by displacement of residents or interruptions to transportation corridors. "Indirect wildfire costs include lost tax revenues in a number of categories such as sales and county taxes, as well as business revenue and property losses that accumulate over the longer term. For example, properties that escape damage in the fire may still experience dramatic drops in value as the area recovers" (Western Forestry Leadership Coalition, 2010). For example, indirect costs attributed to the 2002 Missionary Ridge (Colorado) wildfire were estimated at over $50.4 million (M), which were attributed to "tax losses, employment losses, and long-term USFS [U.S. Forest Service] losses in the area" (Western Forestry Leadership Coalition, 2010). Total costs (indirect and direct) to fight the 2002 Hayman fire were estimated at $237.8M; and total losses from the 2002 Colorado wildfire season totaled $70.3M (Colorado Division of Homeland Security and Emergency Management, 2010).

Wildfires can mar the landscape and negatively affect the tourism sector of State economies. For example, in the two to three years following the 2000 Canyon Ferry Complex (Montana) wildfire, recreational visits to the Helena National Forest declined by roughly 10 percent. The same fire

resulted in $48,000 of damage to archaeological resources (Western Forestry Leadership Coalition, 2010).

Under the No Action Alternative, all populations within a project area would continue to be at risk of a catastrophic wildfire. The No Action Alternative would not have a disproportionately high and adverse socioeconomic effect on minority or low income populations, and meets the requirements of Executive Order (EO) 12898.

#### *4.4.2.2 Alternative 2: Vegetation Management*

Alternative 2 would have indirect beneficial effects on the economy of communities within Colorado. The creation of defensible space and thinning of trees would help prevent and control the spread of a wildfire in the project area. If a wildfire occurred, the proposed vegetation management would likely limit the extent and magnitude of the wildfire. Thus, Alternative 2 would have beneficial impacts on socioeconomic resources to residents because direct costs would not be incurred to fight major wildfires, and direct/indirect costs associated with property, business, agricultural, and damages would not occur.

No disproportionately high and adverse impacts to low-income or minority populations would result from Alternative 2. Therefore, Alternative 2 would comply with EO 12898.

## 4.5 AIR QUALITY

### 4.5.1 Affected Environment

The Clean Air Act (CAA) requires that States adopt ambient air quality standards. These standards have been established in order to protect the public from potentially harmful amounts of pollutants. The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants: sulfur dioxide ($SO_2$), particulate matter with a diameter less than or equal to 10 micrometers ($PM_{10}$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$), and lead (Pb). The USEPA has designated specific areas as NAAQS attainment or non-attainment areas. Non-attainment areas are any areas that do not meet (or that contribute to ambient air quality in a nearby area that does not meet) the quality standard for a pollutant (USEPA, 2016d). In conjunction with the Federal NAAQS, Colorado maintains its own air quality standards for sulfur dioxide ($SO_2$) under the Colorado Ambient Air Quality Standards (CAAQS) (CDPHE, 2010).

The Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD) monitors air pollutants at 59 sites across the 8 air quality regions throughout Colorado (CDPHE, 2015a). The CDPHE prepares Annual Colorado State Ambient Air Quality Reports that summarize pollutant data by region. Throughout 2013, ozone ($O_3$) measurements exceeded the Federal standard of 0.075 ppm 74 times; $PM_{10}$ measurements exceeded the Federal standard of 150 $\mu g/m^3$ 20 times; particulate matter with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$) measurements exceeded the Federal standard for 24-hour of 35 ppm 4 times

at Grand Junction Powell Building; and $SO_2$ measurements exceeded the Federal standard of 0.075 ppm twice at Colorado Springs. Table 4-8 presents all recorded exceedances in Colorado for 2013 (CDPHE, 2015a).

**Table 4-8: Colorado Exceedances for National Ambient Air Quality Standards (NAAQS) in 2013**

| Monitoring Location | Number of $O_3$ Exceedance | Number of $PM_{10}$ Exceedance | Number of $PM_{2.5}$ Exceedance | Number of $SO_2$ Exceedance |
|---|---|---|---|---|
| NREL | 11 | 0 | 0 | 0 |
| Rocky Flats N | 10 | 0 | 0 | 0 |
| Chatfield State Park | 9 | 0 | 0 | 0 |
| BLM Rangely Golf Course | 9 | 0 | 0 | 0 |
| Fort Collins West | 5 | 0 | 0 | 0 |
| Welby | 4 | 0 | 0 | 0 |
| Highlands Reservoir | 4 | 0 | 0 | 0 |
| South Boulder Creek | 4 | 0 | 0 | 0 |
| Welch | 3 | 0 | 0 | 0 |
| Aspen Park | 3 | 0 | 0 | 0 |
| Aurora East | 2 | 0 | 0 | 0 |
| LaCasa | 2 | 0 | 0 | 0 |
| Manitou Springs | 2 | 0 | 0 | 0 |
| Rocky Mountain National Park | 2 | 0 | 0 | 0 |
| Mt. Crested Butte Realty | 1 | 1 | 0 | 0 |
| USFS Shamrock | 1 | 0 | 0 | 0 |
| Fort Collins CSU | 1 | 0 | 0 | 0 |
| Greely – Weld County Tower | 1 | 0 | 0 | 0 |
| Lamar Municipal | 0 | 7 | 0 | 0 |
| Alamosa Adams State College | 0 | 4 | 0 | 0 |
| Almosa Municipal Building | 0 | 3 | 0 | 0 |
| Pagosa Springs | 0 | 3 | 0 | 0 |
| Durango | 0 | 1 | 0 | 0 |
| Telluride | 0 | 1 | 0 | 0 |
| Grand Junction Powell Building | 0 | 0 | 4 | 0 |
| Colorado Springs (Highway 24) | 0 | 0 | 0 | 2 |
| **TOTAL** | **74** | **20** | **4** | **2** |

Source: (CDPHE, 2015a)

## 4.5.2 Environmental Consequences

This section describes potential impacts to air quality associated with the alternatives, as discussed below. There is potential for impacts to air quality to occur when an activity:

- Significant increase in air emissions resulting in an exceedance of one or more NAAQS in non-attainment and/or maintenance areas.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-9 presents the impact summary for air quality.

**Table 4-9: Impact Significance Rating Criteria for Air Quality**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Increase in air emissions | No Impact | Less than Significant |

### *4.5.2.1 Alternative 1: No Action*

Under the No Action Alternative, fuel loads in the project area would continue to accumulate and the potential for wildfires, including catastrophic wildfires, would increase. Catastrophic wildfires would result in emissions of air pollutants from smoke, including high concentrations of particulate matter, nitrogen oxide, carbon monoxide, and ozone (NASA, 2006). 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. Smoke from wildfires emanating in the western part of the United States has been observed to reach areas as distant as the Atlantic Ocean (NASA, 2015).

Fine particulate matter generated by wildfires can affect the health of people breathing the smoke laden air. Fine particulates are of special concern because of their potential to adversely affect human respiratory systems, especially in young children, the elderly, and people with lung disease or asthma. "Smoke can irritate the eyes and airways, causing coughing, a scratchy throat, irritated sinuses, headaches, stinging eyes or a runny nose…People with heart disease might experience chest pain, palpitations, shortness of breath, or fatigue. People with lung disease may not be able to breathe as deeply or as vigorously as usual, and they may experience symptoms such as coughing, phlegm, chest discomfort, wheezing and shortness of breath" (USEPA, 2003).

If no wildfire occurred in the project area, the No Action Alternative would have no effect on air quality.

#### *4.5.2.2 Alternative 2: Vegetation Management*

During the removal of vegetation, machinery would generate low levels of particulate matter emissions and low levels of vehicle exhaust emissions. These emissions represent a temporary, short-term, negligible impact on air quality in the treatment areas.

Vegetative management has the potential for a long-term beneficial effect on air quality in the project area by reducing the risk of a wildfire and the associated emission of air pollutants. If fugitive dust were to become a problem, it could be mitigated by BMPs, such as periodic watering of active construction areas (see Section 5). Impacts from fugitive dust are anticipated to be short-term and negligible.

## 4.6 NOISE

### 4.6.1 Affected Environment

Noise is a form of sound caused by pressure variations that the human ear can detect and is often defined as unwanted sound (USEPA, 2012a). Typical sources of noise that result in this type of interference in urban and suburban surroundings includes interstate and local roadway traffic, rail traffic, industrial activities, aircraft, and neighborhood sources like lawn mowers, leaf blowers, etc. Sounds associated with this project could emanate from vehicular traffic or machinery used to fell trees or create wood chips.

The unit used to describe the intensity of sound is the decibel (dB). Audible sounds range from 0 dB ("threshold of hearing") to about 140 dB ("threshold of pain") (OSHA, 2016). Figure 4-6 presents the sound levels of typical events that occur on a daily basis in the environment. For example, conversational speech is measured at about 55 to 60 dBA, whereas a band playing loud music may be as high as 120 dBA.

As shown below, Colorado's ambient noise levels and ranges vary widely by area.

- **Urban Environments:** Urban areas are likely to have higher noise levels due to highway traffic (70 to 90 dBA) and construction noise (90 to 120 dBA) (U.S. Department of Interior, 2008). Colorado's urban areas that likely have the highest ambient noise levels include: Denver, Colorado Springs, Fort Collins, and Boulder.
- **Airports:** Areas close to airports have high noise levels during periods of aircraft activity; most commercial airports are near urban areas, resulting in significantly higher ambient noise levels than in other areas. A jet engine aircraft can produce between 130 to 160 dBA in its direct proximity (FAA, 2005), although commercial aircraft are most likely to emit noise levels between 70 to 100 dBA depending of the type of aircraft and associated engine, as well as the altitude of the aircraft and its distance to the point of measurement (FAA, 2012).

In Colorado, Denver International Airport (DEN) and the City of Colorado Springs Municipal Airport (COS) have combined annual operations of more than 705,554 flights (FAA, 2016). These operations result in increased ambient noise levels in the surrounding communities.

- **Highways:** Communities near major highways experience relatively higher noise levels than areas that are not close to major highways (FHWA, 2015c). Major highways in Colorado include Interstates 25, 70, and 76, which are discussed further in Section 4.2; these highways tend to have noise levels ranging from 52 to 75 dBA (FHWA, 2015c).
- **Railways:** Like highways, railways tend to produce higher ambient noise levels (FTA, 2006). Railroad operations can generate noise ranging from 70 dBA to 115 dBA (FRA, 2016). As described in Section 4.2, Colorado has two major rail corridors, the California Zephyr route and the Southwest Chief route (CDOT, 2012).
- **National and State Parks:** Most national and state parks are likely to have lower than average ambient noise levels given their size and location in wilderness areas. These areas typically have noise levels as low as 10 dBA (NPS, 2016a). Colorado has 13 national parks (NPS, 2016b). Visitors to these areas expect lower ambient noise conditions than the surrounding urban areas.

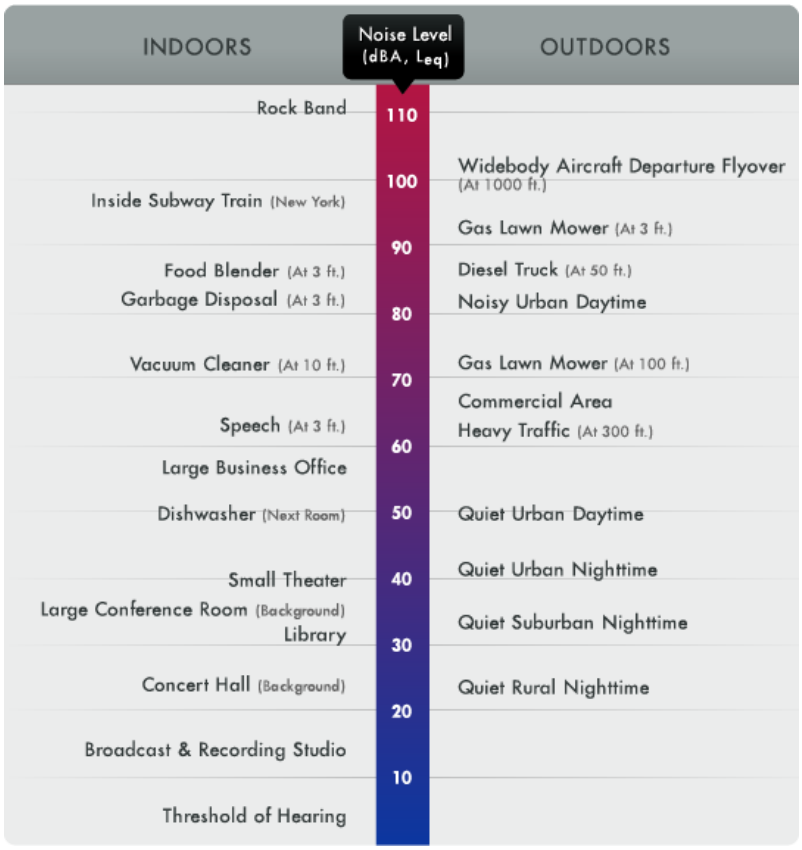


**Figure 4-6: Sound Levels of Typical Sounds**

Source: (Sacramento County Airport Systems, 2016)

### 4.6.2 Environmental Consequences

This section describes potential impacts to noise associated with the alternatives, as discussed below. There is potential for impacts to noise to occur when an activity:

- Noise levels increase from typical noise levels: exceeding 55 dBA at noise sensitive receptors; greater than 10 dBA increase from baseline noise levels at other locations; or greater than 65 dBA near noise receptors at National Parks.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-10 presents the impact summary for noise.

**Table 4-10: Impact Significance Rating Criteria for Noise**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Increase in noise levels | No Impact | Less than Significant |

#### *4.6.2.1 Alternative 1: No Action*

Under the No Action Alternative, no construction or vegetation management-related activities would occur. There would be no effect on noise levels in the project area relative to current conditions.

#### *4.6.2.2 Alternative 2: Vegetation Management*

The operation of chainsaws (92 to 112 dB) and chippers (105 dB) during the creation of defensible space and thinning treatments could potentially create a short-term, temporary increase in noise levels in the vicinity of the treatment areas. Noise associated with operation of equipment would dissipate with increasing distance from the area of operation, and would be limited to 7 a.m. to 5 p.m. Therefore, noise impacts would be short-term, temporary, and limited to the duration of the proposed vegetation management activities.

## 4.7 PUBLIC SERVICES AND UTILITIES

### 4.7.1 Affected Environment

Public services and utilities are the essential systems that support daily operations in a community and cover a broad array of public services, such as electricity, water, wastewater, and solid waste.

Outside of the built environment, there are usually no utilities and few public services. Public services and utilities within the built environment include fire protection, law enforcement, Emergency Medical Services, schools, water, wastewater, sanitation, solid waste disposal, stormwater drainage, electric utilities, natural gas, and telephone/telecommunications.

#### *4.7.1.1 Electricity*

In Colorado, the majority of electricity is generated from either coal or natural gas. In 2015, coal generated 32,544,849 megawatthours (MWh) of power (60% of the total 53,847,386 MWh generated that year). Natural gas generated 11,953,808 MWh (22.2%). In addition, wind and solar generated 7,621,679 MWh (14.1%) (EIA, 2016). The industrial and transportation sectors consume the majority of Colorado's power at 29.1 percent and 27.8 percent, respectively. The residential sector consumes 24.0 percent and the commercial sector accounts for the remaining 19.1 percent (EIA, 2014).

#### *4.7.1.2 Public Safety Services*

Colorado's public safety services include fire protection, law enforcement, and emergency medical services. Table 4-11 and Table 4-12 identify the public safety infrastructure and first responder personnel in Colorado.

**Table 4-11: Colorado Public Safety Infrastructure**

| Infrastructure Type | Number |
|---|---|
| Fire and Rescue Stations | 859 |
| Law Enforcement Agencies | 246 |
| Fire Departments | 325 |

Sources: (U.S. Fire Administration, 2015) (U.S. Bureau of Justice Statistics, 2011)

**Table 4-12: Colorado First Responder Personnel**

| First Responder Personnel | Number |
|---|---|
| Police, Fire, and Ambulance Dispatchers | 1,660 |
| Fire and Rescue Personnel | 13,202 |
| Law Enforcement Personnel | 17,989 |
| Emergency Medical Technicians and Paramedics | 4,110 |

Sources: (U.S. Fire Administration, 2015) (U.S. Bureau of Justice Statistics, 2011) (BLS, 2015)

#### *4.7.1.3 Water*

The CDPHE regulates drinking water quality and is responsible for providing information on the source of Colorado's drinking water, certifying facility operators, and reviewing the design of proposed water facilities (CDPHE, 2015b). Public water systems serving residential customers, classified as "community," must provide their customers with a yearly Consumer Confidence (Water Quality) Report, which details treatment processes, current or potential contaminants and their sources, and the source of the water (CDPHE, 2015c).

#### *4.7.1.4 Wastewater*

The CDPHE is also responsible for handling certain aspects of wastewater treatment facility operation, including certifying all wastewater treatment facility operators, maintaining records of operators and facilities, and preparing and distributing annual reports (CDPHE, 2015d). The CDPHE's Engineering Section is responsible for reviewing the design of new wastewater treatment facilities and reviewing changes to the design of existing facilities, a function required by Colorado's Primary Drinking Water Regulations and Water Quality Control Act (CDPHE, 2015e). Colorado's local governments are largely responsible for managing wastewater services (DOLA, 2015). On-site wastewater treatment systems, or septic systems, are governed by Regulation 43. On-site wastewater treatment systems with flows equal to or greater than 2,000 gallons per day (gpd) must follow CDPHE's design review facility approval process. Systems with flows less than 2,000 gpd must follow local county regulations and permits (CDPHE, 2015f).

#### *4.7.1.5 Solid Waste*

There are 63 active landfills in Colorado that accept waste from the public (CDPHE, 2014a). There are also 52 active transfer stations in Colorado that accept waste from the public (CDPHE, 2014b). Additionally, there are 27 commercial composting facilities (CDPHE, 2016a) and 159 recycling facilities in Colorado (CDPHE, 2016b). In 2014, Colorado generated 10.9 million tons of waste, of which 8.5 million tons were generated from municipal sources. Approximately 38.2 percent, or 4.2 million tons were diverted from landfills through recycling, composting, or other means (CDPHE, 2015g). Colorado also manages waste tires, waste grease, asbestos, paint, electronic waste, and medical waste (CDPHE, 2015h).

### 4.7.2 Environmental Consequences

This section describes potential impacts to public services and utilities associated with the alternatives, as discussed below. There is potential for impacts to public services and utilities to occur when an activity:

- Affects the capacity of local health, public safety, and emergency response services diminished so that individuals or communities cannot access health care and/or emergency services, or access is delayed; or
- Substantially disrupts the delivery of electric power or to physical infrastructure that results in disruptions at a large geographic scope (i.e., county-wide) or over a long duration (i.e., weeks to months).

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.

- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-13 presents the impact summary for noise.

**Table 4-13: Impact Significance Rating Criteria for Public Services and Utilities**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Alteration of the capacity of local health, public safety, and emergency response services | No Impact | No Impact |
| Disruption of the delivery of electric power or to physical infrastructure | No Impact | No Impact |

#### *4.7.2.1 Alternative 1: No Action*

The No Action Alternative does not include any FEMA action. Current management practices have no impact on public services and utilities. However, without any action, Alternative 1 has the potential to affect public services and utilities because fires could continue to damage infrastructure which adversely impact the ability to provide service. For example, in 2002, two events, the Hayman and Missionary Ridge fires, resulted in more than $135M and $90M in total direct costs, a large portion of which were attributable to utility losses (Western Forestry Leadership Coalition, 2010).

For example, wildfires can inhibit the capacity of water treatment plants to produce potable drinking water. "High intensity rainfall events in steep, burned watersheds are likely to move large amounts of suspended and dissolved material into downstream water supplies. The following problems may result:

- Increased sediment loading of water-supply reservoirs, shortened reservoir lifetime, and increased maintenance costs;
- Increased nutrient loading of reservoirs, which may promote algal blooms and associated disagreeable taste and odor;
- Increased turbidity (cloudiness caused by suspended material) or increased iron and manganese concentrations, which may increase chemical treatment requirements and produce larger volumes of sludge, both of which would increase operating costs;
- Increased dissolved organic carbon concentrations, which during disinfection may help form unwanted by-products (for instance, regulated carcinogens such as chloroform and trihalomethanes)" (USGS, 2012d).

#### *4.7.2.2 Alternative 2: Vegetation Management*

No public services or the response time of emergency responders would be directly affected during the vegetation management treatments in the project area. However, if Alternative 2 prevented a catastrophic wildfire, damage to utilities may be prevented and emergency responders would be 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 precipitation events. For the same reasons, Alternative 2 would also help protect and

maintain municipal water supplies for communities that obtain their water from the treated watershed.

Wildfire mitigation projects may be completed in conjunction with projects falling under consideration of the PEA for Utility Restoration, Replacement, and Relocation in the State of Colorado, October 2014 (FEMA, 2014c).

# 4.8 WATER RESOURCES

## 4.8.1 Affected Environment

Water resources in Colorado are heavily regulated. Colorado has more than 105,344 river miles and more than 249,787 lake acres. There are nine major river basins in Colorado: the Colorado, Arkansas, Gunnison, Metro, North Platte, Rio Grande, South Platte, Southwest, and Yampa/White (Figure 4-7 and Table 4-14). Four major river systems−the Platte, Colorado, Arkansas, and Rio Grande–originate within the mountains of Colorado (Figure 4-7). These systems drain fully one-third of the landmass of the lower 48 States. Around 80 percent of the State's population lives on the Eastern Slope of Colorado between Fort Collins and Pueblo, but about 80 percent of Colorado's precipitation falls on the Western Slope (PAWSD, 2005).

Of Colorado's 4.3 million residents, 63 percent obtain at least part of their water from areas west of the Continental Divide via natural channels and a vast network of artificial conveyances such as tunnels, ditches, aqueducts, pipelines, and canals (PAWSD, 2005).

Colorado is divided into eight ground water regions: Kiowa-Bijou, Southern High Plains, Upper Black Squirrel Creek, Lost Creek, Camp Creek, Upper Big Sandy, Upper Crow Creek, and Northern High Plains. Groundwater provides 18 percent of public water supply and 85 percent of agricultural water supply in Colorado. Over 2,780,000 acre-feet of groundwater is used annually in Colorado (DWR, 2007).

The nine principal aquifers within Colorado are categorized as unconsolidated Quaternary age alluvial aquifers associated with the major river systems; poorly consolidated or unconsolidated sediments; consolidated sedimentary rock aquifers; and volcanic and crystalline rock aquifers (CGS, 2016a).


**Figure 4-7: Colorado Water Resources**

**Table 4-14: Areas of Colorado River Basins**

| Name of River Basin | Area (rounded to nearest $mi^2$) |
|---|---|
| Arkansas | 28,262 |
| Colorado | 9,834 |
| Gunnison | 8,030 |
| Metro | 2,117 |
| North Platte | 2,053 |
| Rio Grande | 7,528 |
| South Platte | 25,556 |
| Southwest | 10,161 |
| Yampa/White | 10,533 |

#### *4.8.1.1 Wild and Scenic Rivers*

Colorado has one river classified a wild and scenic river under the National Wild and Scenic River System (16 USC 1271 et seq.) designation, the Cache La Poudre River with 30 miles designated as Wild and 46 miles as Recreational (National Wild and Scenic Rivers System, Undated). This designation protects against most types of alterations as any disruption may adversely affect river values.[11]

#### *4.8.1.2 Floodplains*

EO 11988 requires Federal agencies to consider the effect of their actions on the floodplain, evaluate alternatives to taking action in the floodplain and to provide opportunity for public comment if there is no practicable alternative (FEMA, 2012b). As of December 2016, Colorado has 251 participating and 17 non-participating entities in the National Flood Insurance Program (NFIP) (FEMA, 2016b). Under requirements established in 44 CFR Section 60.3, participating communities shall require permits for all development, including temporary development, in the Special Flood Hazard Areas (SFHA). Development is defined as "any man-made change to improved and unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials" and includes both permanent and temporary actions such as stream crossings and conveyance structures (public and private), sediment removal, channel restoration or relocation, etc. A local floodplain development permit may include, but is not limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to the SFHA (FEMA, 2002).

Adopted November 17, 2010 and effective January 14, 2011, Colorado has new rules and regulations for all development in the SFHA. The rules can be viewed on the Colorado Water

[11] For more information, visit the National Wild and Scenic Rivers System at http://www.rivers.gov/

Conservation Board (CWCB) website.[12] For example, *Rule 6: Standards for Delineation of Regulatory Floodplain Information* contains standards for approximate and detailed floodplains. All floodplain information intended to be used by local jurisdictions for the purpose of regulating flood hazard areas, with the exception of local stormwater drainage reports, Conditional Letter of Map Revision (CLOMR), Letter of Map Revision (LOMR), and LOMR Based on Fill (LOMR-F) submittals, and supporting documentation submitted to FEMA, shall be provided to the CWCB for designation and approval in order to enable local governments to regulate floodplains appropriately (CWCB, 2005). The standards in this rule reference, and incorporate herein, the FEMA Guidelines and Specifications for Flood Hazard Mapping Partners. In addition to the intent of the rule described above, the standard includes the following information: level of detail, base mapping, topography and surveys, GIS, hydrology, detailed hydraulic method, floodplain delineations, special floodplain conditions, written reports and maps, and contractor qualifications. Another example is *Rule 7: Standards for Regulatory Floodways*, which includes the establishment of floodway criteria, designation of floodways, incorporation of FEMA's floodway regulations, and communities in which the rule applies (CWCB, 2005).

These standards are the minimum requirements that local communities must adopt; however, local standards may be more restrictive. The standards are intended to prevent loss of life and property, as well as economic and social hardships that result from flooding. In 2014, roughly $180M was spent creating flood insurance rate maps and advancing the RiskMAP program nationwide (FEMA, 2013).

#### *4.8.1.3 Wetlands*

EO 11990 requires Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. To meet these objectives, the EO requires Federal agencies, in planning their actions, to consider project alternatives to sites with wetlands and limit potential damage if an activity affecting a wetland cannot be avoided (FEMA, 2015a). Wetlands provide flood control, recharge groundwater, stabilize stream flows, improve water quality, and provide habitat for wildlife. The Clean Water Act (CWA) requires that impacts to wetlands be avoided, then minimized, and finally mitigated if no practicable alternative exists for some wetland filling projects, wetlands continue to be impacted and lost as roads are expanded, land is developed and due to cumulative impacts from numerous activities such as draining, changes in land management and landowner preference for open water ponds.

The U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) mapping adopted a national Wetlands Classification Standard that classifies wetlands according to shared environmental factors, such as vegetation, soils, and hydrology, as defined in Cowardin et al.

[12] For more information, visit the Colorado Water Conservation Board (CWCB) Floodplain Rules and Regulations Process at http://cwcb.state.co.us/legal/pages/cwcbfloodplainrulesandregulationsprocess.aspx

(1979). Colorado has over 1.2 million acres of wetlands (Figure 4-8). Colorado has lost approximately half of its naturally occurring wetlands since settlement, decreasing from approximately 2 million acres, to one million acres of wetlands today. Wetlands comprise less than 2 percent of total surface area in Colorado. Current threats to wetlands in Colorado include agricultural use and grazing management, invasive plants, residential development, energy development and mining activities, transportation development, timber harvest, hydrologic alterations, and climate change (CDOW, 2011) (CPW, 2015b).

## 4.8.2 Environmental Consequences

This section describes potential impacts to water resources associated with the alternatives, as discussed below. There is potential for impacts to water resources to occur when an activity causes:

- Groundwater or aquifer contamination degrading drinking water quality; or
- Floodplain or wetland degradation or alteration of stream flow.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-15 presents the impact summary for water resources.

**Table 4-15: Impact Significance Rating Criteria for Water Resources**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Degradation of drinking water quality | No Impact | No Impact |
| Degradation of floodplains or wetlands, or alteration of stream flow | No Impact | Less than Significant |

### *4.8.2.1 Alternative 1: No Action*

Under the No Action Alternative, fuel loads throughout the State would continue to increase, along with the risk of a catastrophic wildfire. Maintaining current practices would have no impact on drinking water quality, nor would maintaining current practices degrade floodplains or wetlands, or alter stream flow. Therefore, the No Action Alternative would have no impact on water resources.

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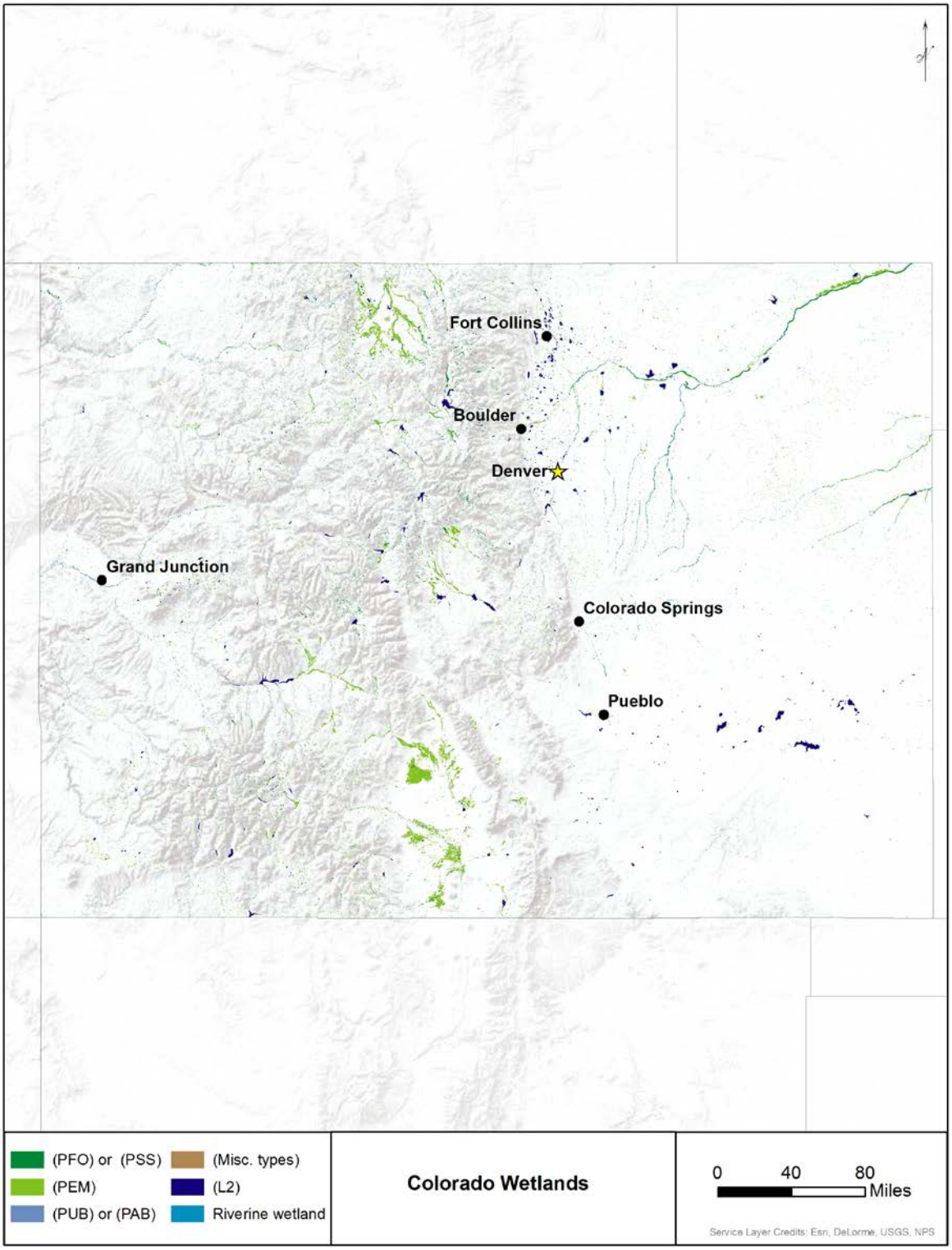


**Figure 4-8: Colorado Wetlands**

However, if a wildfire occurred, the fire would destroy most of the existing vegetation in the burned area and without the existing vegetation, the burned area would be more susceptible to soil erosion during future heavy precipitation events. Flash flooding after a catastrophic wildfire contributes heavy loads of sediment and debris to reservoirs, streams, and wetlands in the affected watershed. Historically, increased loading of sediment and debris has increased water treatment costs for water suppliers in affected watersheds. The U.S. Geological Survey (USGS) initiated a study after the 2010 Fourmile Canyon fire near Boulder to evaluate the effects of wildfire on water quality and downstream ecosystems in the Colorado Front Range. Heavy precipitation events in July 2011 produced short-term flash floods and discharge downstream of the burned area was as much as 8,000 percent above pre-storm discharge. These heavy precipitation events also transported substantial amounts of sediment from hillslopes to Fourmile Creek. Large increases in concentrations of dissolved organic carbon (DOC), nitrate, and turbidity were measured downstream of the burned area. The total loading (defined as concentration times discharge) of nutrients and DOC transferred from burned areas to the stream was 1 to 2 orders of magnitude as great as loading from unburned areas (USGS, 2012c). Accelerated erosion of soils in a watershed can also damage other facilities and structures along affected streams, including bridges, roads, campgrounds, and residences.

#### *4.8.2.2 Alternative 2: Vegetation Management*

Vegetation management activities implemented under Alternative 2 would not include the storage of or other alterations to stream flows that would affect the quantity of water in streams downstream of the project area. Additionally, the 50-foot buffer around wetlands and streams would prevent any impacts on these waters.

USEPA's National Pollutant Discharge Elimination System (NPDES) Program requires all construction activities that disturb more than 1 acre to have a permit. The Water Quality Control Division of the Colorado Department of Public Health and Environment (CDPHE) administers the NPDES Program. The vegetation management activities that would occur with the project area are considered nonpoint source and are exempt from the NPDES permitting process (CDPHE, 2011). Therefore, the project would not require a NPDES permit.

Post-project impacts on water resources under Alternative 2 are difficult to precisely predict. Most of the potential effects depend on whether the Proposed Action prevents the ignition or controls the spread of a wildfire. If a wildfire is not prevented or the spread of a wildfire controlled, Alternative 2 would have no effect on water quality. However, if Alternative 2 helps prevent or control a wildfire, especially a catastrophic wildfire, significant degradation in the water quality of the receiving streams would be prevented. Although the exact area of benefit cannot be quantified, the size of recent wildfires in Colorado suggests that several thousand acres could benefit. Retention of the existing vegetation would also prevent an increase in runoff rates and erosion. Therefore, with Alternative 2, the risk of damage to facilities and structures along the

receiving streams would not increase, and water treatment costs to water supplies would not change.

Certain activities could result in materials being placed in a floodplain or a wetland. Wetland boundaries would be determined in accordance with the latest regulatory guidance from the USACE and the USFWS.[13] Regulatory floodplain boundaries and designations can be found at the FEMA Map Service Center.[14] In these situations, Federal agency projects are required to implement the Eight-step Process to evaluate effects.[15]

Water quality may be adversely affected through the transmission of sediment, debris, oils, and hazardous substances into surface waters. During construction, agencies would mitigate these impacts by requiring the applicant to apply local BMPs to reduce impacts on wetlands and waterways (detailed in Section 5, BMPs and Mitigation Measures).

For any work completed within the designated section of the Cache La Poudre River that is listed wild and scenic, Federal agencies would need to confer with the regulatory agency overseeing that designated river section.

## 4.9 BIOLOGICAL RESOURCES

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS and National Marine Fisheries Service (NMFS). Sensitive habitats include those areas designated by the USFWS or NMFS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by State or Federal rulings. Sensitive habitats may also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

### 4.9.1 Affected Environment

#### *4.9.1.1 Vegetation*

Ecoregions are areas that share similar characteristics and environmental conditions (e.g., climate, geology, soils) within a region having similar ecosystem types, functions, and qualities. Colorado contains parts of six major USEPA Level III ecoregions. The most prominent ecoregion is the Southern Rockies, which occupies most of Colorado's central and western portions; the Great Plains-Palouse Dry Steppe covers the eastern half of the state. Other ecoregions include the Intermountain Semi-Desert and Desert, the Nevada-Utah Mountains, and the Colorado Plateau.

[13] USFWS National Wetlands Inventory at http://www.fws.gov/wetlands/data/mapper.HTML
[14] FEMA Map Service Center at https://msc.fema.gov/
[15] FEMA: Eight Step Planning Process for Floodplain/Wetland Management at https://www.fema.gov/environmental-planning-and-historic-preservation-program/eight-step-planning-process-floodplain

Forests are found in all ecoregions of Colorado, but the Southern Rockies contain the most forested area and the greatest variety of forest types. (USEPA, 2007)

Colorado's ecoregions can then be divided into approximately 60 ecosystems, listed in Table 4-16. Ecosystems are composed of plants and animals that occur together, use similar or interdependent ecological processes and physical environments, and are easily identifiable units (CNHP, 2013c).

**Table 4-16: Colorado Ecosystems**

| Ecosystem Name | Ecosystem Name |
|---|---|
| Central Mixed grass Prairie | Colorado Plateau Blackbrush-Mormon-tea Shrubland |
| Colorado Plateau Hanging Garden | Colorado Plateau Mixed Bedrock Canyon and Tableland |
| Colorado Plateau Mixed Low Sagebrush Shrubland | Colorado Plateau Pinyon-Juniper Shrubland |
| Colorado Plateau Pinyon-Juniper Woodland | Inter-Mountain Basins Active and Stabilized Dunes |
| Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland | Inter-Mountain Basins Big Sagebrush Shrubland |
| Inter-Mountain Basins Big Sagebrush Steppe | Inter-Mountain Basins Greasewood Flat |
| Inter-Mountain Basins Interdunal Swale Wetland | Inter-Mountain Basins Juniper Savanna |
| Inter-Mountain Basins Mat Saltbush Shrubland | Inter-Mountain Basins Mixed Salt Desert Scrub |
| Inter-Mountain Basins Montane Sagebrush Steppe | Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland |
| Inter-Mountain Basins Playa | Inter-Mountain Basins Semi-Desert Grassland |
| Inter-Mountain Basins Semi-Desert Shrub-Steppe | Inter-Mountain Basins Shale Badland |
| Inter-Mountain Basins Wash | North American Alpine Ice Field |
| North American Arid West Emergent Marsh | Northern Rocky Mountain Avalanche Chute Shrubland |
| Rocky Mountain Alpine Bedrock and Scree | Rocky Mountain Alpine Dwarf-Shrubland |
| Rocky Mountain Alpine Fell-Field | Rocky Mountain Alpine-Montane Wet Meadow |
| Rocky Mountain Aspen Forest and Woodland | Rocky Mountain Cliff, Canyon and Massive Bedrock |
| Rocky Mountain Dry Tundra | Rocky Mountain Dry-Mesic and Mesic Montane Mixed Conifer Forest and Woodland |
| Rocky Mountain Foothill Limber Pine-Juniper Woodland | Rocky Mountain Gambel Oak-Mixed Montane Shrubland |
| Rocky Mountain Lodgepole Pine Forest | Rocky Mountain Lower Montane Riparian Woodland and Shrubland |
| Rocky Mountain Lower Montane-Foothill Shrubland | Rocky Mountain Ponderosa Pine Savanna |
| Rocky Mountain Subalpine Dry-Mesic and Mesic Spruce-Fir Forest and Woodland | Rocky Mountain Subalpine Mesic Meadow |
| Rocky Mountain Subalpine-Montane Fen | Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland |
| Rocky Mountain Subalpine-Montane Riparian Shrubland | Rocky Mountain Subalpine-Montane Riparian Woodland |
| Southern Rocky Mountain Juniper Woodland and Savanna | Southern Rocky Mountain Montane-Subalpine Grassland |
| Southern Rocky Mountain Pinyon-Juniper Woodland | Southern Rocky Mountain Ponderosa Pine Woodland |
| Southwestern Great Plains Canyon | Western Great Plains Cliff, Outcrop, and Shale Barren |
| Western Great Plains Closed Depression Wetland | Western Great Plains Big River Floodplain |
| Western Great Plains Foothill and Piedmont Grassland | Western Great Plains Riparian Woodland, Shrubland and Herbaceous |
| Western Great Plains Saline Depression | Western Great Plains Sand Prairie |
| Western Great Plains Sandhill Shrubland | Western Great Plains Shortgrass Prairie |
| Western Great Plains Tallgrass Prairie | Wyoming Basins Low Sagebrush Shrubland |

Source: (CNHP, 2013c)

Many ecosystems in North America have evolved with fire as a natural and necessary contributor to habitat vitality and renewal. Many plant species in naturally fire-affected environments require fire to germinate. Natural wildland fuels and fuel patterns have been displaced or changed by the planting, cultivating and production of crops, the grazing of domestic livestock, and other reasons. (National Wildfire Coordinating Group, Undated).

An inventory of the types of natural communities occurring within Colorado is maintained by the Colorado Natural Heritage Program (CNHP). CNHP categorizes communities based on rarity and vulnerability. Rankings are S1 through S5; communities ranked as S1 are of the greatest concern. This rank is typically based on the community consisting of five or fewer occurrences in Colorado but other factors may be considered when assigning the rank (CNHP, 2013a). CNHP has ranked 59 vegetative communities as S1; these communities represent the rarest terrestrial habitat in Colorado (CNHP, 2013b), and occur in all 6 of the Colorado Level III USEPA ecoregions.

#### *4.9.1.2 Wildlife*

Colorado hosts about 1,571 species of mammals, birds, reptiles, amphibians, mollusks, crustaceans, moths, butterflies, and fish. A comprehensive count of other insect species is not available. Big game hunted in Colorado includes black bear, deer, elk, pronghorn, moose, bighorn sheep, mountain goat, mountain lion, and turkey. There are 186 native game species in Colorado (CPW, 2015c) (Colorado State University, 2016) (PIF, 2000) (BMNA, 2015)

In Colorado, 36 mammals, 61 birds, 26 reptiles and amphibians, 76 invertebrates, and 27 fish are listed as Species of Greatest Conservation Need (SGCN) and protected by Colorado Parks and Wildlife (CPW).[16, 17] (CPW, 2015a)

Migratory birds use flyways during annual migrations northward in the spring and southward in the fall. The Migratory Bird Treaty Act (MBTA), enforced by the USFWS, prohibits take, possession, importing, exporting, transporting, selling, purchasing, bartering, or sale migratory birds, their nests, eggs, or their parts except by permit (USFWS, 2013). The Central and Pacific Flyways both cover portions of Colorado. The Central flyway covers the eastern two-thirds of Colorado, spanning from the Gulf Coast of Texas to the Canadian boreal forest. The Pacific Flyway ranges from the west coast of Mexico to the Arctic, and covers the western third of Colorado.

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (BGEPA). Eagles are found in Colorado year-round. Bald eagles are found near reservoirs and major rivers, nesting in cottonwood trees during the summer breeding season and communally roosting in large trees during the winter. Golden eagles typically nest in cliffs but will also use large trees or human-made structures. (CPW, Undated)

Colorado has 54 Important Birding Areas (IBAs), identified as areas used for breeding, migratory stop-over, feeding, and over-wintering areas, and a variety of habitats such as native grasslands, grasslands, sage brush, and wetland/riparian areas. IBAs are widely distributed throughout Colorado; over 1,200,000 acres of land in areas such as Rocky Mountain National Park and Pawnee National Grasslands are within designated IBAs. (National Audubon Society, 2016)

[16] More on Colorado Parks and Wildlife Species Profiles at http://cpw.state.co.us/learn/Pages/SpeciesProfiles.aspx
[17] Colorado Parks and Wildlife Spatial Data at http://ndis.nrel.colostate.edu/index.html

Colorado's contains cold water trout streams and rivers, often fed by snowmelt, that provide habitat for a variety of fishes and aquatic invertebrates as well as warm water fish habitat (Denver Water, 2016) (USDA, 2016a). Colorado does not contain essential fish habitat identified by the Magnuson-Stevens Fishery Conservation and Management Act (NOAA, Undated).

#### *4.9.1.3 Protected Species*

There are 41 species federally listed as Endangered (E), Threatened (T), Candidate (C), or Proposed (P) (Table 4-17) by the USFWS under the ESA that historically occurred, occur, or may potentially occur within Colorado. Fourteen of these species have designated critical habitat in Colorado (Figure 4-9).

**Table 4-17: Federally Threatened, Endangered and Candidate Species in Colorado**

| Species Type | Common Name | Scientific Name | Federal Status | Critical Habitat | Habitat Requirements/Notes |
|---|---|---|---|---|---|
| Mammals | Black footed ferret | *Mustela nigripes* | E | No | Prairies and grasslands of eastern Colorado. Most of this species has been block-cleared[18] in Colorado. |
| | Canada lynx | *Lynx canadensis* | T | No | Dense subalpine forest, willow corridors along mountain streams, and avalanche chutes (elevation: 8,000 to 14,000 feet). |
| | New Mexico meadow jumping mouse | *Zapus hudsonius luteus)* | E | Yes | Riparian regions of the Florida River and Lake Navajo in southern Colorado. |
| | North American wolverine | *Gulo luscus* | PT | No | Cold areas with snow remaining in late spring, often at high elevations. |
| | Preble's meadow jumping mouse | *Zapus hudsonius preblei* | T | Yes | Heavily vegetated riparian habitats in the foothills of central Colorado. |
| Birds | Gunnison sage-grouse | *Centrocercus minimus* | T | Yes | Requires large expanses of sagebrush with a diversity of grasses, forbs, and healthy wetland and riparian ecosystems. Sagebrush used for cover, fall/winter food. |
| | Least tern* | *Sterna antillarum* | E | No | Banks of Missouri, Ohio, Red, and Rio Grande Rivers. |
| | Lesser prairie-chicken | *Tympanuchus pallidicinctus* | C | No | Found throughout short- and mid-grass prairies. |
| | Mexican spotted owl | *Strix occidentalis lucida* | T | Yes | Old-growth forests in western North America; nests in tree holes, old bird of prey nests, or rock crevices. |
| | Piping plover* | *Charadrius melodus* | T | No | Bare sand and gravel bars along rivers and waste sand piles along several rivers in Nebraska. |
| | Southwestern willow flycatcher | *Empidonax traillii extimus* | E | Yes | Southern portion of Colorado, including shores of the Rio Grande and Conejo Rivers. |
| | Whooping crane* | *Grus americana* | E | NA* | Mid-river sandbars and wet meadows along the Platte River, Nebraska. Species does not occur in Colorado, but occurs downstream and is affected by water depletions. |
| | Yellow-billed cuckoo | *Coccyzus americanus)* | T | Yes | Prefers open woodlands with clearings and a dense shrub layer. Found in woodlands near streams, rivers, or lakes. |
| Invertebrates | Arapahoe snowfly | *Capnia Arapahoe* | C | No | Typically found in cold, clean, well-oxygenated waters. |
| | Pawnee montane skipper | *Hesperia leonardus montana* | T | No | Only in South Platte Canyon River drainage system, in portions of Jefferson, Douglas, Teller, and Park Counties. |
| | Uncompahgre fritillary butterfly | *Boloria acrocnema* | E | No | Patches of snow willow in alpine meadows at elevations above the tree line. |
| Fish | Bonytail chub | *Gila elegans* | E | Yes | Large, fast-flowing waterways of Colorado River system. |
| | Colorado pikeminnow (Squawfish) | *Ptychocheilus lucius* | E | Yes | Swift flowing muddy rivers with quiet, warm backwaters. |

[18] When the USFWS has determined an area to no longer contain any individuals of a species that are wild and free-range, the area is considered to be block-cleared (USFWS, 2009).

| Species Type | Common Name | Scientific Name | Federal Status | Critical Habitat | Habitat Requirements/Notes |
|---|---|---|---|---|---|
| | Greenback cutthroat trout | *Oncorhynchus clarki stomias* | T | No | Headwaters of the South Platte and Arkansas River drainages |
| | Humpback chub | *Gila cypha* | E | Yes | Deep, fast-moving, turbid waters often associated with large boulders and steep cliffs. |
| | Pallid sturgeon* | *Scaphirhynchus albus* | T | No | Evolved and adapted to living close to the bottom of large, silty rivers. Preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats, and gravel bars. |
| | Razorback sucker | *Xyrauchen texanus* | E | Yes | Deep, clear to turbid waters of large rivers and some reservoirs over mud, sand, or gravel. |
| Plants | Chapin mesa milkvetch | *Astragalus schmolliae* | C | No | Sandstone terraces with sand and gravel among juniper and pinyon pines. |
| | Clay-loving wild buckwheat | *Eriogonum pelinophilum* | E | Yes | Endemic to the rolling clay (adobe) hills and flats adjacent to the communities of Delta and Montrose. |
| | Colorado butterfly plant | *Gaura neomexicana var. coloradensis* | T | No | Moist areas of floodplains. |
| | Colorado hookless cactus | *Sclerocactus glaucus* | T | No | Exposed stretches of gravelly clay, including alluvial benches above floodplains and mesa slopes. |
| | DeBeque phacelia | *Phacelia submutica* | T | Yes | Grows on barren patches of shrink-swell clay of the Wasatch Formation at 5,000 to 6,200 feet elevation in the southern Piceance Basin oil and gas fields of Mesa and Garfield Counties. |
| | Dudley bluffs bladderpod | *Lesquerella congesta* | T | No | Barren white outcrops exposed along drainages by erosion from downcutting of streams in the Picaence Basin in Rio Blanco County. |
| | Dudley bluffs twinpod | *Physaria obcordata* | T | No | Steep side slopes of barren white outcrops exposed along drainages by erosion from down cutting of streams in the Picaence Basin in Rio Blanco County. |
| | Knowlton's cactus | *Pediocactus knowltonii* | E | No | Rolling, gravelly hills in a piñon-juniper-sagebrush community at 6,200 to 6,300 feet. |
| | Mancos milk-vetch | *Astragalus humillimus* | E | No | Cracks or eroded depressions on sandstone rimrock ledges and mesa tops. |
| | Mesa Verde cactus | *Sclerocactus mesae-verdae* | T | No | Sparsely vegetated low rolling clay hills from the Mancos or Fruitland shale formations at 4,900 to 5,500 feet. |
| | North park phacelia | *Phacelia formosula* | E | No | Ravines and bare slopes of eroding rock originating from the Coalmont Formation. |
| | Osterhout milkvetch | *Astragalus osterhoutii* | E | No | Grows in high-selenium soils. |
| | Pagosa skyrocket | *Ipomopsis polyantha* | E | Yes | Grows on weathered Mancos Shale outcrops at 7,000 feet elevation in the vicinity of Pagosa Springs. |
| | Parachute beardtongue | *Penstemon debilis* | T | Yes | Only on oil shale outcrops on the Roan Plateau escarpment in Garfield County. |
| | Penland alpine fen mustard | *Eutrema penlandii* | T | No | Limestone outcrops in the Hoosier Ridge and Hoosier Pass areas of Summit County. |
| | Penland beardtongue | *Penstemon penlandii* | E | No | Alkaline shale weathered to barren clay having selenium. |
| | Skiff milkvetch | *Astragalus microcymbus* | C | No | Found on sparsely vegetated slopes within open sagebrush habitat. |
| | Ute Ladies'-tresses | *Spiranthes diluvialis* | T | No | Along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. Stable wetland and seepy areas associated with landscape features within historical floodplains. |
| | Western prairie fringed orchid* | *Platanthera praeclara* | T | No | Occurs often in mesic to wet unplowed tall grass prairies and meadows but have been found in old fields and roadside ditches. |

*Water depletions in the North Platte, South Platte, and Laramie River Basins may affect downstream species and/or critical habitat associated with the Platte River in Nebraska.[19]

Key:

Endangered (E) - Any species that is in danger of extinction throughout all or a significant portion of its range.

Threatened (T) - Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate (C) - Those taxa for which the Services has sufficient information on biological status and threats to propose to list them as threatened or endangered. The Services encourage their consideration in environmental planning and partnerships, however, none of the substantive or procedural provisions of the Act apply to candidate species

Sources: (USFWS, Undated) (USFWS, 2016)

[19] USFWS: How to Seek ESA Coverage for Water-Related Activities through the Platte River Recovery Implementation Program at http://www.fws.gov/platteriver/

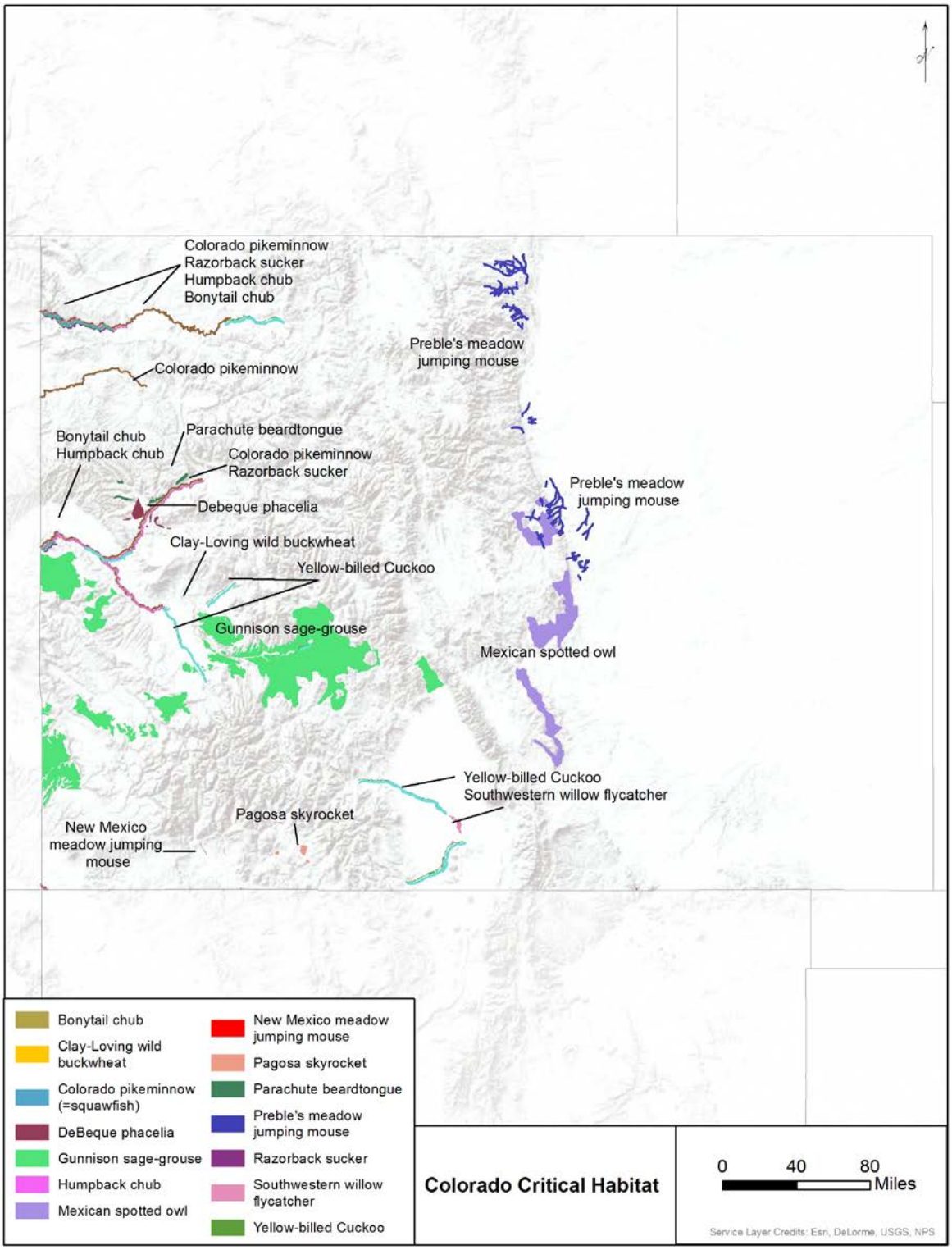


**Figure 4-9: ESA Designated Critical Habitat for Colorado**

### 4.9.2 Environmental Consequences

This section describes potential impacts to biological resources associated with the alternatives, as discussed below. There is potential for impacts to biological resources to occur when an activity:

- Direct or indirect injury or mortality of a non ESA-listed species at the population level;
- Any impact to an ESA-listed species that would constitute a take under the ESA;
- Habitat loss or fragmentation at the population-level, sub-population effects observed for at least one species or vegetation cover type;
- Habitat alteration in locations designated as Critical Habitat; or
- Effects to migratory pattern, path, or rest stops for migratory birds at the population level for at least one species.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-18 presents the impact summary for biological resources.

**Table 4-18: Impact Significance Rating Criteria for Biological Resources**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Non-ESA listed species injury or mortality at the population level | No Impact | No Impact |
| Habitat loss or fragmentation | No Impact | Less than Significant |
| Migratory pattern, path, or rest stops | No Impact | Less than Significant |

Impacts to species listed under the ESA are described in specific terms by the USFWS (USFWS & NOAA Fisheries, 1998). For ESA-listed species or designated critical habitat, the possible effects determinations are:

- **No Effect:** If the alternative will not affect listed species or designated critical habitat;
- **Not Likely to Adversely Affect (NLAA):** If effects on listed species or designated critical habitat are expected to be discountable, insignificant, or completely beneficial; or
- **Likely to Adversely Affect (LAA):** If any adverse effect to a listed species or designated critical habitat may occur as a direct or indirect result of the alternative, or an interrelated or interdependent action, and the effect is not discountable, insignificant, or beneficial.

Table 4-19 presents the impact summary for ESA-listed species and designated critical habitat.

**Table 4-19: Impact Significance Rating Criteria for ESA-listed Species and Critical Habitat**

| Impact Criteria | Alternative 1 No Action | Alternative 2 Preferred Action |
|---|---|---|
| Direct injury or mortality of an ESA-listed species or other special status species | No Effect | NLAA |
| Habitat loss in designated Critical Habitat | No Effect | NLAA |

#### *4.9.2.1 Alternative 1: No Action*

Under the No Action Alternative, current management activities would continue. These include maintenance of existing facilities and methods of suppressing wildfires, which would result in the further accumulation of hazardous fuels resulting in increased potential for wildfires.

Wildfire mitigation projects may be completed by local or private landowners, therefore, projects may be approached in an uncoordinated manner that does not appropriately consider environmental impacts. Without a Federal partner, these projects would not require NEPA analysis or Federal agency consultations for the ESA or MBTA.

Under the No Action Alternative, the potential for a wildfire would not be reduced. The impacts of a potential wildfire on biological resources could be significant and long-term. Depending on the severity of the wildfire, large amounts of habitat could burn, causing wildlife displacement, injury, or mortality.

#### *4.9.2.2 Alternative 2: Vegetation Management*

Alternative 2 consists of an integrated vegetation management process in which targeted trees and other fuels would be removed by hand and/or mechanical methods in order to create defensible space and/or reduce hazardous fuels. Impacts could vary among species and ecosystems, as well as the specific method for vegetation management. Although disturbances during vegetation removal may be measurable, minimal impacts to behavior of wildlife would be short-term and would only last for the duration of the project. Direct injury or mortality of wildlife during commencement of vegetation removal is not anticipated.

Temporary and negligible impacts may occur for biological resources resulting from the creation of defensible space. Fragmentation of continuous habitat may result in negative impacts for species sensitive to such fragmentation. Conversely, the resulting creation of edge habitat may have a beneficial impact for bird species.

Based on the impact significance criteria presented in Table 4-19, any direct injury or mortality of an ESA-listed species or other special status species at the individual level could be potentially significant. Federal agencies are required to consult or coordinate with USFWS if the agency determines that a project has the potential to affect threatened or endangered species, critical habitat, migratory birds, or bald or golden eagles. FEMA will determine if consultation or coordination under the ESA, MBTA, or BGEPA is warranted on a project- or site-specific basis.

Specific project areas can be searched for presence of listed species or critical habitats through the USFWS online Information, Planning and Consultation System (IPaC) resource.[20] Additionally, if work occurs on USFS or Bureau of Land Management (BLM) land, FEMA would coordinate with these agencies.

Post-project impacts on biological resources are difficult to predict because the actual impacts would depend on whether the project area experiences a wildfire. If a wildfire occurs and the advancement of the fire is controlled due to the vegetation management activities to the extent that firefighters are able to contain the fire, Alternative 2 would have a beneficial effect on the wildlife in the areas that would have burned if the vegetation management had not been implemented. The beneficial effects would extend to adjacent areas that otherwise would have burned. Although the exact area of benefit cannot be quantified, the size of recent wildfires in Colorado suggests that several thousand acres could benefit. The unburned areas would retain existing vegetation and habitat. Conversely, some ecosystems in Colorado may benefit from a fire regime, as fire is a natural and necessary contributor to ecosystem succession, habitat vitality, and renewal.

## 4.10 CULTURAL RESOURCES

### 4.10.1 Affected Environment

To preserve historic properties and archaeological sites in the United States, the National Historic Preservation Act (NHPA) was established in 1966 (CEQ, 2013). The NHPA created the National Register of Historic Places (NRHP), the list of National Historic Landmarks, and State Historic Preservation Offices (SHPO). Later amendments to the NHPA in 1992, affirmed the importance of also preserving and protecting religious and/or culturally significant Traditional Cultural Properties (TCPs) of Native American tribes and Native Hawaiian organizations (NPS, Undated(a)).

The NRHP is the Nation's official list of cultural resources worthy of preservation and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, objects, and landscapes that are significant in American history, architecture, archeology, engineering, and culture. To be eligible for listing on the NRHP, a property must meet one of four eligibility criteria and have sufficient integrity. (NPS, Undated(b))

In 2014, FEMA signed a Programmatic Agreement (PA) with the Colorado State Historic Preservation Officer and Colorado Division of Homeland Security and Emergency Management in order to "effectively integrate historic preservation compliance considerations into the delivery of FEMA assistance." Activities covered under the PA include (FEMA, 2014e):

[20] USFWS Endangered Species Information, Planning and Consultation System at http://ecos.fws.gov/ipac/ or http://www.fws.gov/ipac/

- "Ground disturbing activities and site modification, when proposed activities described below substantially conform to the original footprint and/or are performed in previously disturbed soils, including the area where the activity is staged." This category includes: debris and snow removal,[21] temporary structures and housing, and recreation and landscaping.
- Buildings and structures; and
- Transportation facilities, when proposed activities substantially conform to the original footprint and/or performed in previously disturbed soils, including staging areas. This category includes roads and roadways, airports, and rail systems.

Humans have inhabited Colorado for roughly 16,000 years (USFWS, 2002). Colorado has 89 archaeological sites listed on the NRHP: 29 historic; 47 prehistoric; and 13 with historical and prehistoric provenance (NPS, 2014a). The number of archaeological sites may increase with the discovery of new sites.

In Colorado, local governments that have developed a local preservation ordinance meeting the standards of a State's SHPO and the NPS are identified as Certified Local Governments.[22] In 1980, Congress created "a federally-funded, state-administered grant program" to support local governments interested in preserving their local historic heritage and willing to follow Federal and State historic preservation standards and guidance. Both the SHPO and the NPS are responsible for certifying each local government for them to receive funding, leading to the name of Certified Local Governments (CLGs). The goal of the program was an "increase in awareness within the community of local preservation issues, programs, policies, and procedures" (History Colorado, 2016). Table 4-20 provides a list of CLGs in Colorado.

A Secretary of Interior-qualified archaeologist would conduct a pre-construction briefing and training session with sub-recipient staff and contractors. Training would include an overview of the basic identification of cultural resources and potential project impacts.

All activities with the potential to affect cultural resources would be monitored by sub-recipient staff throughout the project period. All known cultural resources in the project area would be identified and avoided during the project implementation. If during the course of any ground disturbance related to the project activities cultural materials are inadvertently discovered, the project would be immediately stopped and the SHPO and FEMA notified.

[21] Debris removal includes "Wildfire Mitigation Projects involving the removal woody debris such as branches, limbs and uprooted trees (under a 6-inch diameter) by non-mechanical means from within the defined wildfire boundaries of improved property or infrastructure. This allowance includes the transport on existing road surfaces and disposal of such waste to existing approved waste facilities or landfills and establishing or expanding temporary non-hazardous debris staging and disposal areas at licensed transfer stations, or existing hard-topped or gravel surfaces." (FEMA, 2014e)

[22] Certified Local Government – "Jointly administered by the National Park Service (NPS) and the State Historic Preservation Offices (SHPOs), each local community works through a certification process to become recognized as a Certified Local Government (CLG). Once certified CLGs become an active partner in the Federal Historic Preservation Program" (NPS, 2017).

## Table 4-20: Colorado Certified Local Governments

| Certified Local Government | Certification Date | Certified Local Government | Certification Date |
|---|---|---|---|
| Alamosa, Colorado | 14-Sep-05 | Greeley, Colorado | 22-Dec-99 |
| Aspen, Colorado | 05-Sep-85 | Gunnison County, Colorado | 24-Mar-06 |
| Aurora, Colorado | 03-Oct-88 | Idaho Springs, Colorado | 10-Jan-90 |
| Berthoud, Colorado | 24-Feb-03 | Kiowa County, Colorado | 13-Nov-06 |
| Black Hawk, Colorado | 24-Jul-09 | La Veta, Colorado | 24-Jul-09 |
| Boulder, Colorado | 04-Sep-85 | Lafayette, Colorado | 23-Mar-00 |
| Boulder County, Colorado | 22-Nov-93 | Lake City, Colorado | 09-Jan-87 |
| Breckenridge, Colorado | 09-Mar-99 | Lakewood, Colorado | 20-Mar-14 |
| Brighton, Colorado | 19-Feb-08 | Leadville, Colorado | 25-Sep-13 |
| Broomfield, Colorado | 10-Jan-07 | Littleton, Colorado | 11-Jan-95 |
| Buena Vista, Colorado | 14-Sep-16 | Longmont, Colorado | 20-Aug-85 |
| Carbondale, Colorado | 19-Feb-08 | Louisville, Colorado | 18-Oct-05 |
| Castle Rock, Colorado | 09-Feb-98 | Loveland, Colorado | 10-Oct-02 |
| Central City, Colorado | 07-Oct-96 | Manitou Springs, Colorado | 13-Mar-90 |
| Colorado Springs, Colorado | 15-Apr-94 | New Castle, Colorado | 23-Jan-11 |
| Cortez, Colorado | 28-Jul-10 | Otero County, Colorado | 04-Mar-11 |
| Crested Butte, Colorado | 25-Oct-91 | Pagosa Springs, Colorado | 24-Oct-00 |
| Cripple Creek, Colorado | 20-Apr-92 | Park County, Colorado | 14-Oct-99 |
| Denver, Colorado | 23-Sep-85 | Pueblo, Colorado | 18-Oct-05 |
| Durango, Colorado | 20-Nov-92 | Saguache, Colorado | 04-Mar-11 |
| Elizabeth, Colorado | 03-Aug-15 | Salida, Colorado | 26-Oct-04 |
| Erie, Colorado | 24-Oct-11 | Starkville, Colorado | 28-Sep-16 |
| Florence, Colorado | 06-Oct-16 | Steamboat Springs, Colorado | 23-Aug-99 |
| Fort Collins, Colorado | 31-Jan-91 | Telluride, Colorado | 07-Feb-86 |
| Fort Lupton, Colorado | 05-Dec-95 | Walsenburg, Colorado | 07-Jun-16 |
| Georgetown, Colorado | 30-Sep-91 | Westminster, Colorado | 23-Jun-04 |
| Gilpin County, Colorado | 23-Mar-06 | Windsor, Colorado | 25-Jun-07 |
| Glenwood Springs, Colorado | 23-May-01 | Woodland Park, Colorado | 07-Apr-16 |
| Golden, Colorado | 14-Feb-91 | | |

Source: (NPS, 2014b)

As discussed in Section 4.4.1, there are two federally recognized tribes in Colorado the Southern Ute Indian Tribe of the Southern Ute Reservation, and the Ute Mountain Tribe of the Ute Mountain Reservation (Colorado, New Mexico, and Utah) (National Conference of State Legislators, 2016; U.S. Government Publishing Office, 2015). There are also more than 50 non-resident tribes in Colorado.[23] Colorado has 1,480 NRHP listed sites, as well as 25 National Historic Landmarks (NHL) (NPS, 2015a).

## 4.10.2 Environmental Consequences

This section describes potential impacts to cultural resources associated with the alternatives, as discussed below. There is potential for impacts to cultural resources to occur when an activity:

- Physically damages and/or destroys a contributing portion of a cultural resource or historic properties; or
- Indirectly affects cultural resources or historic properties (i.e., visual, noise, vibration, atmospheric)

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Impacts were evaluated using the significance criteria presented in Table 4-21. The impact levels for historic properties differ than those for other resources described in this PEA as historic properties are non-renewable resources by nature. As such, any and all unavoidable adverse effects to historic properties, per Section 106 of the NHPA (as codified in 36 CFR Part 800.6), would

[23] Non-resident tribes in Colorado include: Northern Arapaho Tribe, Northern Cheyenne Tribe, Paiute Indian Tribe of Utah, Southern Ute Indian Tribe, Ute Indian Tribe (Uintah & Ouray Reservation), Ute Mountain Ute Tribe, Cheyenne & Arapaho Tribes of Oklahoma, Eastern Shoshone Tribe (Wind River Reservation), Apache Tribe of Oklahoma, The Crow Tribe of Indians, Standing Rock Sioux Tribe, Spirit Lake Tribe of Fort Totten, Cheyenne River Sioux Tribe, Crow Creek Sioux Tribe, Flandreau Santee Sioux Tribe, Oglala Sioux Tribe, Rosebud Sioux Tribe of Indians, Sisseton-Wahpeton Oyate, Yankton Sioux Tribe, Comanche Nation, The Navajo Nation, Pyramid Lake Paiute Tribe, Northern Arapaho Tribe, Jicarilla Apache Nation, Paiute Indian Tribe of Utah, Kewa Pueblo (formerly the Pueblo of Santo Domingo), Fort Sill Apache Tribe, Kiowa Tribe of Oklahoma, The Hopi Tribe, Mescalero Apache Tribe, Ohkay Owingeh (Pueblo of San Juan), Osage Nation, Pawnee Nation of Oklahoma, Pueblo of Acoma, Pueblo of Jemez, Pueblo de Cochiti, Pueblo of Laguna, Pueblo of Isleta, Pueblo of Nambe, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of Santa Ana, Pueblo of San Felipe, Pueblo of Santa Clara, Pueblo of Taos, Pueblo of San Ildefonso, Pueblo of Tesuque, Pueblo of Sandia, Pueblo of Zia, Three Affiliated Tribes, Shoshone-Bannock Tribes, Ysleta del Sur Pueblo, Zuni Tribe of the Zuni Reservation, and Wichita & Affiliated Tribes.

require consultation with the SHPO/ Tribal Historic Preservation Officer (THPO) and other consulting parties, including Indian tribes, to develop appropriate mitigation.

**Table 4-21: Impact Significance Rating Criteria for Cultural Resources**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Physical damage or destruction to a contributing portion of a cultural resource or historic property | No Impact | Less than Significant |
| Indirect effect to a cultural resource or historic property | No Impact | Less than Significant |

### *4.10.2.1 Alternative 1: No Action*

Under the No Action Alternative, no localized effects to cultural resources are expected, although there is the potential for fire to damage or destroy a cultural resource. If State or local actions were to occur, compliance with the Colorado State Register Act would be required.[24] Depending on the severity of the wildfire, historic properties and other cultural resources could be damaged or lost completely.

### *4.10.2.2 Alternative 2: Vegetation Management*

Alternative 2 has the potential to affect historic or cultural resources depending on the project location and proposed project methods. Alteration of any site, structure, or object of historic or prehistoric importance may occur as a result of wildfire mitigation projects. Activities such as driving vehicles off of established roads (which will be minimized to the extent practicable) and vegetation removal could lead to ground disturbance and, thus, possible impacts to cultural resources. To the maximum extent practicable, project activities that would disturb known locations of historic or cultural resources should be avoided or minimized. Site-specific reviews also should be conducted ahead of consultation with the Colorado SHPO to identify potential impacts to historic and cultural resources.

In addition, wildfire mitigation projects have the potential to effect existing Traditional Cultural Properties (TCP) within and adjacent to project locations. Any agencies that have entered into PAs with the Colorado SHPO or a THPO would determine if a project meets any programmatic allowances outlined in that agreement. If so, Federal agencies would consider the project to be in compliance with Section 106 of NHPA and no further review would occur. If a project type does not fall within the provisions of the existing PA, then Federal agencies would make a determination of effect in accordance with NHPA Section 106 and initiate consultation with the SHPO.[25] Additional archaeological surveys of locations that will involve ground disturbing activities or architectural surveys of projects impacting built environments may be required depending on

[24] Office of Archaeology and Historic Preservation – Review and Compliance available at http://www.historycolorado.org/oahp/review-compliance

[25] In September 2014, FEMA entered into a PA with the Colorado SHPO and Colorado Division of Homeland Security and Emergency Management, to ensure that historic preservation compliance considerations are integrated into all FEMA Programs in Colorado.

consultation with the SHPO and/or THPO. To the maximum extent practicable, project activities that would disturb known locations of TCPs should be avoided or minimized. Section 5, BMPs and Mitigation Measures, describes typical steps that can be taken to reduce potential impact levels.

## 4.11 HAZARDOUS MATERIALS

### 4.11.1 Affected Environment

Hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), are defined as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may; (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or; (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed" (42 USC 6903(5)) (U.S. Government Printing Office, 2011). Hazardous materials and wastes are regulated in Colorado by a combination of Federal and State laws. Federal regulations governing the assessment and disposal of hazardous wastes include RCRA, the RCRA Hazardous and Solid Waste Amendments, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Solid Waste Act, and Toxic Substances Control Act (TSCA).

The CDPHE provides guidance and regulatory relief for the management and disposal of damaged or destroyed structures and provides oversight to USEPA superfund sites in Colorado (CDPHE, 2016c). Colorado does not have a State Superfund program. As of December 2016, Colorado had 43 RCRA Corrective Action sites, 541 brownfields, and 21 proposed or final Superfund/National Priorities List (NPL) sites (USEPA, 2016a). Based on a December 2016 search of USEPA's Cleanups in My Community (CIMC) database, there are four Superfund sites in Colorado where contamination has been detected at an unsafe level, or a reasonable human exposure risk exists (USEPA, 2016b). Small appliance refrigerant recovery is also regulated by the CDPHE, as well as the Air Pollution Control Division, and the Indoor Environment Program. A Chlorofluorocarbon Hotline (303-692-3200) is available to leave messages, report violations or to request assistance for either the State or Federal chlorofluorocarbon programs.

The National Pollutant Discharge Elimination System (NPDES) regulates the quality of stormwater and sewer discharge from industrial and manufacturing facilities. As of November 18, 2016, Colorado had 135 major NPDES permitted facilities registered with the USEPA Integrated Compliance Information System (USEPA, 2016c).

The National Institutes of Health (NIH), U.S. National Library of Medicine, provides an online mapping tool called TOXMAP, which allows users to "visually explore data from the USEPA's Toxics Release Inventory (TRI) and Superfund Program" (NIH, 2015). A map of potentially hazardous sites in Colorado is included in Figure 4-10.

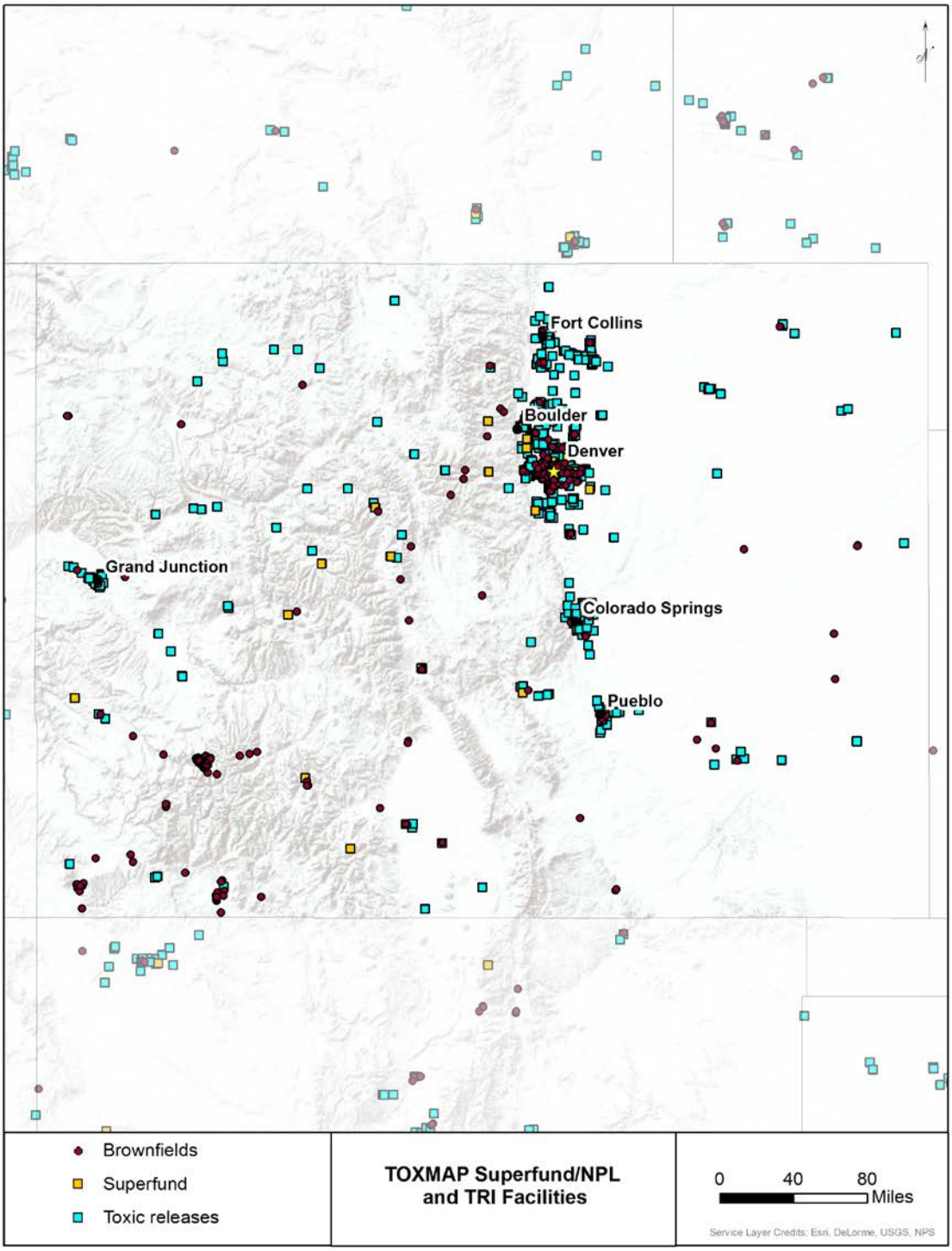


**Figure 4-10: TOXMAP Superfund/NPL and TRI Facilities in Colorado**

## 4.11.2 Environmental Consequences

This section describes potential impacts from hazardous materials associated with the alternatives, as discussed below. There is potential for impacts from hazardous materials to occur when an activity:

- Causes exposure to concentrations of chemicals above regulatory limits, or USEPA chemical screening levels protective of the general public.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4-22 presents the impact summary for hazardous materials.

**Table 4-22: Impact Significance Rating Criteria for Hazardous Materials**

| Impact Criteria | Alternative 1<br>No Action | Alternative 2<br>Preferred Action |
|---|---|---|
| Exposure to concentrations of chemicals | No Impact | Less than Significant |

### *4.11.2.1 Alternative 1: No Action*

The No Action Alternative would not disturb any hazardous materials or create any potential hazard to human health**.** There would be no changes to or increases in hazardous material levels in the project area.

Under the No Action Alternative, the potential for a wildfire would not be reduced. The impacts if a hazardous waste site would be in the path of a wildfire could be significant and long-term. Should the waste be flammable, there is the potential for the hazardous waste to ignite or explode, further fueling a wildfire. In addition, a fire could cause the storage materials housing hazardous waste to rupture, causing leaks, spills, and contamination of soils and drinking water.

### *4.11.2.2 Alternative 2: Vegetation Management*

Wildfire mitigation activities would not disturb any known hazardous materials or create any potential hazard to human health. If hazardous constituents are encountered, appropriate measures for the proper assessment, remediation and management of the contamination would be initiated

in accordance with applicable Federal, State, and local regulations. Federal agencies would ensure appropriate measures are taken to prevent, minimize, and control the spill of hazardous materials.[26]

Post-project impacts are difficult to predict because the actual impacts would depend on whether the project area experiences a wildfire. If a wildfire occurs and the advancement of the fire is controlled due to the creation of fuelbreaks and other vegetation management activities, and the fire does not ignite a hazardous waste site, Alternative 2 would have a beneficial effect, as the hazardous material would remain contained.

## 4.12 CUMULATIVE IMPACTS

The CEQ's NEPA implementing regulations, as amended,[27] define cumulative effects as:

*"[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or local) or person undertakes such other action."*[28]

Based on these regulations, if the alternative does not have direct or indirect effects, there can be no cumulative effects resulting from the project because there would be no impacts added to past, present, or reasonably foreseeable actions.

CEQ regulations also describe cumulative impacts as impacts that "can result from individually minor but collectively significant actions taking place over a period of time." On a programmatic level and combined with other actions affecting wildfire mitigation projects, Alternative 2 could lead to cumulative impacts depending on the scale (number of projects) or geography (localized area) in which the actions are performed.

### 4.12.1 Summary of Cumulative Impacts

Individual projects proposed under this PEA have the potential to cause significant impacts when compounded and undocumented. In an effort to track and mitigate cumulative impacts, any official usage of this PEA must be documented by the completion of the Appendix A−Compliance Checklist. All supporting documentation, completed project specific compliance checklists, and SEAs, must be submitted to Colorado FEMA Region VIII, Mr. Richard Myers, via Richard.Myers2@fema.dhs.gov.

Cumulative impacts could occur from private development activities throughout Colorado, such as residential and business development, new infrastructure expansion and construction (buildings, roads, utilities), as well as vegetation management activities. While private development activities

[26] CDPHE Hazardous Waste Management available at https://www.colorado.gov/pacific/cdphe/hazwaste
[27] 42 USC Section 4321
[28] 40 CFR Part 1508.7

will continue to occur in the WUI, their intensity and magnitude are difficult to foresee. These activities would be required to comply with applicable laws and regulations.

Vegetation management activities throughout Colorado have a cumulative impact regarding the location and connectivity of fuelbreaks and fuel reduction areas across lands managed by various agencies and individuals. In addition, the construction of fuel breaks, creation of defensible space, and thinning to reduce fuel loads 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 (FEMA, 2012a). Vegetation management activities could also include herbicide treatments. A reduction in vegetation following herbicide treatments could temporarily increase soil erosion and surface water runoff in these areas. However, projects including successful herbicide treatments would allow for the reestablishment of native vegetation, thus having a long-term beneficial impact.

Cumulative impacts can be reduced, and project streamlining realized by (1) coordinating natural and cultural resource compliance review responsibilities with other Federal agency projects in the vicinity, (2) exploring multi-objective project opportunities, and (3) incorporating effective mitigation and/or long term planning strategies.

#### *4.12.1.1 Mitigation*

Under this PEA, project impacts that are implemented at an individual or cumulative scale, such as to produce significant impacts may potentially be reduced by implementing BMPs and conservation measures for individual impacts using the Mitigation Measures outlined in Section 5. A SEA would be completed for any projects that are anticipated to surpass the scope of this document such that impacts cannot be contained utilizing the Mitigation Measures outlined in Section 5.

For any official usage of this PEA, all supporting documentation, completed project specific compliance checklists, and SEAs, must be submitted to Colorado FEMA Region VIII, Mr. Richard Myers, via Richard.Myers2@fema.dhs.gov, for purposes of documenting cumulative wildfire mitigation project impacts.

# 5 Best Management Practices (BMPs) and Mitigation Measures

Section 4 includes descriptions of the affected environment and potential environmental consequences (beneficial or adverse) resulting from the proposed action and alternatives. Although none of the potential impacts are significant based on the significance criteria defined in Section 4, the level of significance may be further reduced through avoidance, minimization, or by mitigating for individual potential impacts using BMPs or mitigation measures as described in Table 5-1.

**Table 5-1: BMPs and Mitigation Measures by Resource Area**

| Resource Area | BMP and Mitigation Measure |
|---|---|
| Physical Resources | For projects in which soil erosion potential is determined to be significant, a project erosion control plan to minimize soil loss, including the use of construction practices such as the use of temporary sediment barriers, to isolate the construction site and minimize adverse effects of soil loss and sedimentation on soil and water resources would be implemented. |
| Physical Resources | To avoid unnecessary ground disturbance, all project activities would be conducted during time periods when the ground is frozen or dry. All disturbed areas including skid trails, landings, and staging areas would be restored using native, weed-free seed or mulch. |
| Safety and Occupational Health | To minimize any potential to occupation safety and health, construction workers and equipment operators are required to wear appropriate personal protective equipment (PPE) and to be properly trained for the work being performed, including removal and disposal of asbestos and lead-based paint for demolition projects. |
| Air Quality | To mitigate for fugitive dust during construction, periodic watering of active construction areas, particularly in areas close to sensitive receptors (e.g., hospitals, senior citizen homes, and schools), would be implemented. |
| Noise | Construction noise levels would be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Impact to noise levels would be minimized by limiting construction activities that occur during early morning or late evening hours. |
| Water Resources | For projects where wetland areas would be impacted, Federal agencies would evaluate individual and cumulative impacts and implement avoidance, minimization, and/or mitigation measures as necessary to reduce impacts below level of significance. Examples of compensatory mitigation include purchasing mitigation credits from a mitigation bank or contributing to an in-lieu fee program. |
| Water Resources | To mitigate for impacts to floodplains, a hydrology and hydraulics study would be completed to ensure the flow of flood waters. The project must not serve as a dam or otherwise impede water movement thus aggravating flooding upstream of the roadway. |
| Water Resources | Federal agencies would consult with the USFWS and/or NRCS for any project which extends outside of the original right of way and has the potential to affect land use, including USFWS easements, prime farmland, or farmland of State/local significance. |
| Biological Resources | Federal agencies would consult with USFWS on any actions that have the potential to affect biological resources including listed species and would include measures to avoid or minimize potential impacts as grant conditions. This includes migratory birds and raptors. Projects may be subject to additional documentation through Colorado Senate Bill 40. |
| Biological Resources | Fill material must not come from nor be deposited in threatened and/or endangered species habitat. |
| Biological Resources | Federal agencies would consult with the USFWS on ESA-listed species and coordinate with CPW concerning guidelines regarding impacts to State species of interest. Coordination may include measures to avoid or minimize potential impacts as grant conditions. This includes migratory birds and raptors. |
| Biological Resources | To avoid impacts to migratory birds and raptors, trees must be surveyed for nesting activity prior to felling activities in compliance with the MBTA and BGEPA. Contact the USFWS Colorado Ecological Services Field Office for guidance if surveys identify birds or nests that may be affected by project activities. If active nests are observed in the project area, the guidelines outlined in CPW's *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptor* must be implemented. Guidelines are available online at: https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/RaptorBufferGuidelines2008.pdf. |

| Resource Area | BMP and Mitigation Measure |
|---|---|
| Cultural Resources | Unless a project is covered under a PA exemption, all other ground disturbing projects must consult with the SHPO or THPO under Section 106 of the NHPA. The absence of cultural property documentation in the area does not mean they do not exist, but rather may reflect the absence of any previous cultural resource inventory in the area. If during the course of any ground disturbance related to this project, cultural materials are inadvertently discovered, the project would be immediately stopped and the SHPO/THPO and Federal agency notified. |
| Cultural Resources | A Secretary of Interior-qualified archaeologist would conduct a pre-construction briefing and training session with sub-recipient staff and contractors. Training would include an overview of the basic identification of cultural resources and potential project impacts. All activities with the potential to affect cultural resources would be monitored by sub-recipient staff throughout the project period. All known cultural resources in the project area would be identified and avoided during the project implementation. |
| Cultural Resources | To avoid impacts to cultural resources from material borrow source, borrow material source will be reviewed and approved by SHPO or THPO prior to use. |
| Cultural Resources | Federal agencies will consult with the SHPO or THPO on activities for any project that has the potential to affect previously undisturbed areas or historic properties. |
| Hazardous Materials | All waste material associated with the project must be disposed of properly and not placed in identified floodway or wetland areas or in habitat for ESA-listed species. No open burning would occur. |

Specific BMPs, including Federal agency consultation and undergoing specific permitting processes, may be required for compliance with Federal or State laws and regulations, and may further reduce any potential impacts. Consultations and permitting processes common to vegetation removal projects are outlined in Table 5-2. Table 5-2 provides examples of typical processes; not all projects would adhere strictly to this list. Moreover, each project would require compliance with local laws, and additional processes may apply.

**Table 5-2: Consultations and Permits that May be Required or Applicable**

| Resource Area | Permits | Conditions |
|---|---|---|
| Physical Resources | USACE Permit | Applicant is responsible for verifying and compliance with all permit requirements, including permit conditions, pre-construction notification requirements, and regional conditions as provided by the USACE. Applicant is responsible for implementing, monitoring, and maintaining all BMP's and Pre-Construction Notification (PCN) conditions of applicable Nation Wide Permits (NWP). This is to include any requirements per CDPHE 401 Water Quality Certification for Clean Water Act permits.<br><br>To the extent possible, keep equipment and construction within previously disturbed area and ROW. |
| Biological Resources | Consultation with USFWS would be necessary to assess permanent and temporary impacts<br><br>Compliance with Senate Bill 40 may be required | Applicant shall, to the extent possible, follow best construction practices to minimize impacts to any species. Should any threatened or endangered species be discovered during construction work in the subject area, work shall be halted and the Applicant should contact USFWS for further guidance.<br><br>To avoid impacts to migratory birds and raptors, trees must be surveyed for nesting activity prior to felling activities in compliance with the MBTA and BGEPA. Contact the USFWS Colorado Ecological Services Field Office for guidance if surveys identify birds or nests that may be affected by project activities. If active nests are observed in the project area, the guidelines outlined in CPW's *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptor* must be implemented. Guidelines are available online at: https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/RaptorBufferGuidelines2008.pdf |

| Resource Area | Permits | Conditions |
|---|---|---|
| Water Resources | Applicant must coordinate with USACE as well as CWCB to obtain and comply with all appropriate permits | Applicant is responsible for verifying and compliance with all permit requirements, including permit conditions, pre-construction notification requirements and regional conditions as provided by the USACE.<br><br>Applicant is responsible for implementing, monitoring, and maintaining all BMP's and PCN conditions of applicable NWP. This is to include any requirements per CDPHE 401 Water Quality Certification for Clean Water Act permits. Applicants must coordinate with local floodplain administrator to obtain and comply with the appropriate floodplain management permits.<br><br>For any work completed within the designated section of the Cache La Poudre River that is listed wild and scenic agencies, must confer with the regulatory agency overseeing that section of the river. |
| Cultural Resources | None | Applicant shall, to the extent possible, follow best construction practices to minimize impacts to any cultural resources. Should any historic or archaeological materials be discovered during construction, all activities on the site would be halted immediately and the applicant should contact the SHPO for further guidance.<br><br>If a project does not fall within an allowance, or a PA does not exist with the SHPO, then the Federal agency would make a determination of effect under Section 106 of the NHPA and consult with the SHPO. |
| Hazardous Materials | CDPHE permits | Hazardous materials must be appropriately separated and disposed of in an approved disposal site or landfill.<br><br>Asphalt must be recycled as a blended base material or appropriately separated and disposed of in an approved disposal site or landfill in accordance with the CDPHE authorized waste management regulations.<br><br>For any "Asbestos Containing Material," lead-based paint and/or other hazardous materials found during remediation or repair activities, the Applicant must comply with all Federal, State, and local abatement and disposal requirements. Applicants are responsible for ensuring contracted removal of hazardous debris also follows these guidelines. |

# 6 Summary of Impacts

Table 6-1 summarizes the potential impacts of each alternative on the resource areas discussed in Section 4. The table is organized by resource area for each alternative.

**Table 6-1: Summary of Impacts**

| Resource Area | Impact Criteria | Alternative 1 No Action | Alternative 2 Preferred Action |
|---|---|---|---|
| Physical Resources | Soil erosion | No Impact | Less than Significant |
| Physical Resources | Soil compaction and rutting | No Impact | Less than Significant Beneficial |
| Physical Resources | Access to recreational lands or activities | No Impact | Less than Significant Beneficial |
| Transportation | Traffic congestion, delay, or incidents | No Impact | No impact |
| Safety and Occupational Health | Exposure to occupational hazards | No Impact | Less than Significant Beneficial |
| Socioeconomics and Environmental Justice | Shift in real estate or rental market | No Impact | Less than Significant Beneficial |
| Socioeconomics and Environmental Justice | Change in spending, income, or tourism | No Impact | Less than Significant Beneficial |
| Air Quality | Increase in air emissions | No Impact | Less than Significant |
| Noise | Increase in noise levels | No Impact | Less than Significant |
| Public Services and Utilities | Alteration of the capacity of local health, public safety, and emergency response services | No Impact | No Impact |
| Public Services and Utilities | Disruption of the delivery of electric power or to physical infrastructure | No Impact | No Impact |
| Water Resources | Degradation of drinking water quality | No Impact | No Impact |
| Water Resources | Degradation of floodplains or wetlands, or alteration of stream flow | No Impact | Less than significant |
| Biological Resources | Non-ESA listed species injury or mortality at the population level | No Impact | No Impact |
| Biological Resources | Habitat loss or fragmentation | No Impact | Less than significant |
| Biological Resources | Migratory pattern, path, or rest stops | No Impact | Less than significant |
| Biological Resources | Jeopardy of an ESA-listed species or other special status species | No Effect | NLAA |
| Biological Resources | Habitat loss in designated Critical Habitat | No Effect | NLAA |
| Cultural Resources | Physical damage or destruction to a contributing portion of a cultural resource or historic property | No Impact | Less than Significant |
| Cultural Resources | Indirect effect to a cultural resource or historic property | No Impact | Less than Significant[29] |
| Hazardous Materials | Exposure to concentrations of chemicals | No Impact | Less than Significant |

[29] Allowances under FEMA's PA with the Colorado SHPO and Colorado Division of Homeland Security and Emergency Management are summarized in Section 4.10.1.

# 7 Public Involvement

## *7.1* PUBLIC NOTICE OF AVAILABILITY FOR COMMENT

**PUBLIC NOTICE OF AVAILABILITY OF A PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA) FOR WILDFIRE MITIGATION PROJECTS IN COLORADO**

Notification is hereby given to the public that the Federal Emergency Management Agency (FEMA) has prepared a draft Programmatic Environmental Assessment (PEA) to evaluate wildfire mitigation projects in Colorado. This notification is provided pursuant to the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), Executive Order (EO) 11988 (Floodplain Management) and EO 11990 (Protection of Wetlands), and Federal agency implementation procedures described in 44 C.F. R. Part 9 and FEMA Directive 108-1. Funding from FEMA's Pre-disaster Mitigation Grant Program (PDM) will be utilized. The purpose of FEMA's PDM program is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. The intent of the PEA is to evaluate the expected environmental impacts associated with implementing wildfire mitigation projects in Colorado.

The PEA will integrate various vegetation management practices intended to protect the public health and safety, improved property and other infrastructure elements in Colorado from wildfire. Project activities would be in accordance with all applicable Federal, tribal, state, and local laws, regulations, and ordinances. Some specific items of work may include thinning, pruning, and removal of targeted trees; as well as brush cutting and reduction of ladder fuels, and other flammable vegetative materials. Prescribed burning would not be covered under the PEA

The draft PEA will be available for review at https://www.fema.gov/media-library/assets/documents/. A public comment period for the proposed project described in this notice will remain open for 30 days from date of publication. In addition to this initial comment period, a final opportunity for public review and comment may be provided if substantive comments are received. Interested persons may obtain more detailed information about the PEA from Richard Myers, FEMA Region VIII Environmental Specialist by email to Richard.Myers2@fema.gov or by mail at the Denver Federal Center, P. O. Box 25267, Denver, Colorado, 80225.

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# Appendix A Compliance Checklist

Upon completion please submit this checklist and all attachments to Rick Myers (Richard.Myers2@fema.dhs.gov), FEMA Region VIII, Deputy Regional Environmental Officer, for the purpose of tracking cumulative impacts.

**Vegetation management activities likely would involve the following:**

- Use of hand or mechanical methods in order to create defensible space or reduce hazardous fuels (mechanical removal could involve use of machines, such as feller bunchers);
- Creation of access and staging areas, when needed, to move trucks and heavy equipment;
- Placement of cut trees in a stack suitable for a skidder, forwarder, or other means of transport (chippers, tractors, brush hogs, skid loaders, and all-terrain vehicles could also be used to remove vegetation);
- In areas with severe slopes, trees can be hand cut and removed via helicopters or cable-yarding systems;
- Vegetation management areas would be accessed using existing roads to the extent possible, and no project activities would occur within 50 feet of a wetland or stream; and
- Reseeding of disturbed areas, such as skid trails, landings, and normally unused roads, with native species.

**General Project Conditions:**

1. In the event that archeological deposits, including any Native American pottery, stone tools, bones, or human remains, are uncovered, the project shall be halted and the Applicant shall stop all work immediately in the vicinity of the discovery and take reasonable measures to avoid or minimize harm to the finds. All archeological findings will be secured and access to the sensitive area restricted. The Applicant will inform FEMA immediately and FEMA will consult with the State Historic Preservation Office (SHPO) or Tribal Historic Preservation Office (THPO) and Tribes and work in sensitive areas cannot resume until consultation is completed and appropriate measures have been taken to ensure that the project is in compliance with the National Historic Preservation Act (NHPA).
2. Unusable equipment, debris, and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, Applicant shall handle, manage, and dispose of petroleum products, hazardous materials, and toxic waste in accordance to the requirements and to the satisfaction of the governing Federal, State, and local Agencies.
3. Applicant must obtain any required elevation certificate from the local floodplain administrator before work begins. Elevation must meet applicable Federal, State, and local requirements.

4. If any asbestos containing materials, lead based paint, and/or other hazardous materials are found during remediation or repair activities, the Applicant must comply with all Federal, State, and local abatement and disposal requirements under the National Emissions Standards for Hazardous Air Pollutants.
5. The Applicant is required to obtain and comply with all Federal, State, and local permits, approvals, and requirements prior to initiating work on this project.
6. Changes, additions, and/or supplements to the approved listed properties and the scope of work which alter the existing scope of work, including additional work not funded by FEMA but performed substantially at the same time, will require re-submission of the application prior to construction to FEMA for re-evaluation under the National Environmental Policy Act.

## *Part I*

| POST-DISASTER<br>**Wildfire Mitigation Projects in the State of Colorado** | Date: | Project Code: |
|---|---|---|
| Assessment under the **Wildfire Mitigation Projects in the State of Colorado Programmatic Environmental Assessment (PEA) and Finding of No Significant Impact (FONSI) (FEMA *Insert Date if FONSI Signed*)** | | |
| Disaster Description and Date: | | |
| Project Name and Location: Include address and coordinates. | | |
| Name and Contact Information of Project Primary Point of Contact: | | |
| Comprehensive Project Description: | | |

# I. PEA Alternative Used (Check all that apply)

☐ Alternative 1 – No Alternative

☐ Alternative 2 – Vegetation Management

# II. Evaluation

**ENVIRONMENTAL IMPACT ASSESSMENT:**
Document impacts to human, socioeconomic, or natural environment for environmental setting or circumstances.

| Setting/Resource/Circumstance | Are Impacts Consistent with Descriptions in PEA? (Yes/No) | Are there Additional Impacts? (Yes/No) | Date Reviewed | Are Site Specific Study Documents Attached? (Yes/No) |
|---|---|---|---|---|
| Physical Resources | | | | |
| Transportation Resources | | | | |
| Safety and Occupational Health | | | | |
| Socioeconomics and Environmental Justice | | | | |
| Air Quality | | | | |
| Noise | | | | |
| Public Services and Utilities | | | | |
| Water Resources | | | | |
| Biological Resources | | | | |
| Cultural Resources | | | | |
| Hazardous Materials | | | | |

**REGULATORY CHANGES:** Document changes to laws, regulations, and/or guidelines since signature of PEA/FONSI

**IMPACTS ASSESSMENT:** For items checked as having additional impacts, assess the affected natural and socioeconomic environment, impacts, and new issues/concerns which may now exist:

**MITIGATION:** List specific mitigation measures for each resource impacted (both impacts from PEA or additional impacts):

## III. Public/Agency Involvement (if any)

| Document any public meetings, notices, & websites, and/or document agency coordination. For each provide dates, and coordination: |
|---|
| |

## IV. Permits

| List required permits and status of permit: |
|---|
| |

## V. Attachments Listed

| List maps, studies, background data, permits, etc. |
|---|
| |

## VI. Conclusion and Recommendation

☐ The project is consistent with the alternatives and impacts as described in the PEA.

☐ The project generally is consistent with the alternatives and impacts as described in the PEA, but includes some minor impacts not described in the PEA which are documented in this checklist.

☐ The project requires a Supplemental Environmental Assessment or Environmental Impact Statement because (1) creates impacts not described in the PEA; (2) creates impacts greater in magnitude, extent, or duration than those described in the PEA; or (3) requires additional mitigation measures that are not described in the PEA to keep impacts below significant levels.

Applicant or Responsible Entity Signature Date

Funding Agency Date

Upon completion please submit this checklist and all attachments to Rick Myers (Richard.Myers2@fema.dhs.gov), FEMA Region VIII, Deputy Regional Environmental Officer, for the purpose of tracking cumulative impacts.