

Draft Environmental Assessment

Balcones Canyonlands Preserve
Hazardous Fuels Reduction

HMGP-DR-1999-0019

Travis County, Texas

July 2015



FEMA

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Acronyms and Abbreviations

APE	area of potential effect
AQCR	air quality control region
Atlas	Texas Archeological Sites Atlas
BID	Brackett-Rock outcrop complex
BMPs	best management practices
BoF	Brackett-Rock outcrop-Real complex
BrF	Brackett soils and Urban Land
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	environmental assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	flood insurance rate map
FONSI	finding of no significant impact
FPPA	Farmland Protection Policy Act
GLO	Texas General Land Office
HCP	Habitat Conservation Plan
HMGP	Hazard Mitigation Grant Program
in	inches
in/hr	inch(es) per hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

Acronyms and Abbreviations

NRHP	National Register of Historic Places
PCE	primary constituent element
P.L.	Public Law
RIFA	red-imported fire ants
SHPO	State Historic Preservation Officer
TAC	Texas Administrative Code
TcA	Tarrant and Speck soils
TCEQ	Texas Commission on Environmental Quality
TDEM	Texas Division of Emergency Management
TdF	Tarrant Rock outcrop complex
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VoD	Volente silty clay loam
WBWP	Wild Basin Wilderness Preserve
WUI	wildland-urban interface

SECTION 1 Introduction

Travis County, Texas proposes to conduct hazardous fuels reduction along the woodland edge of the Balcones Canyonlands Preserve (BCP) to reduce wildfire hazards along the wildland-urban interface (WUI). The WUI is the zone where structures and other human development meet or mix with wildland or vegetative fuels. Removal of organic fuel and debris is intended to prevent the rapid movement of a ground fire up into tree crowns by removing ladder fuels and creating a continuous tree canopy that suppresses vegetative growth in the understory. The targeted land in the BCP represents a potential direct wildfire threat to nearby residences and businesses. Travis County has submitted an application to the Federal Emergency Management Agency (FEMA) through the Texas Division of Emergency Management (TDEM) for a grant under FEMA's Hazard Mitigation Grant Program (HMGP). TDEM is the direct applicant for the grant, and Travis County is the subapplicant.

The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Under the HMGP, federal funds pay 75 percent of the project cost, and the remaining 25 percent comes from non-federal funding sources.

Travis County, located in south central Texas, is part of the Austin-Round Rock metropolitan area. The BCP is composed of a network of privately and publicly owned land in western Travis County that was created as a preserve to provide habitat for wildlife. Travis County manages a large portion of the BCP and holds a U.S. Fish and Wildlife Service (USFWS) permit that outlines how the BCP must be managed to maintain this area for endangered and threatened species. The BCP was created to provide mitigation for impacts of previous development projects; therefore, the BCP is managed with a focus on wildlife conservation. The proposed project would be conducted along Travis County-owned segments of the BCP boundary that are adjacent to homes and commercial facilities as shown on **Figure 1.1** and **Figure 1.2**. The proposed project includes proposed and secondary project areas that total approximately 68 acres combined. The primary project areas total approximately 50.6 acres; however, all proposed and secondary treatment areas are included in the analysis in this EA. (See **Appendix A-1** for detailed project area aerial photography and **Appendix A-2** for treatment unit maps).

Travis County proposes to reduce wildfire hazards along the BCP boundary by:

- removing surface fuels;
- increasing the distance between the forest floor and the canopy; and
- thinning the canopy.

Treatments would be applied in linear segments within the BCP property boundary in selected areas. Travis County proposes to reduce the wildfire hazard along the BCP boundary by employing 3 zones of treatment based on forest canopy and distance from the preserve boundary; Canopy Edge, Canopy Interior, and Open Woodland. All work would be conducted on BCP property.

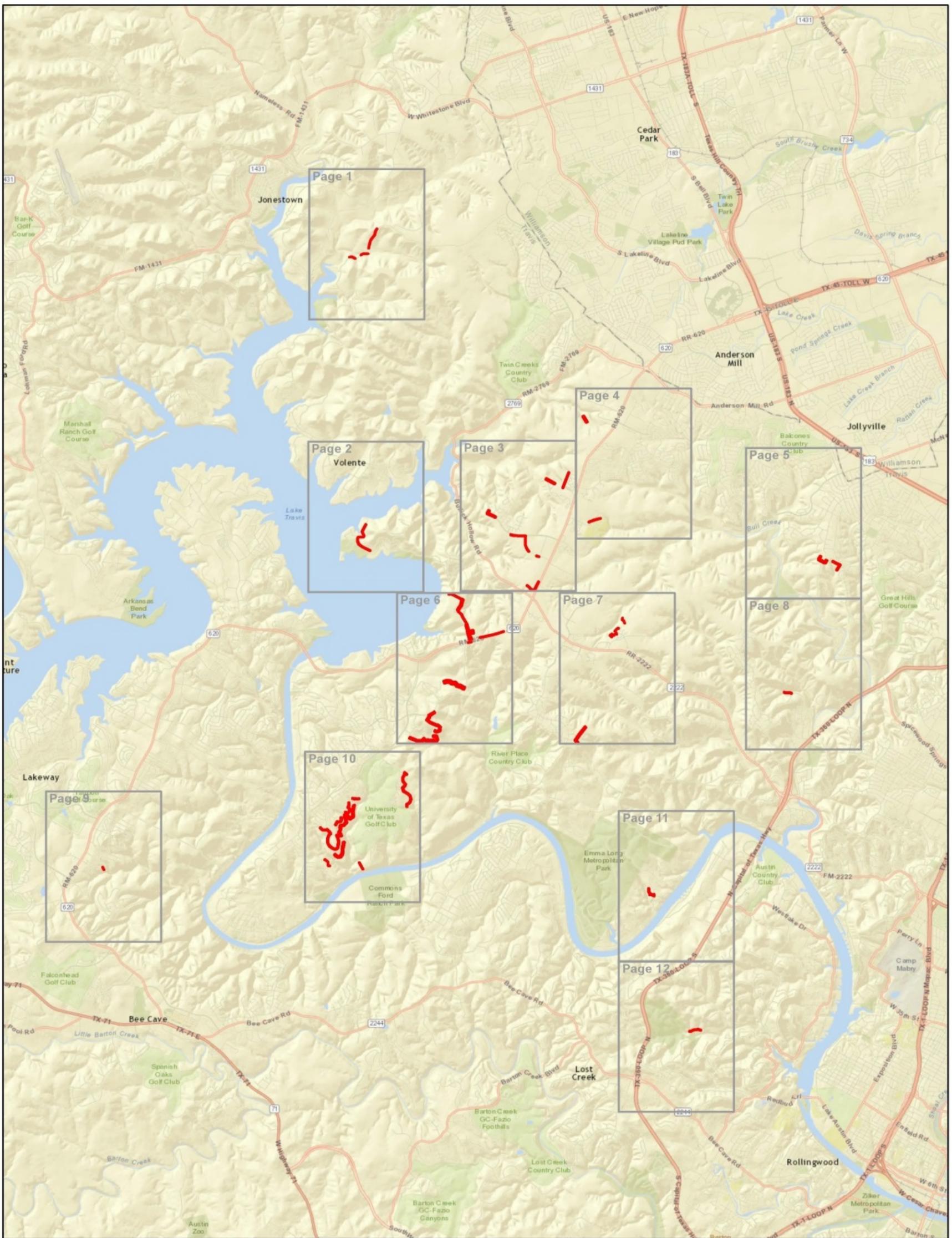
The proposed action would reduce hazardous fuels loading in the understory and midstory by removing overgrowth and limbs. The fuels reduction would mitigate the effects of a wildfire

moving across the wildland-urban interface into developed areas. The proposed project would include removal of surface fuels and “ladder” fuels that have accumulated and reduce the canopy bulk density to diminish the chance of a fire transitioning into a crown fire or sustaining as a crown fire. The project would focus on the edge of woodlands, where fuel loading is greater than in the interior due to greater sunlight penetration along the edges. The proposed fuels reduction would start at the edge of private yards perched on limestone cliffs within residential properties, where the woodlands begin, and would minimize the volume of combustibles near homes.

The intended effect of these actions is to remove ladder fuels, decrease ambient surface temperature, and increase humidity and fuel moisture underneath an intact forest canopy. Furthermore, the growth of herbaceous plants and grasses will be inhibited due to the limited sunlight available beneath the canopy.

The proposed action is focused on the WUI, which is the zone where structures and other human development meet or mix with wildland or vegetative fuels. This type of treatment appears to have been effective as a prophylactic pre-treatment in woodland areas adjacent to zones where prescribed burns have been implemented by the USFWS on the BCP in recent years.

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President’s Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and FEMA’s regulations implementing NEPA (44 CFR Part 10). FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this draft EA is to analyze the potential environmental impacts of the proposed Balcones Canyonlands hazardous fuels reduction project. FEMA will use the findings in this draft EA to determine whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI)



**Balcones Canyonlands
Hazardous Fuels Reduction**
Travis County

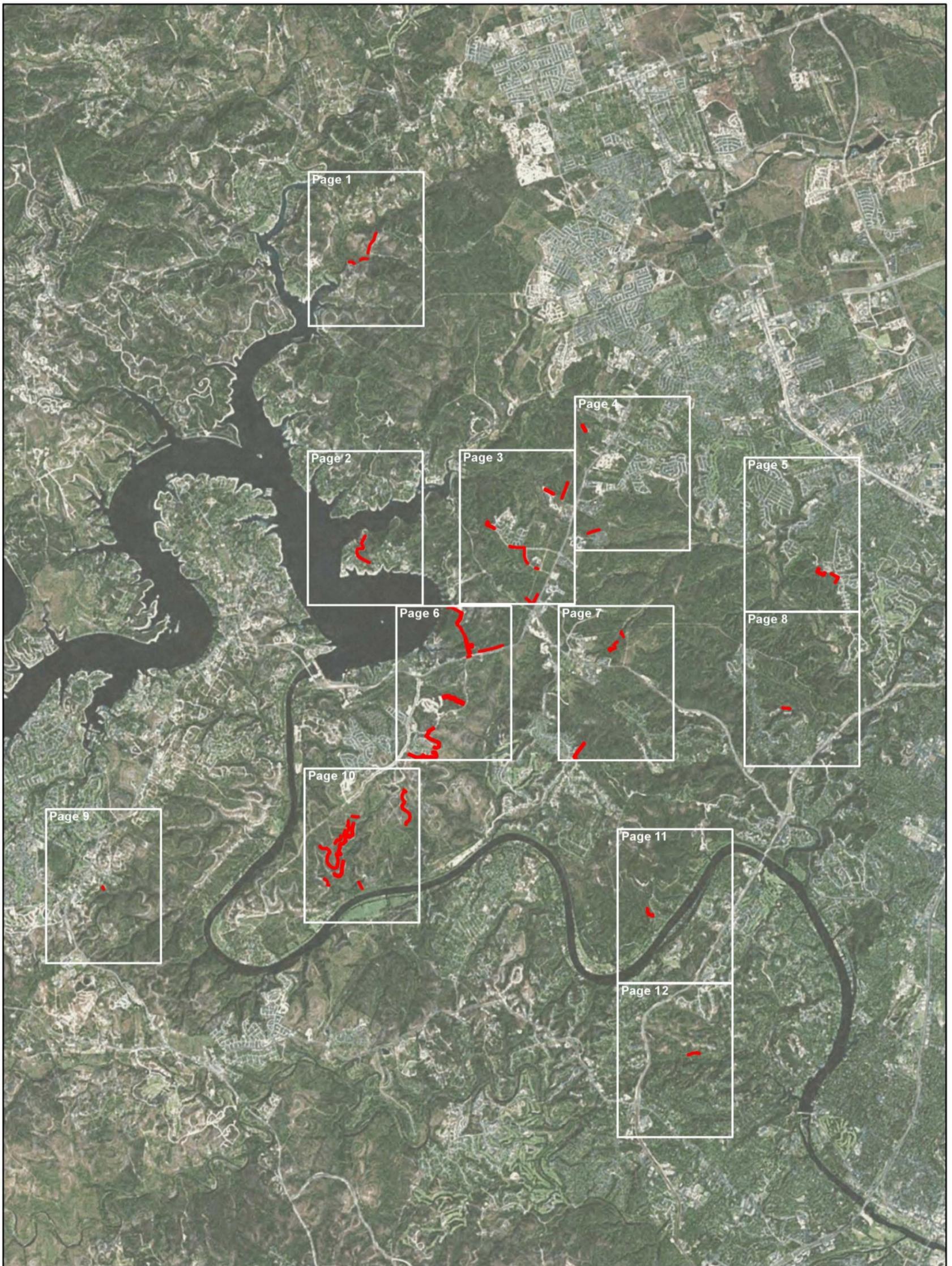
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Project Areas Streets Overview

Legend
 Project Areas

Project Areas
 Travis County

Data Sources: USGS NHD
 Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand).



**Balcones Canyonlands
Hazardous Fuels Reduction**
Travis County

0 2.5 5 Miles

Project Areas Aerial Overview

Legend
Project Areas

Legend
Project Areas

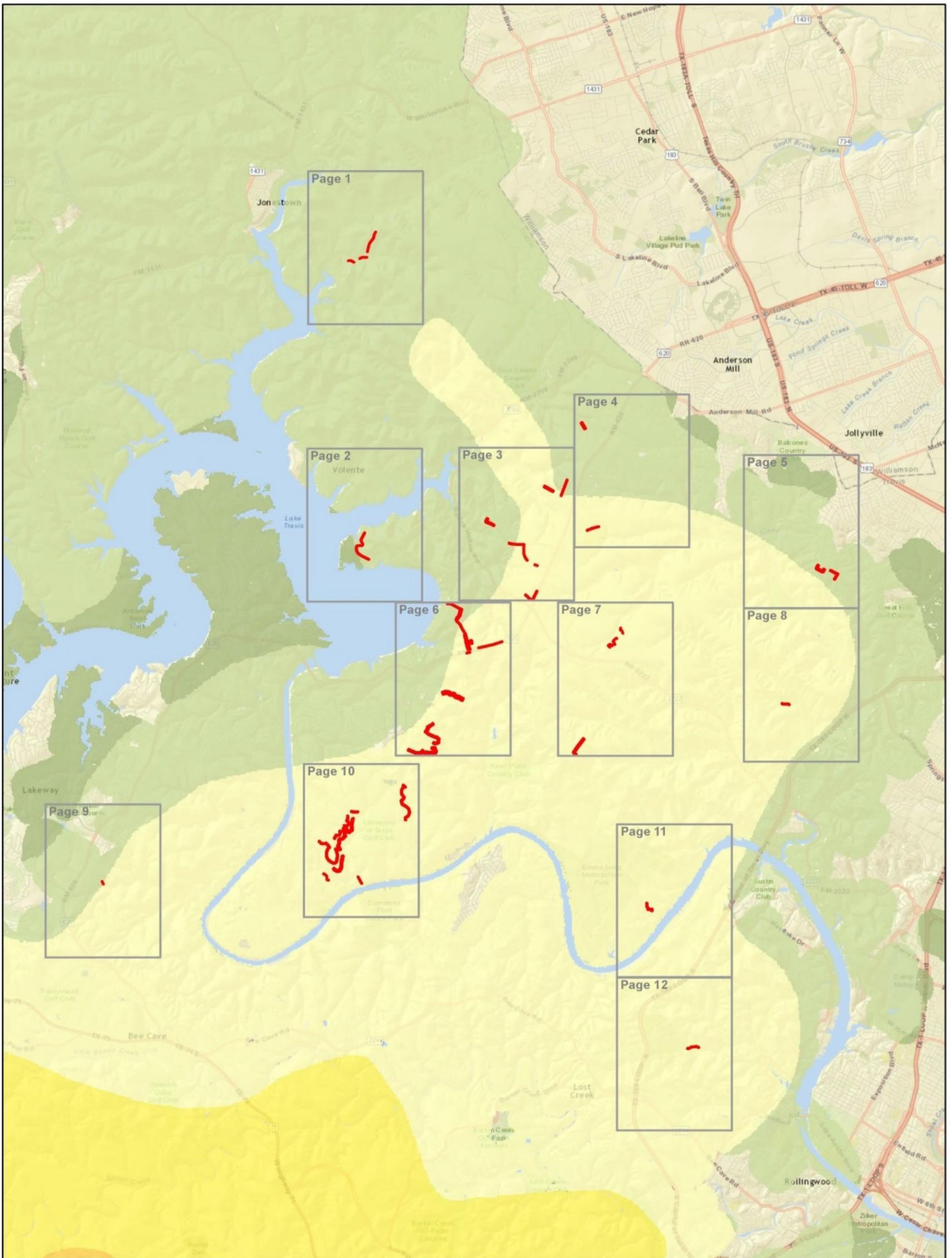
Data Sources: USGS NHD
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

SECTION 2 Purpose and Need

FEMA's HMGP provides funds to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable implementation of mitigation measures during the immediate recovery and response from a declared disaster.

The purpose of the proposed project is to reduce wildfire hazards in Travis County. Along the WUI, unmanaged forests pose a greater wildfire risk because hazardous fuels can accumulate, increasing the potential intensity of wildfires in adjacent developed areas. Long-term drought has increased wildfire hazards by providing a large amount of dry fuel for a potential wildfire. Wooded areas with thick vegetation and dead vegetative understory material along the BCP boundary are close to homes, roads, and some public facilities.

Most of the project areas are rated as a 3 (moderate) on the Fire Intensity Scale by the Texas Wildfire Risk Assessment (**Figure 2.1**) (Texas A&M Forest Service 2014). In the summer of 2011, central Texas experienced severe drought conditions and record heat that heightened wildfire risks throughout the region, including Travis County. In Travis County, the drought created vulnerable conditions that resulted in the destructive "Labor Day Fires" of September 2011. Notable fires in Travis County were the Steiner Ranch and Spicewood fires, which occurred in the WUI and originated near large properties owned and managed by Travis County as parks or preserves. The Spicewood Fire burned approximately 600 acres at the Travis County Milton Reimers Ranch Park and two other parks were closed and evacuated due to encroaching fires that affected adjoining residential neighborhoods. The Steiner Ranch fire destroyed approximately 58 homes in the WUI near the BCP and damaged 26 additional properties. **Figure 2.2** shows a home being consumed by fire during the Steiner Ranch Labor Day fire (Austin American Statesman 2011).



Balcones Canyonlands
Hazardous Fuels Reduction
Travis County

Legend

 Project Areas	 1 (Low)	 3 (Moderate)	 5 (High)
	 2	 4	 6
			 7 (Very High)

Wildfire Threat Overview

Data Sources: USGS NHD
Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),

Figure 2.2. Steiner Ranch Labor Day Fire, September 2011



SECTION 3 Alternatives

This section describes the alternatives considered, including the proposed action.

3.1 No Action Alternative

The no action alternative is included to describe potential future conditions if no action is taken to reduce wildfire hazards. Under the no action alternative, no work would be conducted to reduce hazardous fuels along the boundaries of the targeted portions of the BCP. Residents and homes in the vicinity of the BCP would remain at an elevated risk in the event of a wildfire.

Because existing wildfire hazards in the area around BCP would not be reduced under the no action alternative, the probability of loss of human life and property in a wildfire would continue to be unacceptably high. A major wildfire could also have severe temporary impacts on environmental resources (*e.g.*, air quality, water quality, and emergency services). Fighting a major wildfire could also require large quantities of water at a time when water resources in the area may already be strained by drought.

In addition to risks to residents near the portions of BCP identified here, several federally endangered species rely on the natural vegetation in the preserve for habitat. A major wildfire would be more likely to spread under the no action alternative and could damage existing and potential habitats for several karst species, Black-capped vireo, and Golden-cheeked warbler.

Under the no action alternative, minor short-term impacts that may occur under the proposed project would be avoided because there would be no work conducted to remove hazardous fuels. The impacts avoided would include temporary increases in noise, truck traffic, and minor short-term impacts to air quality. For the reasons described in this section, the no action alternative would not meet the purpose and need of the proposed project.

3.2 Proposed Action

Travis County proposes to implement a hazardous fuels reduction program to reduce potential wildfire hazards. The proposed action would be conducted along portions of the BCP to reduce the wildfire hazard within the WUI near the BCP boundary by:

- removing surface fuels;
- increasing the distance between the forest floor and the canopy; and
- thinning the canopy.

The proposed treatment would be conducted on approximately 36 segments located along edges of the BCP in north central Travis County. Segments range from 30 to 100 feet in width and are located on BCP land in areas adjacent to roads and existing developments. The County would implement in a prioritized approach and has identified primary and secondary treatment units. Primary treatment units will be treated first and secondary treatment units would be treated depending on available funds. For the purposes of this EA, all primary and secondary treatment units are analyzed.

The treatments would be applied in linear segments varying in width depending on topography and other site conditions. Treatments would be applied in areas that have a slope of less than 30 percent. In areas with a slope of greater than 30 percent, the County will extend the treatment into the BCP property until an area with a slope of under 30 percent is found. Any vegetation between the BCP property boundary and the edge of road pavement would not be altered as part of this project.

The proposed treatment would be conducted in 3 zones based on forest canopy and distance from the preserve boundary: Canopy Edge, Canopy Interior, and Open Woodland. These zones are based on the USFWS best management practices (BMPs) for Golden-cheeked warbler habitat, with minor modifications intended to further reduce the impacts to habitat for bird species (USFWS 2013a).

The Canopy Edge Zone extends from 0 to 30 feet inward from the BCP property boundary and would be applied to land adjacent to both roadways and residences. Work in this zone would include: 1) removal of surface fuels, downed limbs, and logs under 4 inches in diameter lying on the ground; and 2) pruning of live and dead limbs on Ashe juniper and live oak trees to a height of 6 feet.

The Canopy Interior Zone extends from 30 to 100 feet inward from the BCP property boundary and would be applied to land adjacent to residences. The treatment would be the same as in the Canopy Edge Zone except that limbs would only be pruned to a height of 4 feet.

The Open Woodland Zone, also located within 30 to 100 feet inward from the BCP property boundary, would be applied to land adjacent to residences and would be implemented in areas where the canopy is not completely closed. The treatment would be the same as in the Canopy Interior Zone except that limbs would be pruned to a height of 8 feet.

In all three zones, juniper and live oak trees that meet the following criteria would be removed: less than 4 inches in diameter; less than 10 feet tall; not currently contributing to canopy cover (i.e. underneath or mixing with another tree's canopy); and not growing into a canopy opening.

If a juniper or live oak tree is growing into a canopy opening and is less than 10 feet in height, limbs would be pruned to approximately one half of the tree's current height. All juniper trees that have either a dead crown or greater than 75 percent branch mortality are considered dead and would be removed.

The pruning and thinning portion of the work would be accomplished by workers using chainsaws or similar powered hand tools. Vegetative fuel removal conducted for this project would not involve heavy machinery (e.g. forestry mowers) to remove trees or limbs. In areas with adequate vehicular access, woody slash would be chipped using a large wood chipper and spread on-site (by hand) to no more than 2 inches in depth. In areas without adequate vehicular access cut material would be removed and disposed of off-site. A vehicle (large pick-up truck or a full-sized dump truck) would tow the chipper and transport the chipped material when necessary. In some cases a small all-terrain vehicle (i.e. a 'Gator') may be used to help move material, although this would probably not be feasible in most situations.

Access to treatment areas would be via internal (unimproved) roadways whenever possible and by foot when on-site vehicular access is not possible. In some cases, access would require permission from private property owners (arranged in advance via local Firewise groups) for workers to access the BCP on foot and to bring cut vegetation to the curb for processing. Processing of cut material (chipping and mulching) may take place on the shoulder of a roadway if BCP access is limited, shoulder space is sufficient for safe working conditions, and chipping does not interfere with traffic flow.

Cut tree stumps would remain in place and no rootballs would be removed. The County will apply, by hand, a sealant to any oak stumps or wounds on oak trees resulting from the implementation of the proposed action. The sealant would combat the onset of oak wilt, a disease caused by the fungus *Ceratocystis fagacearum*, which is thought to be attracted to the sap in oak tree species and can be transmitted through roots to adjacent oak trees (Rexrode and Brown 2014).

BCP is the site of several karst features (*i.e.*, caves) that provide habitat to threatened and endangered species; these features are described in more detail in **Section 4.4.3**. The project scope includes a number of measures to protect these karst features which are discussed in more detail throughout **Section 4**.

No work will be conducted within 100 feet of an occupied cave opening. Equipment staging, refueling, and storage of gasoline will occur more than 500 feet from the entrance of occupied caves. Travis County staff will be present to supervise workers during the time that work is being implemented within the 345-foot cave cricket foraging radius of occupied caves. When work is not being conducted within this 345-foot buffer, staff will provide supervision as needed. The 100-, 345- and 500-foot buffers will be well marked for work crews prior to the commencement of work by flagging/taping and these materials will be promptly removed when work is complete. Mulch will not be placed within 262 feet of occupied cave openings. Any mulch placed within 262 feet and 345 feet of occupied cave openings will be thin enough to allow for herbaceous growth.

Fuel reduction activities would take place during the non-breeding season of the year, from September through February, in compliance with the Balcones Canyonlands Conservation Plan, which is a 30-year permit from the USFWS for incidental take (*e.g.*, displacement) of endangered species outside of the preserve boundary (USFWS 1996). The work would be completed over the 3-year span of the grant.

Travis County has developed a maintenance operation program for incorporating fuels reduction maintenance requirements into the BCP land management plan. County BCP staff would monitor and maintain the fuels reduction areas on BCP property. Maintenance activities would include mowing; removal of accumulated surface fuels; and pruning and thinning of woody perennials. Treated areas will be mowed to 6 inches or higher above the ground to protect vegetation around occupied cave openings. Maintenance activities would include red-imported fire ant (RIFA) eradication efforts. No herbicides would be used during implementation or maintenance.

3.3 Additional Action Alternatives Considered and Dismissed

An alternative to the proposed action that was considered was to remove all junipers within 50 feet of the WUI. While full removal of junipers would appear to maximally reduce wildfire risk, scientific research and wildland fire experience have shown that complete removal of junipers would open up the canopy and encourage growth of tall grasses, which pose a greater fire hazard because of their greater ignition potential and the erratic behavior associated with grass fires. Furthermore, this alternative would have greater environmental impacts than the proposed action because of the dependence of endangered species such as the Golden-cheeked warbler and the Black-capped vireo on mature trees and shrubs.

This alternative was rejected because the WUI near the BCP would continue to be at an elevated risk for the spread of catastrophic wildfire, and the probability of loss of human life and property would continue to be unacceptably high. Thus, this alternative would not meet the purpose and need of the proposed project and was dismissed from further consideration in this EA.

SECTION 4 Affected Environment, Potential Impacts, and Mitigation

This section describes the environment potentially affected by the no action and proposed action alternatives, evaluates potential environmental impacts, and recommends measures to avoid or reduce those impacts.

4.1 Resources Not Affected and Not Considered Further

This section provides an overview of the environmental resources that would not be affected by the no action or proposed action alternatives and that have been removed from further consideration in this EA.

4.1.1 Geology and Seismicity

Based on the nature and location of the project area, the proposed action would have no effect on seismicity and is very unlikely to be affected by seismic events. Seismicity is not considered further in this analysis. Vegetative fuel reduction and hazard mitigation actions involving vegetation management are surface activities that do not affect geology and are not affected by geology. Therefore, geology and seismicity are not considered further in this analysis.

4.1.2 Wild and Scenic Rivers

The National Wild and Scenic Rivers System (P.L. 90-542; 16 U.S.C. 1271 et seq.) was created in 1968 to preserve rivers with outstanding natural, cultural, and recreational value in a free-flowing condition. The project area is not near any river segment designated as "wild and scenic." The Rio Grande, located along the Texas border, is the only wild and scenic river in Texas. The proposed project would not cause any impacts to wild and scenic rivers because the project site is not within the Rio Grande watershed (see **Appendix C-1**) (Interagency Wild and Scenic Rivers Council 2014). Wild and scenic rivers are not considered further in this analysis.

4.1.3 Coastal Resources

The Coastal Zone Management Act enables coastal states to designate state coastal zone boundaries and develop coastal management programs to improve protection of sensitive shoreline resources and guide sustainable use of coastal areas. The Texas Coastal Management Program is administered by the Texas General Land Office (GLO). Travis County is not a coastal county and is approximately 137 miles from the nearest coastline; therefore, it is not included as part of the Texas Coastal Management Program (GLO 2014). There would be no potential impacts to coastal resources under either the no action alternative or the proposed action. Coastal resources are not considered further in this analysis.

4.2 Physical Resources

This section provides an overview of the affected area and potential environmental effects from the no action and proposed action alternatives on physical resources, including soils, air quality, climate change, and visual resources.

4.2.1 Soils

According to the Geologic Atlas of Texas, Austin Sheet, 1981, the project area primarily consists of the Glen Rose Formation and the Fredericksburg group (Texas Water Development Board [TWDB] 1981). The project area is in the Edwards Plateau region, which is characterized by shallow, alkaline clays and clay loams underlain by limestone. The seven soil types in the project area include Brackett-Rock outcrop complex (BID), Brackett-Rock outcrop-Real complex (BoF), Tarrant soils (TaD), Tarrant-Rock outcrop complex (TdF), Volente silty clay loam (VoD), Tarrant and Speck soils (TcA), and Brackett soils and Urban Land (BrF). The properties of these soils are described in more detail in **Table 4.1** (US Department of Agriculture [USDA] 2013). Soil maps of the project area are shown in **Appendix B-1** (USDA 2013).

The soils within the proposed project area are not hydric, which means they are unlikely to support wetlands (see also **Section 4.3.2**).

Prime and unique farmlands are protected under the Farmland Protection Policy Act (FPPA) (Public Law [P.L.] 97-98, 7 United States Code [U.S.C.] 4201 et seq.). The FPPA applies to prime and unique farmlands and those that are of state and local importance. The FPPA establishes criteria for identifying and considering the effects of federal programs on the conversion of farmland to non-agricultural uses. None of the soils present within the project area are considered prime or unique farmland soils per the USDA, Natural Resources Conservation Service (NRCS) Web Soil Survey (2013).

Topography in the project area is depicted in **Appendix B-2**. Elevations in the project vicinity range from 740 to 1040 feet. Elevations within the proposed treatment units generally do not change significantly since the proposed action would not be performed in areas with a slope of 30 percent or greater. Elevation changes of up to 100 feet are present within some of the proposed treatment units.

No Action Alternative

In the absence of a major wildfire near the project area, the no action alternative would have no effect on soils because no project-related disturbances would occur. However, a major wildfire would be more likely under the no action alternative, and soils within the burnt areas could be adversely affected. A wildfire could alter the cycling of nutrients; the physical and chemical properties of soils; and the temperature, moisture, and biotic characteristics of the existing soils. In the event of a major wildfire, more bedrock could be exposed to direct rainfall, which would increase the rate of erosion of the formation. These primary impacts from a wildfire can also result in decreased infiltration and increased runoff, which often causes increased erosion.

Affected Environment, Potential Impacts and Mitigation

Table 4.1. Soils

Parameters	Brackett-Rock outcrop complex (BID)	Brackett-Rock outcrop-Real complex (BoF)	Tarrant soils (TaD)	Tarrant- Rock outcrop complex (TdF)	Volente silty clay loam (VoD)	Tarrant and Speck soils (TcA)	Brackett soils and Urban Land
Depth	6 to 20 inches (in.) to paralithic bedrock	10 to 20 in. to paralithic bedrock	6 to 20 in. to paralithic bedrock	6 to 20 in. to paralithic bedrock	More than 80 inches	6 to 20 in. to paralithic bedrock	6 to 20 in. to paralithic bedrock
Drainage	Well drained	Well drained	Well drained	Well drained	Well drained	Well drained	Well drained
Permeability	Moderately low to moderately high (0.06 to 1.98 in. per hour [in/hr])	Moderately low to moderately high (0.06 to 1.98 in/hr)	Moderately low to moderately high (0.06 to 0.57 in/hr)	Moderately low to moderately high (0.06 to 0.57 in/hr)	Moderately high (0.2 to 0.57 in/hr)	Moderately low to moderately high (0.06 to 0.57 in. per hour [in/hr])	Moderately low to moderately high (0.06 to 1.98 in/hr)
Parent Material	Residuum weathered from limestone	Residuum weathered from limestone	Residuum weathered from limestone	Residuum weathered from limestone	Residuum weathered from limestone	Residuum weathered from limestone	Residuum weathered from limestone
Slope	1 to 12 percent slopes	8 to 30 percent slopes	5 to 18 percent slopes	18 to 50 percent slopes	1 to 8 percent slopes	0 to 2 percent slopes	12 to 30 percent slopes
Depth to Water Table	More than 80 in.	More than 80 in.	More than 80 in.	More than 80 in.	More than 80 in.	More than 80 in.	More than 80 in.
Hydic Soils	No	No	No	No	No	No	No

Proposed Action

The proposed action would not result in significant soil disturbance and is not expected to change the grade of the land surfaces present. The proposed fuel reduction activities would not result in significant soil removal or transport from the site through erosion; therefore, new bedrock would not be exposed. The proposed action would not remove stumps or rootballs of cut trees, and removal of debris and brush and tree limbing would not result in significant soil disturbance. Elevation changes within the proposed work areas are significant in some areas; however, the County would not conduct any hazardous fuels reduction on slopes greater than 30 percent. Because slopes in the work areas are not significant, erosion of soils would not be likely with the minor soil disturbance that would occur from the proposed activities. Whenever possible, mulched vegetative material would be spread on site up to 2 inches thick. The fire hazard reduction activities would also reduce the potential for the negative effects of a major wildfire on soils if a wildfire occurs. No adverse impacts on soils are anticipated under the proposed action.

Short term soil disturbance may occur from the use of mechanical equipment; however, measures such as the use of rubber tracks on machinery would be taken to reduce soil disturbance in the project area during vegetation removal and no adverse impacts on soils are anticipated. The proposed action would reduce the hazards associated with a major wildfire, potentially protecting more of the existing vegetation, which would also decrease the amount of mechanical weathering of the formation and protect aquifer recharge areas.

4.2.2 Air Quality

The Clean Air Act (CAA; 42 U.S.C. 7401 et seq.) provides the basis for regulating air emissions. Air quality control regions (AQCRs) have been created under the CAA. The U.S. Environmental Protection Agency (EPA) classifies air quality within each AQCR according to whether the concentrations of certain pollutants called criteria air pollutants exceed National Ambient Air Quality Standards (NAAQS).

The proposed project area in Travis County is in the Austin-Round Rock metropolitan area, which includes Travis, Williamson, Bastrop, Hays, and Caldwell counties. EPA designates this region as being in attainment of all NAAQS (EPA 2014).

No Action Alternative

In the absence of a major wildfire in the area, no impacts would occur under the no action alternative, as the current air quality conditions would not change. No work would be conducted that could affect air emissions. However, a major wildfire would be more likely under the no action alternative, and a major wildfire would cause substantial pollutant emissions.

Proposed Action

Air quality impacts associated with the proposed action would be localized and temporary; occurring over a period of approximately 3 years during implementation of the fuel reduction measures. During project implementation, the equipment to be used would include chainsaws or

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similar powered hand tools, wood chipper, an all-terrain vehicle, and trucks to haul equipment and debris. The equipment would burn hydrocarbon fuels.

Under the proposed action, the use of equipment to remove vegetation could result in low levels of particulate matter and vehicle exhaust emissions, such as hydrocarbons. Emissions would be temporary and localized, and only minor impacts on air quality in the project area would occur. To reduce emissions, labor crews would keep all vehicle and mechanical equipment running times to a minimum and ensure that all engines are properly maintained. Overall, the proposed project would not have a significant impact on air quality.

Post-project maintenance would be conducted as needed and would not have a significant impact on air quality. The proposed action has the potential for a long-term beneficial effect on air quality in the project area by reducing wildfire hazards and the potential for a major wildfire.

4.2.3 Climate Change

“Climate change” refers to changes in Earth’s climate caused by a general warming of the atmosphere. The primary cause of climate change is emissions of carbon dioxide and methane. The impact climate change may have on the proposed project area is uncertain and difficult to anticipate. Climate change is capable of affecting species distribution, temperature fluctuations, sea level dynamics, and weather patterns. Executive Order (EO) 13653 directs federal agencies to plan for and to prepare communities to be more resilient to the effects of climate change.

No Action Alternative

In the absence of a major wildfire, the no action alternative would have no effect on climate change, as current conditions would not change. A major wildfire would be more likely under the no action alternative, and large quantities of greenhouse gases could be released that could contribute to climate change. Climate change may result in more extended droughts in the project area and increase the risk of wildfire.

Proposed Action

Because of the relatively small scale of the proposed action, the contribution to climate change from project implementation would be minor. The proposed action would also reduce the potential emission of greenhouse gasses associated with a major wildfire. The proposed action is not anticipated to affect global climate change.

4.2.4 Visual Quality and Aesthetics

BCP is densely vegetated with trees and understory brush in some areas while other areas are less densely vegetated and have a partially or completely open canopy with grasses. The majority of the project area is dominated by Ashe juniper and live oak. The project area is adjacent to residential neighborhoods and roadways, and portions of the proposed work areas are visible to residents. To a limited extent, the project area is also visible to the public that visits the BCP and the Wild Basin Wilderness Preserve (WBWP), a distinct park within the BCP.

Figure 4.1, Figure 4.2, and Figure 4.3 illustrate existing visual conditions in the project area. **Figure 4.1** shows existing vegetation in the proposed project area. **Figure 4.2** shows existing

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vegetation along the BCP property boundary in the WUI. **Figure 4.3** shows the existing vegetation along the boundary between the project area and The Preserve at Laurel Mountain, an outdoor educational outreach area intended to teach students at the nearby Laurel Mountain Elementary School. **Figure 4.4** and **Figure 4.5** show an area adjacent to the Steiner Ranch development where a hazardous fuels reduction prescription similar to the proposed action is in progress on a portion of the BCP adjacent to residences.

No Action Alternative

In the absence of a major wildfire, under the no action alternative there would be no impact on visual quality and aesthetics as current conditions would not change. A major wildfire would be more likely under the no action alternative and would have negative visual effects immediately after the fire for both adjacent landowners and the public that visits the BCP.

Proposed Action

The proposed action would clear brush, understory trees, dead trees, and vegetative debris within the project area resulting in some changes to the visual aesthetics along the boundary of the BCP. Because the BCP is very large and densely vegetated, the overall visual quality and aesthetics along the boundary would not be impacted significantly by the proposed project. The proposed work areas are adjacent to developed areas that include structures and roads; therefore, the visual contrast between the developed areas and the treated areas would not be significant. The proposed work would open up some views from private property into the BCP that were previously obscured by vegetation in the foreground. Fuels reduction work along BCP boundaries adjacent to residences would not affect privacy screening in most cases because of the large size of the preserve and the limited public access on BCP. Some of the work areas within WBWP are located near and along the internal trail network. In these areas, the fuels reduction work may change the existing visual setting. Under the proposed action, wildfire hazards would be reduced, and the potential for significant visual alteration due to a major wildfire would also be reduced.

Figure 4.1. Existing Vegetation in the Proposed Project Area





Figure 4.2. View of Residence Adjacent to Project Area



Figure 4.3. The Preserve at Laurel Mountain Educational Outreach Area and Adjacent Project Area



Figure 4.4. Example of Fuels Reduction Adjacent to Steiner Ranch

Figure 4.5. Example of Fuels Reduction Adjacent to Steiner Ranch



4.3 Water Resources

This section provides an overview of the affected area and potential environmental effects of the no action and proposed action alternatives on water resources, including water quality, streams, wetlands, and floodplains.

4.3.1 Water Quality

The water quality effects analysis includes both surface water and groundwater resources.

4.3.1.1 Surface Water

Sections 303(d) and 305(b) of the Clean Water Act (CWA) require all states to identify and characterize waters that do not meet, or are not expected to meet, water quality standards (U.S.C. 1313(d) and 1315(b)). The Texas Commission on Environmental Quality (TCEQ) is the regulatory agency responsible for compliance with water quality standards in Texas. The TCEQ's 2012 Integrated Report for CWA Sections 303(d) and 305(b) characterize the quality of Texas surface waters and identify those waters that do not meet water quality standards on the 303(d) list, an inventory of impaired waters (TCEQ 2014). Streams are classified by segment

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within their respective basin. An unclassified segment is one for which a designated use (e.g. drinking water source, recreation) has not been identified.

The project areas are located near several creeks and lakes, which may be temporarily affected by the proposed action. The nearby water bodies are: Lake Travis, Bee Creek, Bear Creek, Bull Creek, Lake Austin, and Turkey Creek. Three of these stream segments are listed on the 303(d) list: Lake Austin, from Quinlan Park upstream of Mansfield Dam, is listed for depressed dissolved oxygen; Bull Creek is listed for depressed dissolved oxygen; and Turkey Creek is listed for bacteria.

No Action Alternative

In the absence of a major wildfire in the proposed project area, the no action alternative would not have an adverse effect on surface water quality because inputs to receiving waters would not change. However, a major wildfire would be more likely under the no action alternative and could have substantial impacts on surface water quality. Reduced vegetation cover could lead to flooding, soil erosion and sedimentation, pollution from substances no longer filtered by riparian vegetation, and changes in water temperature.

A major wildfire may cause changes to the soil as discussed in **Section 4.2.1**, which could impact surface waters. Infiltration properties of soils may be altered when fire destroys vegetation cover within a watershed. These changes in vegetation and subsequently the soil often result in decreased infiltration, increased overland flow, and ultimately, increased stream flow discharges (USDA, Forest Service 2005).

Proposed Action

The proposed action could cause minor, localized, short-term adverse impacts to surface waters from potential erosion and sedimentation, but the effects are unlikely to be significant. Although the proposed action would be implemented over a period of about 3 years, the work at any one project segment would be completed within a few days to a few weeks. The proposed action would minimize ground disturbance by not removing the stumps of trees, but operation of heavy equipment during the work would disturb soils, which could increase erosion potential during heavy rains. BMPs would be implemented to minimize transport of sediment to nearby creeks and streams. Mulch created from cut vegetation would be used for temporary erosion control to prevent soil or sediment from reaching the waterways. Appropriate barriers would be used to prevent mulch from being washed into the creeks. With the implementation of these BMPs, the effect on water quality would not be significant. In addition, the proposed work would not introduce new impervious surfaces or activities that could affect surface water quality. Therefore, effects on water quality would not be significant.

4.3.1.2 Groundwater

The major aquifer underlying the proposed project area is the Edwards Aquifer, as shown on **Figure 4.6**. The Edwards Aquifer is a narrow belt extending through 13 Texas counties along the Interstate 35 corridor between Austin and San Antonio and consists primarily of partially dissolved limestone that is hydrologically connected to form a highly permeable aquifer. Water

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quality in the Edwards Aquifer is generally good and contains less than 500 milligrams per liter of total dissolved solids (TWDB 2014).

The Edwards Aquifer provides water supply for municipal, industrial, and agricultural uses and is the sole source of drinking water for over 1.7 million people in central Texas. The aquifer produces large volumes of water from highly permeable and porous honey-combed limestone, which allows for rapid recharge and discharge. The high permeability and porosity of the aquifer makes the aquifer vulnerable to contamination within the recharge zone. Pollutants on or near the surface can enter the aquifer directly with little natural filtering and once in the aquifer those pollutants can travel long distances in a relatively short period of time.

The sole source aquifer protection program is authorized by section 1424 of the Safe Drinking Water Act of 1974 (U.S.C. 300 et seq.). EPA defines a sole source aquifer as an aquifer that supplies at least 50 percent of the drinking water for the area overlying the aquifer. A portion of the Edwards Aquifer is designated as a sole source aquifer, and this designation requires all projects receiving federal funds to undergo a review to ensure they do not endanger the water source. The portion of the Edwards Aquifer that is designated a sole source aquifer does not underlie the project area (EPA 2008). Sole source aquifers in Texas are shown in **Appendix C-2**.

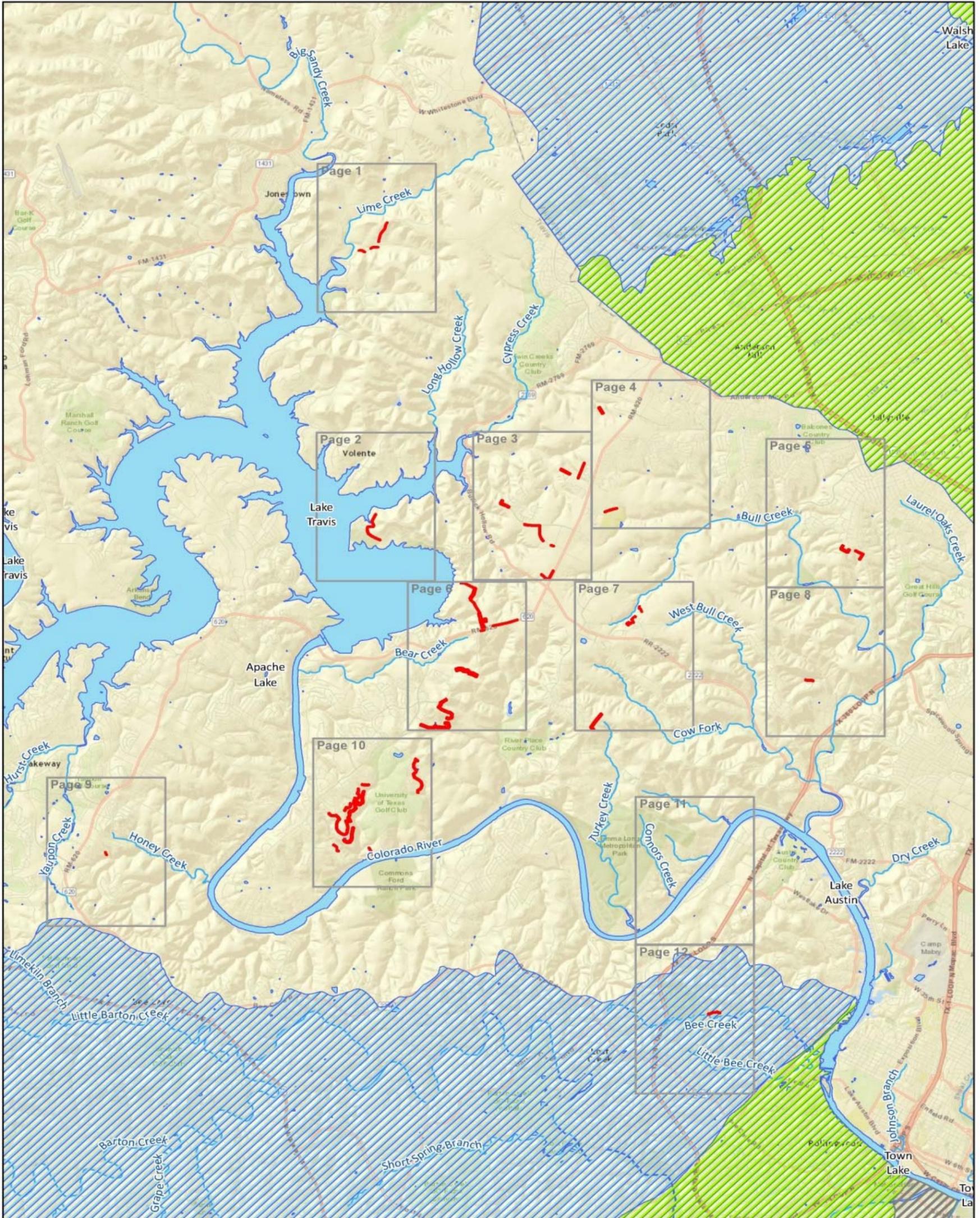
According to the TCEQ Edwards Aquifer Mapper, a portion of the proposed project area (the portion within WBWP) is located within the Edwards Aquifer Contributing Zone (**Figure 4.6**) (TCEQ 2007). TCEQ regulates activities within the Edwards Aquifer recharge, contributing, and transition zones via 30 TAC Chapter 213. Under the 30 TAC regulations, vegetation clearing that does not disturb the soil is not an activity that is regulated under the Edwards Aquifer rules.

No Action Alternative

In the absence of a major wildfire in the project area, the no action alternative would have no effect on groundwater quality, because current conditions would remain the same. However, a major wildfire would be more likely under the no action alternative and would cause changes to the soil as discussed in **Section 4.2.1**. These changes could impact groundwater because the infiltration properties of soils can be altered when fire destroys vegetation and litter cover within a watershed. These changes in the soil can result in decreased infiltration, increased overland flow, and ultimately decreased aquifer recharge (USDA, Forest Service 2005).

Proposed Action

The proposed action would reduce the risk of catastrophic wildfire and thus would reduce the risk of impacts to groundwater from a wildfire. The proposed action would not result in the placement of impervious surfaces nor would it affect the quality of the surface waters that infiltrate down to the aquifer. BMPs would be implemented to protect surface water quality; however, no impact on groundwater from stormwater runoff associated with the proposed action is anticipated. Therefore, there would be no impact on the Edwards aquifer from the proposed action.



Balcones Canyonlands Hazardous Fuels Reduction
 Travis County
 Page

Water Resources Overview

0 2.5 5 Miles

Legend

Project Areas	Edwards Aquifer Contributing Zone
Rivers	Edwards Aquifer Recharge Zone
Lakes	Edwards Aquifer Transition Zone

Data Sources: USGS NHD
 Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand).

4.3.2 Wetlands

EO 11990, Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. Activities that disturb jurisdictional wetlands require a permit from the U.S. Army Corps of Engineers under Section 404 of the CWA of 1977 (33 U.S.C. 1344).

FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands, sets forth the policy, procedures, and responsibilities to implement and enforce EO 11990 and prohibits FEMA from funding construction in a wetland unless no practicable alternatives are available. To comply with EO 11990, FEMA uses the eight-step decision-making process in 44 CFR 9.6 to evaluate proposed actions that have potential to affect a wetland.

The USFWS National Wetlands Inventory (NWI) maps for the project area indicate that there are multiple freshwater ponds within the project vicinity (see **Appendix C-4** for project area wetland maps) (USFWS 2014a). NWI data shows one pond is inside a portion of the project area (see Sheet 10 of the map series in **Appendix C-4**); however, a site visit did not identify any wetland at that site. Although wetlands are present near the project areas, the actual work areas are more than 100 feet from any wetlands.

No Action Alternative

In the absence of a major wildfire in the BCP, the no action alternative would have no effect on wetlands because existing conditions would not change. However, a major wildfire would be more likely under the no action alternative and could result in the destruction of vegetation in wetlands beyond the project area. Vegetation destruction in wetlands would damage habitat for wildlife and lessen the effectiveness of wetlands to filter pollutants and maintain water quality. However, there are no wetlands within the project area; therefore, the potential for wetland impacts would be minor.

Proposed Action

The proposed action would not occur in or near wetland areas. Moreover, BMPs intended to protect surface water quality would prevent impacts on nearby wetlands if they turn out to be present. Long-term project maintenance also would have no impact on wetlands. The proposed project would have no effect on wetlands; thus, FEMA is not required to conduct an eight-step decision making process.

4.3.3 Floodplains

EO 11988, Floodplain Management, requires federal agencies to take actions to minimize occupancy of and modifications to floodplains. FEMA regulations in 44 CFR Part 9, Floodplain Management and Protection of Wetlands, set forth the policy, procedures, and responsibilities to implement and enforce EO 11988 and prohibit FEMA from funding improvements in the 100-year floodplain unless no practicable alternative is available.

To satisfy the requirements of EO 11988, the Water Resources Council developed an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps reflect the decision-making process

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required in Section 2(a) of the EO and are reflected in FEMA regulations at 44 CFR 9.6. The first step is to determine if the proposed action is in the 100-year floodplain. As discussed below, the proposed action is partially located within a floodplain. The eight-step process is documented in **Appendix C-7**.

FEMA Flood Insurance Rate Maps (FIRMs) map floodplain areas and illustrate the extent of the 100-year floodplain within the project area. The FIRMs for the project area are listed in **Table 4.2**. The pertinent portions of the FIRMs are included in **Appendix C-5**.

Table 4.2. FEMA FIRM Panels in Project Area

FIRM Panel Number	Effective Date
48453C0210H	September 26, 2008
48453C0230H	September 26, 2008
48453C0220H	September 26, 2008
48453C0240H	September 26, 2008
48453C0245H	September 26, 2008
48453C0410H	September 26, 2008
48453C0430H	September 26, 2008
48453C0435H	September 26, 2008
48453C0440H	September 26, 2008

The floodplain figures in **Appendix C-6** depict the proposed work areas and extent of the floodplain within and near the project areas. Floodplains are present within three proposed project areas (see Sheets 8, 10, and 12 in **Appendix C-6**). In advance of initiating treatment, Travis County biologists would visit each site and mark any critical environmental feature or area that warrants special protection and exclusion from treatment.

No Action Alternative

In the absence of a major wildfire, the no action alternative would have no effect on floodplains because the current conditions would not change. However, a major wildfire would be more likely under the no action alternative, which could impact the floodplain. If a wildfire were to occur, vegetation and ground cover would be destroyed, which could lead to increased stormwater runoff following a rain event. The no action alternative has the potential to increase localized sedimentation and flooding.

Proposed Action

Portions of the proposed project area are within the 100-year floodplain. The proposed action would not place any structures or fill within the floodplain that would impede or redirect flood flows nor would it result in any excavation. No structures would be constructed and no significant soil disturbance would occur within floodplains. The proposed action would remove some vegetation, but the forested canopy would be retained, which would protect floodplain functions. Although, the proposed action would reduce hazards to homes adjacent to BCP, the

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project would not facilitate any development within the floodplain. No debris or mulch would be placed in the floodplain, which would prevent potential impacts to the floodplain.

For any work conducted in the floodplain, Travis County would be required to coordinate with the local floodplain administrator to obtain any required permits prior to initiating work. All coordination pertaining to these activities and application compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files. The full eight-step analysis is documented in **Appendix C-7**.

4.4 Biological Resources

This section provides an overview of the affected area and potential environmental effects of the no action and proposed action alternatives on vegetation, wildlife, and federally and state-listed species.

4.4.1 Vegetation

The project area is in the Edwards Plateau ecoregion according to the Gould Ecoregions of Texas, as recognized by Texas Parks and Wildlife Department (TPWD). The Edwards Plateau comprises an area of central Texas commonly known as the Texas Hill Country. It is a land of many springs, stony hills, and steep canyons. Elevations range from slightly less than 100 feet to over 3,000 feet above sea level (Texas A&M 2008). Generally covered by juniper-oak savanna and mesquite-oak savanna, it is a region of unique habitats.

Wildlife and habitat surveys conducted in the spring of 2014 (March 18 and 19 and April 1 to 3, 2014) and the summer of 2014 (August 25 to 28, 2014) determined that the project area is characterized primarily by dense juniper shrubland, juniper shrubland, and juniper oak woodland habitats. A total of eight distinct vegetation types were identified within the project area. These habitat types are depicted on aerial figures included in **Appendix D-3**.

- **Dense Juniper Shrubland** – This habitat is characterized by shrubland communities dominated by Ashe juniper (*Juniperus ashei*) shrubs. The tree canopy layer, represented by trees greater than 20 feet in height, consists of Ashe juniper and Texas live oak (*Quercus fusiformis*) and comprises less than 10 percent total cover. The shrub layer, represented by woody species less than 20 feet in height, consists of Ashe juniper, Texas live oak saplings, lotebush (*Ziziphus obtusifolia*), and argarita bush (*Mahonia trifoliolata*) and comprises approximately 70 to 100 percent total cover. The groundcover component comprises approximately 0 to 10 percent total cover within this habitat type and is dominated by Hall's panicum (*Panicum hallii*), tall grama (*Boutelous curtipendula*), little bluestem (*Schizachyrium scoparium*), rosettegrass (*Dichantheium dichotomum*), plains yucca (*Yucca campestris*), and red grama (*Bouteloua trifida*).
- **Juniper Shrubland** – This habitat is characterized by open grassy areas dominated by little bluestem, Hall's panicum, prickly pear cactus (*Opuntia engelmannii*), plains yucca, red grama, and tall grama with dense patches of Ashe juniper and flameleaf sumac (*Rhus copallinum*) shrubs. The shrub layer comprises approximately 40 to 70 percent total cover. There is no tree canopy layer present. The groundcover component comprises

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approximately 10 to 30 percent total cover within this habitat type and there is approximately 10 to 30 percent bare ground.

- **Juniper Oak Woodland** – This habitat consists predominately of Ashe juniper, Texas live oak, post oak (*Quercus stellata*), and few/sparse cedar elm (*Ulmus crassifolia*). The tree canopy averages 90 percent total cover. The shrub layer consists mostly of Ashe juniper saplings with less than 10 to 20 percent total cover. The herbaceous layer consists of prickly pear cactus, rosettegrass, Hall’s panicum, red grama, and common greenbriar (*Smilax rotundifolia*) averaging 10 percent total cover and there is 80 to 90 percent bare ground with a thick layer of leaf litter.
- **Mixed Woodland** – This habitat is characterized by a moderately dense canopy of both deciduous and evergreen trees, and moderately dense shrub and herbaceous layers. The tree canopy consists of Ashe juniper, Texas live oak, and cedar elm averaging 60 to 80 percent total cover. The shrub layer consists of shumard oak (*Quercus shumardii*) Texas persimmon (*Diospyros texana*), flameleaf sumac, skunkbush sumac (*Rhus trilobata*), and elbowbush (*Forestiera angustifolia*) with approximately 40 percent total cover. The herbaceous layer consists of American vetch (*Vicia americana*), Texas sacahuista (*Nolina texana*), wild garlic (*Allium* sp.), red grama, prickly pear cactus, yucca, poison ivy (*Toxicodendron radicans*), common greenbriar, and southern dewberry (*Rubus trivialis*) averaging 30 percent total cover.
- **Juniper Woodland** – This habitat is characterized by dense stands of Ashe juniper with sparse Texas live oak. The tree canopy averages 90 percent total cover and Texas live oak composes no more than 30 percent of the canopy. The shrub layer consists of Ashe juniper saplings and skunkbush sumac with approximately 10 percent total cover. The groundcover component is dominated by Hall’s panicum and poison ivy, and comprises approximately 5 percent total cover.
- **Mixed Shrubland** – This habitat is characterized by a moderately dense shrub community with open grassy areas dominated by red grama, prickly pear cactus, argarita, little bluestem, tall grama, American vetch, southern dewberry, dogfennel (*Eupatorium capillifolium*), and frogfruit (*Phyla* sp.). There is no tree canopy layer present. The shrub layer is dominated by Ashe juniper saplings, Texas live oak saplings, cedar elm saplings, shumard oak saplings, fireleaf sumac, elbowbush, and argarita and comprises approximately 70 percent total cover. The groundcover component comprises approximately 30 percent total cover within this habitat type.
- **Juniper Oak Shrubland** – This habitat consists predominately tree species that are less than 20 feet in height, and lacks a tree canopy layer. This habitat type is most often located on very steep rocky slopes. The shrub layer consisting of Ashe juniper, Texas live oak, and shumard oak saplings, fireleaf sumac, elbowbush, and evergreen sumac (*Rhus virens*) comprises 90 to 100 percent total cover. The herbaceous layer consists of yucca, prickly pear cactus, rosettegrass, and red grama, averaging 5 percent total cover with patches of bare ground present.

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- **Dense Short Juniper Shrubland** – This habitat is characterized as a shrubland community dominated by Ashe juniper shrubs and very sparse Texas live oak saplings, all less than 10 feet in height. There is no tree canopy layer present. The shrub layer comprises approximately 60 to 90 percent total cover. The groundcover component comprises approximately 0 to 10 percent total cover within this habitat type and is dominated by red grama, yucca, and prickly pear cactus.

There are no federally threatened or endangered plant species listed in Travis County; therefore, the proposed project would have no effect on listed plant species.

4.4.1.1 Invasive Species

EO 13112 requires federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause. The habitat survey did not note any invasive plant or animal species listed by the Texas Department of Agriculture within the project area.

No Action Alternative

In the absence of a major wildfire, the no action alternative would have no effect on vegetation, including invasive species, because the vegetation that is currently present would persist. However, a major wildfire would be more likely under the no action alternative and would result in partial or complete loss of vegetation. While fire is a natural component of the ecosystems near the project area, years of fire suppression have increased fuel density and likely would increase the extent and intensity of future wildfires in the area. In the event of a major wildfire, non-native and/or invasive species might be expected to become established over larger areas.

Proposed Action

The proposed action would affect a combined area of approximately 68 acres. Treated areas would range from approximately 30-100 feet in width. Fuel reduction would include trimming or removal of highly flammable dead and diseased vegetation, selective trimming of beneficial trees, and cutting of tree branches up to a height of 8 to 10 feet. The proposed action would not have a significant impact on vegetation communities although individual trees would be affected.

Since there are no listed threatened or endangered plant species in Travis County, the proposed action would not affect federally listed endangered plant species.

The proposed action could provide avenues for the establishment of invasive plant species through accidental introduction and the removal of native vegetation. However, because the proposed action would not alter the canopy layer significantly, it would not be expected to contribute to the spread of invasive plant species. Any invasive species encountered during the vegetation management work should be removed.

4.4.2 Common Wildlife Species

In addition to the listed species discussed below in **Section 4.4.3**, the proposed action has the potential to impact common wildlife species and their habitats. **Table 4.3** provides a list of

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species that were recorded during the habitat surveys conducted in the spring and summer of 2014.

Table 4.3. Common Wildlife Species Observed Within Project Area

Common Name	Scientific Name
Birds	
Bewick's wren	<i>Thryomanes bewickii</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
House finch	<i>Carpodacus mexicanus</i>
Mourning dove	<i>Zenaida macroura</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Western scrub jay	<i>Aphelocoma californica</i>
White-eyed vireo	<i>Vireo griseus</i>
Mammals	
Eastern cottontail	<i>Sylvilagus floridanus</i>
Northern raccoon	<i>Procyon lotor</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Reptile	
Six-lined racerunner	<i>Aspidoscelis sexlineata</i>

Common species observed during the field survey are typical of those found along the forest fringe and open grassland edges. The project areas are adjacent to residential neighborhoods, and the wildlife species present would be influenced by residential habitats and activities.

The dense juniper shrubland, juniper shrubland, juniper oak woodland, mixed woodland, juniper woodland, mixed shrubland, juniper oak shrubland, and dense short juniper shrubland habitats present likely would support additional species adapted to these areas, including bobcats, snakes, and wild turkeys. Although streams are located in and near some of the proposed project areas, work within streams is not proposed; therefore direct impacts to aquatic wildlife species would

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not be expected. BMPs will be implemented to prevent erosion and sedimentation to nearby or adjacent waters, which would further protect aquatic habitats.

The BCP provides habitat for a number of migratory bird species, which are protected by the Migratory Bird Treaty Act.

The red-imported fire ant (RIFA) is native to South America and has become a pest in the southern U.S. RIFA successfully competes against other ants and outcompetes species that karst invertebrates rely on for food. The significance of listed karst species, and the impact RIFA colonies may have on them, is explained in **Section 4.4.3**.

No Action Alternative

In the absence of a major wildfire, the no action alternative would have no effect on common wildlife species in the project area. However, a major wildfire would be more likely under the no action alternative and would result in the destruction of wildlife habitat.

Proposed Action

The birds, mammals, and reptiles observed within the project area and other species expected to be in the project area are species commonly found within and at the edges of forested areas and are well adapted to habitats that are influenced by human activities. Potential impacts would likely be temporary and have little effect on local populations.

The following mitigation measures will be required to reduce potential impacts on migratory birds and to avoid destruction of individuals, nests, or eggs. Travis County will conduct hazardous fuels reduction work only during the non-breeding season. Work is allowed from September 1 through February 28. Work cannot be conducted from March 1 through August 31. This restriction is primarily imposed to protect federally listed bird species, but will also serve to protect migratory birds.

In addition, Travis County will retain larger diameter (6 inches or greater in diameter) dead trees as snags whenever practical, at an average rate of 1 to 3 per acre while still achieving fuels reduction. Snags provide sheltering, nesting, roosting, and feeding habitat for cavity nesting and migratory bird species.

With implementation of mitigation measures to protect migratory birds, significant adverse impacts from the proposed action on the various songbird, mammal, and reptile species that potentially occur within the project area would not be expected.

4.4.3 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act of 1973 gives USFWS authority for the protection of threatened and endangered species. This protection includes a prohibition of direct take (e.g., killing, harassing) and indirect take (e.g., destruction of critical habitat). TPWD code prohibits take of state-listed threatened and endangered species.

The proposed project area is located in Travis County, Texas. Eleven species federally listed as endangered and one species federally listed as threatened are known to occur in Travis County.

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Ten additional species are state listed as threatened in Travis County by TPWD. Critical habitat in the project area has been designated for the Jollyville Plateau salamander. All federally listed species potentially found in Travis County are shown in **Table 4.4**, and the state-listed species are shown in **Table 4.5** (USFWS 2014b, TPWD 2014).

Table 4.4. Federally Listed Species for Travis County, Texas

Common Name	Scientific Name	Federal Status
Amphibians		
Austin blind salamander	<i>Eurycea waterlooensis</i>	Endangered
Barton Springs salamander	<i>Eurycea soscorum</i>	Endangered
Jollyville Plateau salamander	<i>Eurycea tonkawae</i>	Threatened
Arachnids		
Bee Creek Cave harvestman	<i>Texella reddelli</i>	Endangered
Bone Cave harvestman	<i>Texella reyesi</i>	Endangered
Tooth Cave pseudoscorpion	<i>Tartarocreagris texana</i>	Endangered
Tooth Cave spider	<i>Leptoneta (Neoleptoneta) myopica</i>	Endangered
Birds		
Black-capped vireo	<i>Vireo atricapilla</i>	Endangered
Golden-cheeked warbler	<i>Setophaga chrysoparia</i>	Endangered
Whooping crane	<i>Grus americana</i>	Endangered
Insects		
Kretschmarr Cave mold beetle	<i>Texamaurops reddelli</i>	Endangered
Tooth Cave ground beetle	<i>Rhadine persephone</i>	Endangered

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Table 4.5. State-Listed Species for Travis County, Texas

Common Name	Scientific Name	State Status
Mollusks		
False spike mussel	<i>Quadrula mitchelli</i>	Threatened
Smooth pimpleback	<i>Quadrula houstonensis</i>	Threatened
Texas fatmucket	<i>Lampsillis</i>	Threatened
Texas fawnsfoot	<i>Truncilla macrodon</i>	Threatened
Texas pimpleback	<i>Quadrula petrina</i>	Threatened
Amphibians		
Barton Springs salamander	<i>Eurycea sosorum</i>	Endangered
Reptiles		
Texas horned lizard	<i>Phrynosoma cornutum</i>	Threatened
Birds		
American peregrine falcon	<i>Falco peregrinus anatum</i>	Threatened
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Black-capped vireo	<i>Vireo atricapilla</i>	Endangered
Golden-cheeked warbler	<i>Setophaga chrysoparia</i>	Endangered
Interior least tern	<i>Sterna antillarum athalassos</i>	Endangered
Peregrine falcon	<i>Falco peregrinus</i>	Threatened
Whooping crane	<i>Grus Americana</i>	Endangered

The field survey conducted in the spring and summer of 2014 identified habitat types within the project area and also surveyed for karst or cave features near the project areas. In addition to documenting general wildlife observations and the dominant vegetation types present, the survey recorded listed species and their habitats (see **Appendix D-2**).

Suitable aquatic habitat for the Austin blind salamander, Barton Springs salamander, Whooping crane, or state-listed mollusks is not present. In addition, the closest habitat for the Bee Creek Cave harvestman ranges from approximately 1,500 feet to over 1 mile away from project areas (USFWS 1994). No suitable habitat is present within 500 feet of the project area for this federally listed species. Therefore, there would be no impact on these nine species. Although critical habitat has been designated for the Austin blind salamander and Whooping crane, there is no designated critical habitat within the project area for these species.

Of the remaining eight federally listed species in Travis County, five require cave habitats, including Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, Kretschmarr Cave mold beetle, and Tooth Cave ground beetle. All five of these species occur within 345 feet, and some within 100 feet, of some project segments (**Table 4.6**).

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Table 4.6. Cave Openings within 500 Feet of the Project Area.

Cave or Karst Feature	Listed Species Present?	Cave Opening within 350 feet	Cave Opening within 100 feet	Bee Creek Cave Harvestman <i>Texella reddelli</i>	Tooth Cave Ground Beetle <i>Rhadine Persephone</i>	Tooth Cave pseudoscorpion <i>Tartarocreagris texana</i>	Tooth Cave Spider <i>Neoleptoneta myopica</i>	Kretschmarr Cave Mold Beetle <i>Texamaurops reddelli</i>	Bone Cave Harvestman <i>Texella reyesi</i>
Amber Cave	Y	Y	Y		Present	Present		Present	
LU11	Y	Y	N				Present		
LU12	Y	Y	N						Present
Geode Cave	Y	Y	Y		Present		Present		Present
Kretschmarr Cave	Y	Y	Y		Present			Present	
Kretschmarr Dbl Pit Cave	Y	Y	N		Present	Present			
New Comanche Trail Cave	Y	Y	N				Present		Present
Tardus Hole Cave	Y	Y	Y		Present			Present	
Tooth Cave	Y	Y	N		Present	Present	Present	Present	Present

Five karst or cave features within or in the vicinity of the project areas were visited during the field surveys. It is not possible to link these karst features with the named caves identified in **Table 4.6** because location information for the caves listed in the table was not made available to FEMA. Per the USFWS protocol, biologists did not enter, excavate, or investigate the interior of the karst or cave features identified during the field survey.

4.4.3.1 Karst Invertebrates

There are 9 caves within 500 feet of the project area known to be occupied by karst fauna (**Table 4.6**). Caves host both troglobites which are obligate cave-dwelling organisms and troglaxens which are species that live partly in caves and partly outside of caves. Troglobites have developed adaptations for living in caves, including loss of pigment, loss of sclerotization (hardening of exoskeletons), reduction or loss of eyes, elongation of appendages, lengthened lifespan, modified fecundity and metabolic adaptation to nutrient-poor habitat conditions.

Karst fauna are vulnerable to the impacts of development due to their dependency on the specific environmental conditions present in caves. Natural processes of erosion gradually remove calcium and surface nutrients are carried by troglaxens into caves and alter the nutrient balance. Human activities may also affect cave environments by altering erosional patterns or surface nutrient availability (USFWS 1994).

Bone Cave Harvestman

The Bone Cave harvestman, endangered, is restricted to Travis and Williamson Counties, and is also a troglobitic species that requires deep cave habitats. Because this species does not leave the deep cave environment, it is dependent in part on energy inputs from species that do move in and out of the cave environment such as cave crickets (Taylor et al. 2005). At least four Bone Cave harvestman occupied caves are within 345 feet of the proposed work areas and one is within 100 feet (**Table 4.6**).

Tooth Cave Pseudoscorpion

The Tooth Cave pseudoscorpion, endangered, is an inhabitant of small limestone caves (TPWD 2014). Little is known about this species other than that it is an eyeless troglobite, found under rocks, and is a predator of microarthropods (USFWS 1994). At least 3 Tooth Cave pseudoscorpion occupied caves are within 345 feet of the proposed work areas and one is within 100 feet (**Table 4.6**).

Tooth Cave Spider

The Tooth Cave spider, endangered, is a cave obligate species. It is a troglobitic species that lives in subterranean habitats. This spider is a very small, sedentary, aerial spider that hangs from a small tangle or sheet web (TPWD 2003, TPWD 2014). At least 4 Tooth Cave spider occupied caves are within 345 feet of the proposed work areas and one is within 100 feet (**Table 4.6**).

Kretschmarr Cave Mold Beetle

The Kretschmarr Cave mold beetle, endangered, is a small mold beetle found under rocks and logs, in rotting wood, moss, ant and termite nests, and caves (USFWS 1994, TPWD 2014). This mold beetle is found in total darkness under and among rocks and organic debris or buried in silt (TPWD 2003). At least 4 Kretschmarr Cave mold beetle occupied caves are within 345 feet of the proposed work areas and three are within 100 feet (**Table 4.6**).

Tooth Cave Ground Beetle

The Tooth Cave ground beetle, endangered, is a cave obligate species. It is a troglobitic species that lives in subterranean habitats. This beetle is the largest, most visible, and most active of the endangered karst species. It is usually found under rocks, but has been seen walking on damp rocks and silt when conditions are favorable. Tooth Cave ground beetles run rapidly as they search for prey (TPWD 2003). At least six Tooth Cave ground beetle occupied caves are within 345 feet of the proposed work areas and four are within 100 feet (**Table 4.6**).

4.4.3.2 Birds

Golden-cheeked Warbler

The Golden-cheeked warbler, endangered, requires juniper-oak woodland habitat, with mature Ashe junipers in particular, for the long fine bark that is used for nesting material. Mature junipers are trees that are at least 15 feet high and about 5 inches in diameter at 4 feet above the ground. Preferred warbler habitat generally has a canopy closure of 50 to 100 percent. Nests may be constructed in trees other than the Ashe juniper. Broad-leaved trees and shrubs are required to provide insects for foraging. Nesting occurs between March and early summer (USFWS 2013a, USFWS 2013b). There is no designated critical habitat for the Golden-cheeked warbler.

In the project area, juniper woodland, mixed woodland, and juniper oak shrubland habitats were noted during the habitat field surveys. These vegetation types may provide potential nesting and foraging habitat (vegetation communities are described in **Section 3**). Mature juniper trees with sloughing bark for nesting material were found through the proposed project area. The existing tree age and height profile (*i.e.*, approximately 15 to 20 feet average canopy height) meets the Golden-cheeked warbler requirements for nesting and foraging habitat. Mapped Golden-cheeked warbler habitat exists within the proposed action project area.

Two Golden-cheeked warblers were observed within the dense juniper shrubland and one was observed within the juniper oak woodland habitat type. The three observations occurred during the spring 2014 habitat survey (*i.e.*, March 18 to 19 and April 1 to 3, 2014) and were of male birds calling, likely within a breeding territory. No observations of the species were made during the summer 2014 (*i.e.*, August 25 to 28, 2014) habitat survey. The locations where Golden-cheeked warblers were observed within dense juniper shrubland are no longer included in the current project area; however, similar habitat was observed within the current project area. The location where a Golden-cheeked warbler was observed within the juniper oak woodland habitat is included in the current project area. Observations are noted on the figures in **Appendix D-3**.

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Black-Capped vireo

The Black-capped vireo, endangered, requires oak-juniper woodlands with a two-layer shrub and tree structure. Woody foliage reaching the ground is used for nesting cover and deciduous or broad-leafed shrubs provide insects for successful foraging. These vireos require some open grassy areas and a canopy that is too closed may not allow for the development of the patchy, low shrub cover that provides suitable nesting habitat. Good nesting habitat generally has between 30 to 60 percent shrub canopy (USFWS 2013a). Nesting occurs between March and late summer.

Within the action area, potential nesting and foraging habitat exists in the juniper shrubland, mixed woodland, mixed shrubland, and juniper oak shrubland habitats. The quality of the habitat may be reduced in the juniper shrubland habitat due to decreased diversity within the shrub layer and reduced opportunities for foraging (USFWS 2013a). A distinct two layer shrub and tree structure is present in the mixed woodland habitat type, providing adequate nesting and foraging opportunities. There were no observations of Black-capped vireos within the project survey area during the spring or summer habitat surveys.

Mapped Black-capped vireo habitat is in close proximity to some of the project areas and within one project area (*i.e.*, just northeast of Steiner Ranch Boulevard). The habitat quality in these areas for Black-capped vireo is not optimal. There is no designated critical habitat for the Black-capped vireo (USFWS 2013a).

Bald Eagle

The Bald eagle has been delisted by the USFWS; however, this species is protected by the Bald and Golden Eagle Protection Act and may occur in Travis County. No potential nesting or foraging habitat for Bald eagle was identified during the field survey of the project area. Bald eagles nest from October through July; therefore, the nesting season is difficult to avoid. Since Bald eagle nests are large and readily identifiable, trees containing nests can be avoided easily.

4.4.3.3 Other Federally Listed Species and Critical Habitats Potentially Impacted

Jollyville Plateau Salamander and Critical Habitat

The Jollyville Plateau salamander, threatened, is a neotenic salamander (*i.e.*, does not transform into a terrestrial form) and is mostly restricted to subterranean cavities of the Edwards Aquifer. As neotenic salamanders, they have external gills and inhabit springs, spring-runs, and wet cave aquatic habitats throughout their lives. Jollyville Plateau salamanders are found only in the Jollyville Plateau and Brushy Creek areas of the Edwards Plateau in Travis and Williamson counties (USFWS 2014c). Several caves in Travis County are known to contain Jollyville Plateau salamanders, including several in the action area. The salamanders are dependent on stable groundwater and surface water quantities and high water quality.

Jollyville Plateau Salamander Critical Habitat: Designated critical habitat for the species includes spring outlets and outflow up to the high water line on surface waters and 262 feet of upstream and downstream habitat but does not include manmade structures. In the proposed project area, designated critical habitat is surface and subterranean habitat associated with suitable caves. Designated critical habitat is present in and near several of the proposed project areas.

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Designated critical habitat units for the Jollyville Plateau salamander in and near the action area include the Kretschmarr Unit 14 (68 acres), Fern Gully Spring Unit 16 (68 acres), Bull Creek 1 Unit 17 (1,198 acres), Bull Creek 2 Unit 18 (237 acres), Bull Creek 3 Unit 19 (97 acres), and Long Hog Hollow Unit 24 (68 acres). Kretschmarr Unit 14 is on private and Travis County lands. Some of the unit is owned and managed by Travis County as part of the BCP. The Fern Gully Spring Unit 16 is on private and City of Austin land. Most of the southern half of the unit is undeveloped land managed by the City of Austin as part of the BCP Habitat Conservation Plan (HCP). Bull Creek 1 Unit 17 consists of private, City of Austin, and Travis County land, with much of the land managed as part of the BCP HCP. Bull Creek 2 Unit 18 also is made up of private, City of Austin, and Travis County land. Concordia University is located in the central and eastern parts of the unit with the remainder located under the management of the BCP HCP. Bull Creek 3 Unit 19 is made up of private and City of Austin land. Long Hog Hollow Unit 24 consists entirely of private land (USFWS 2013c, USFWS 2013d, and USFWS 2012a).

In the final rulemaking for the “Designation of Critical Habitat for the Austin Blind and Jollyville Plateau Salamanders” (USFWS 2013c), USFWS identified primary constituent elements (PCEs) for the Jollyville Plateau salamander. PCEs are those specific elements of the physical or biological features that provide for a species’ life-history processes and are essential to the conservation of the species. The PCEs for the Jollyville Plateau salamander include the following elements:

- Surface Habitat:
 - Water from Trinity, Northern Edwards, and local alluvial aquifers
 - Rocky substrate with interstitial spaces
 - Aquatic invertebrates for food
 - Access to subterranean aquifer
- Subsurface Habitat:
 - Water from Trinity, Northern Edwards, and local alluvial aquifers
 - Subsurface spaces
 - Aquatic invertebrates for food

State Listed Species

The Texas horned lizard, which is a state-listed threatened species, has the potential to occur within the project area since suitable habitat is present. No horned lizards were observed during the site visit. Consultation with TPWD concerning state-listed species would be the responsibility of the sub-applicant.

No Action Alternative

In the absence of a major wildfire, the no action alternative would have no effect on federally threatened or endangered species because existing conditions would continue unchanged.

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However, a major wildfire would be more likely to spread under the no action alternative and would damage existing and potential habitats for karst species, Black-capped vireo, Golden-cheeked warbler, Jollyville Plateau salamander, and state-listed species.

Proposed Action

The proposed action includes a variety of vegetation modification activities, which may occur within habitat for federally protected species and cave habitats. The proposed action may directly alter habitats through vegetation trimming and removal, or indirectly through changes in surface habitats within 345 feet of occupied caves.

Karst Invertebrates

Several caves in and near the project area are known to be occupied by endangered karst fauna as shown in **Table 4.6**. The vegetation within 345 feet of a cave entrance may be used by foraging cave crickets, a main source of nutrient inputs into cave ecosystems (USFWS 2012b).

The proposed work would not remove stumps of cut trees, which would avoid a potential major source of ground disturbance. Operation of heavy equipment during implementation of the proposed action could disturb ground surfaces, which would increase erosion potential during heavy rains. The proposed work could cause temporary minor adverse impacts to nearby surface waters from potential erosion and sedimentation.

There would be no physical disturbance of subterranean habitats. The proposed work would not alter drainage patterns, which would avoid any disturbance of springs or existing conditions that may direct moisture to cave environments. The proposed action also would not significantly alter the canopy cover, which would preserve the existing condition with respect to evapotranspiration from the vegetation and the soils. Therefore, existing temperature and humidity regimes around karst features would not be altered.

The proposed action would maintain natural vegetation within the project area and would help to reduce the hazards associated with a major wildfire, including the potential loss of all surface vegetation. Because the proposed action would maintain natural vegetative cover on the surface, the ability of cave crickets to continue to forage in their usual manner should not be affected. The proposed action has the potential to create conditions that might be more favorable for the invasive RIFA to come into areas near caves and adversely impact karst species.

The following measures would avoid and minimize potential adverse effects on karst species:

- Deposition or accumulation of soil, trash, ashes, refuse, waste, bio-solids, or any other materials at the project site as a result of the proposed action is prohibited. Vegetative debris must be removed from the project site or mulched and spread on-site. Appropriate measures (such as adequate setbacks or a silt fence) will be used to prevent mulch from washing into cave openings. Mulch will not be placed within 262 feet from occupied cave openings. This will exclude 92 percent of the area associated with cricket foraging activity from mulch placement. Any mulch placed between 262 feet and 345 feet from occupied cave openings will be thin enough to allow for herbaceous growth.

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- Equipment staging, refueling, and storage of gasoline must occur more than 500 feet from the entrance of any occupied cave.
- Travis County will employ a “no treatment zone” within 100 feet of the openings of occupied caves (Amber Cave, Geode Cave, Kretschmarr Cave, and Tardus Hole Cave; see **Table 4.6**). The 100 foot buffer area must be well marked for work crews prior to the commencement of work by flagging/taping and these materials must be promptly removed once work is complete.
 - Travis County staff will be present to supervise workers during the time that work is being implemented within 345 feet of any karst feature containing species of concern. When not within this distance, staff will provide supervision as needed. The 345 foot and 500 foot buffer distances will be clearly marked in the field with colored ribbon.
- Travis County must implement boiling water treatments on RIFA colonies following the first rain of the first spring after project implementation. Boiling water treatments are required within treated areas within 345 feet of the openings of occupied caves (Amber Cave, LU11, LU12, Geode Cave, Kretschmarr Cave, Kretschmarr Double Pit Cave, New Comanche Trail Cave, Tardus Hole Cave, and Tooth Cave; see **Table 4.6**). Boiling water treatments are most effective during early to mid-morning when the queen(s) and larvae are likely to be near the top of the mound. Mounds should not be disturbed before treatment as this causes the ants to move the queen(s) and larvae to deeper locations within the mound or to a remote location.
- As part of the maintenance program, Travis County will conduct RIFA eradication efforts twice annually, during the spring and fall within treated areas that are within 345 feet of the openings of occupied caves. This should include a regimen of two or more treatments per month. If some time has passed since the initial RIFA invasion, the control regimens can be decreased to one or fewer times per month, provided that RIFA mounds have decreased. Once RIFA levels are below the thresholds outlined in “Karst Preserve Management and Monitoring Recommendations” (USFWS 2014d), RIFA control can occur twice annually. Treated areas mowed during maintenance efforts must be mowed to a height of 6 inches or higher.
- Travis County must ensure that best management practices (BMPs) are implemented to prevent erosion and sedimentation to nearby or adjacent waters. This includes equipment storage and staging practices to minimize erosion and sedimentation.

To ensure the project is implemented properly and that staff working within the preserve area are aware of issues related to threatened and endangered species, Travis County will coordinate with work crews prior to the start of work and throughout project implementation. Travis County will host a preconstruction coordination meeting with work crews to go over the project implementation plan, including avoidance and minimization measures intended to protect species. These measures are described in detail below. Travis County will provide a project manager that will oversee implementation of the project and ensure compliance with the avoidance and minimization measures. Furthermore, Travis County will clearly identify all

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buffer zones relevant for project implementation with colored flags or tape prior to work beginning. The buffer zones that will be marked include:

- 100 feet from cave openings (no treatment zone);
- 262 feet to 345 feet (mulch can be placed thin enough to allow for herbaceous growth);
- 345 feet from cave openings (hot water treatments for control of RIFA must be conducted); and
- 500 feet from cave openings (no refueling, equipment staging, or storage of fuels may occur in this area).

The flags or tape marking the buffer zones will be promptly removed when work is complete.

Although avoidance and minimization measures have been incorporated into the scope of work to reduce adverse impacts of RIFA on the prey base of these species (*i.e.*, cave crickets), incidental take may still occur as a result of the proposed action; therefore, FEMA has determined that the proposed action “may affect and is likely to adversely affect” the Bone Cave harvestman, Tooth Cave ground beetle, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle.

Jollyville Plateau Salamander and Critical Habitat

The Jollyville Plateau salamander likely occurs within the action area. Activities that could affect the salamander would be actions that could (1) physically disturb spring or subsurface habitats, (2) increase concentrations of sediment or contaminants in surface or subsurface habitats, or (3) deplete the aquifer to an extent that it decreases or stops the flow of occupied springs or reduces the quantity of subterranean habitat used by the salamander (USFWS 2013d). In addition, maintaining suitable foraging habitat for cave crickets within 345 feet of caves and karst features may be important to supply energy inputs into the cave environments.

The proposed action is “not likely to adversely affect” the Jollyville Plateau salamander due to the lack of: 1) disturbance to springs and subsurface habitats, 2) changes in water quality or quantity, or 3) changes in surface vegetation that may affect foraging conditions for either the salamander or cave crickets. The proposed action also would “not adversely modify” designated critical habitat for the Jollyville Plateau salamander because it would not (1) physically disturb spring or subsurface habitats, (2) permanently increase concentrations of sediment or contaminants in surface or subsurface habitats, nor (3) deplete the aquifer to an extent that the flow of occupied springs or subterranean habitat would be reduced.

Birds

Habitat for both the Black-capped vireo and Golden-cheeked warbler exists within the project area although the existing habitat quality for Black-capped vireo is poor. Vegetation management activities would be conducted between September 1 and February 28 to avoid any direct impacts to nesting birds. Direct effects to individual Golden-cheeked warblers or Black-capped vireos are not anticipated because the proposed action would take place outside of breeding and nesting season. These species migrate south to Mexico in July and August. The

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warblers return to Texas in late February, with most arriving in mid-March and the vireos arrive in mid-March to mid-April (USFWS 2007).

The proposed action “may affect and is likely to adversely affect” the Black-capped vireo. Although the habitat quality is not optimal, there is mapped habitat within one project area where fuels reduction work is proposed. Throughout most of the project area, potential effects would be avoided and minimized due to 1) the sub-optimal habitat quality and limited amount of preferred habitat, 2) the timing of the work, which would occur when the birds are not present, and 3) the vireo is not known to occur in most of the project area.

Critical habitat for the Golden-cheeked warbler exists within the project area and warblers have been observed in the vicinity of the proposed project area. Vegetation management activities will be conducted between September 1 and February 28, which is outside of breeding season to avoid direct impacts to nesting birds. The proposed action is consistent with USFWS BMPs for treating vegetation that may pose a wildfire hazard in Golden-cheeked warbler habitat and various karst species habitat (USFWS 2013c; USFWS 2014d). By following the BMPs developed by USFWS, Travis County will minimize potential effects to federally protected species and their habitat. Vegetation treatments that are consistent with the BMPs may result in habitat conditions over the long-term that are more favorable to these species. In addition, Travis County has removed some project segments from the treatment plan where Golden-cheeked warblers were observed during the spring 2014 field surveys.

FEMA has determined the proposed action “may affect and is likely to adversely affect” the Golden-cheeked warbler. USFWS concurred with FEMA’s determination in a Biological Opinion dated May 14, 2015 (Appendix F) Adverse effects will be avoided by working outside of the breeding season when birds are not present and will be minimized by conducting the work consistent with USFWS recommendations and BMPs for treating vegetation that may pose a wildfire hazard in Golden-cheeked warbler habitat (USFWS 2013b).

The wildlife and habitat surveys did not identify any potential Bald eagle nesting habitat within the project area. Therefore, the proposed action is unlikely to adversely impact Bald eagles. If the project activities occur adjacent to any occupied or unoccupied Bald or Golden eagle nest, the applicant must contact FEMA and consult with USFWS before work begins.

4.5 Cultural Resources

This section provides an overview of the affected area and potential environmental effects from the no action and proposed action alternatives on cultural resources, including historic structures and archeological resources.

The National Historic Preservation Act of 1966 (NHPA; 16 U.S.C. 470 et seq.) is the primary federal law protecting historic properties and promoting historic preservation in cooperation with states, tribal governments, local governments, and other consulting parties. The NHPA established the National Register of Historic Places (NRHP) and designated the State Historic Preservation Office (SHPO) as the entity responsible for administering state-level programs. The NHPA also created the Advisory Council on Historic Preservation, the federal agency responsible for overseeing the process described in Section 106 of the NHPA (16 U.S.C. §470f)

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and for providing commentary on federal activities, programs, and policies that affect historic properties.

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

To assess the potential for intact, significant cultural resources within the APE of the proposed action, an archival review of the proposed undertaking was conducted.

Cultural resources consist of locations of human activity, occupation, or use identified through field inventory, historic documentation, or oral evidence. The term includes archaeological, historic, and architectural properties and sites or places of traditional cultural or religious importance to Native American tribes or other social or cultural groups. Areas that have been previously surveyed for cultural resources are shown on the figures **Appendix E-1**.

4.5.1 Historic Architectural Properties

Archival research conducted via the Texas Historical Commission's (THC's) Texas Archeological Sites Atlas (Atlas) web site indicated that no previously recorded historic architectural properties or NRHP properties or districts have been identified within or in the immediate vicinity of the APE. The closest NRHP property or district is the Moonlight Towers located approximately 1.1 miles southwest of Treatment Units 79, 80, and 81 (see **Appendix A-2** for treatment unit key maps).

4.5.2 Archaeological Sites

The majority of the treatment units have not been previously surveyed for archaeological sites. However a few have been either partially or fully surveyed. Treatment Unit 6 was partially surveyed by Prewitt and Kotter (1980). Treatment Unit 16 was partially surveyed by Ellis et al. (2009). Treatment Unit 22 was partially surveyed by Benment (1988). Treatment Unit 30 has been fully examined for cultural resources by Farabough and Nash (2006) and by Owens (2009). Treatment Unit 31 has been fully surveyed by Howard and Freeman (1984). Treatment Unit 32 has been completely surveyed by an unknown author (1985). Treatment Unit 36 was partially surveyed by Owens (2009). Treatment Unit 39 has been partially surveyed by an unknown author (1985). Treatment Unit 43 has been completely surveyed by Henderson (2006). Treatment

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Area 58 has been partially surveyed by Brownlow (2006). Treatment Unit 82 has been partially surveyed by SDHP (1976) and by Godwin et al. (1998). Treatment Unit 84 has been partially surveyed by Godwin et al. (1998). Treatment Unit 86 has been partially surveyed by Robinson (1986).

There are four known archaeological sites that fall within the Treatment Units. Site 41TV117 is within Treatment Unit 20. Its NRHP eligibility status is unknown. Site 41TV769 is within Treatment Unit 31. It is not eligible for the NRHP. Site 41TV1896 is within Treatment Unit 33. It is not eligible for the NRHP. And site 41TV2002 is within Treatment Unit 78. It is not eligible for the NRHP.

4.5.3 Native American Cultural/Religious Sites

No registered American Indian, Native Hawaiian, or Native Alaskan cultural or religious sites are on or near the proposed project site (National Conference of State Legislatures 2014).

No Action Alternative

Under the no action alternative, no hazardous fuel reduction measures would occur; therefore, this alternative would result in no effect on cultural resources, including archeological sites and historic properties.

Proposed Action

The proposed action was coordinated with the SHPO, and pertinent correspondence is included in **Appendix F**. In a letter dated August 1, 2012, a determination of “no historic properties affected; project may proceed” was provided.

There are two archaeological sites near to but outside the project area. Neither of these sites would be adversely affected by the proposed undertaking. There are no historical structures within the project area or in the areas immediately surrounding the project areas. Based on archival research, building construction dates, and correspondence with the SHPO, FEMA has made the determination that the proposed action would have no impact on cultural resources.

In the event that archeological deposits, including any Native American pottery, stone tools, bones, or human remains are uncovered, the project must be halted immediately in the vicinity of the discovery, and all reasonable measures must be taken to avoid or minimize harm to the discovered items. The subapplicant must secure all archeological findings and restrict access to the sensitive area. The subapplicant must inform FEMA immediately, and FEMA will consult with the SHPO. Work in sensitive areas must not resume until consultation is completed and until FEMA determines that appropriate measures have been taken to ensure compliance with the NHPA and its implementing regulations.

4.6 Socioeconomics

This section provides an overview of the affected area and potential environmental effects of the no action and proposed action alternatives on socioeconomic resources, including environmental justice, hazardous materials, noise, traffic, public services and utilities, and human health and safety resources.

4.6.1 Environmental Justice

Environmental justice is defined by EO 12898 (59 *Federal Register* 7629) and CEQ guidance (1997). Under EO 12898, demographic information is used to determine whether minority populations or low-income populations are present in the areas potentially affected by the range of project alternatives. If so, a determination must be made whether implementation of the project alternatives may cause disproportionately high and adverse human health or environmental impacts on those populations.

This environmental justice analysis is focused at the local (*i.e.*, census tract) level. The local area included in this analysis is where project-related impacts would occur, potentially causing an adverse and disproportionately high effect on neighboring minority and low-income populations. For this project, the analysis includes census tracts 17.14, 17.16, 17.42, 17.55, 17.60, 17.61, 17.65, and 19.13 in Travis County, which include the project area and adjacent residential areas. **Table 4.7** and **Table 4.8** provide economic and demographic characteristics for these census tracts (U.S. Census Bureau 2011). Information for Travis County as a whole is presented for comparison.

Low-Income Populations

Residents of areas with a high percentage of people living below the poverty level may be considered low-income populations. The U.S. Census Bureau poverty threshold for a family of four (two adults and two children) in 2012 was \$23,681 and \$11,945 for an individual (U.S. Census Bureau 2014a). Low-income populations are also considered to include residents of areas where the median family income is less than 60 percent of the median income of the surrounding area. This analysis also considered whether the project area's median household and per capita incomes were substantially lower than the county's average.

As shown in **Table 4.7**, the census tracts in the project area have median household and family incomes higher than Travis County as a whole. All census tracts included in the analysis have a poverty level below that of the county (U.S. Census Bureau 2011). Based on the criteria identified above, the census tracts within the project area are not considered a low-income population.

Table 4.7. Income

Parameter	Census Tract 17.14	Census Tract 17.16	Census Tract 17.42	Census Tract 17.55	Census Tract 17.60	Census Tract 17.61	Census Tract 17.65	Census Tract 19.13	Travis County
Percentage of population below poverty level	6.1%	2.3%	14.9%	2.3%	3.2%	5.3%	6.3%	2.9%	17.4%
Median household income	\$79,223	\$111,950	\$73,068	\$163,451	\$125,997	\$126,476	\$105,033	\$209,479	\$56,403
Median family income	\$124,609	\$167,720	\$77,458	\$193,098	\$138,973	\$176,951	\$126,250	\$242,629	\$72,131

Table 4.8. Minority Populations

Parameter	Census Tract 17.14		Census Tract 17.16		Census Tract 17.42		Census Tract 17.55		Census Tract 17.60		Census Tract 17.61		Census Tract 17.65		Census Tract 19.13		Travis County	
	Count	%	Count	%														
White	8,973	76.2%	4,421	92.4%	5,067	84.8%	3,725	63.9%	12,282	81.5%	5,932	87.0%	11,441	87.5%	4,435	90.3%	746,424	72.1%
Black or African American	458	3.9%	0	0%	0	0.0%	21	0.4%	273	1.8%	0	0%	375	2.9%	0	0.0%	87,799	8.5%
Asian	1,604	13.6%	198	4.1%	243	4.1%	1,814	31.1%	1,653	11.0%	478	7.0%	755	5.8%	415	8.5%	60,637	5.9%
American Indian	75	0.6%	0	0.0%	24	0.4%	18	0.3%	76	0.5%	0	0%	0	0.0%	0	0.0%	5,972	0.6%
Native Hawaiian	82	0.7%	0	0.0%	0	0.0%	0	0.0%	0	0%	93	1.4%	0	0.0%	0	0.0%	820	0.1%
Some Other Race/Multiracial	582	5.0%	164	3.4%	643	10.8%	255	4.4%	785	5.2%	319	4.7%	498	3.8%	60	1.2%	133,190	12.9%
Total Population	11,774	--	4,783	--	5,977	--	5,833	--		--	6,822	--	13,069	--	4,910	--	1,034,842	--
Hispanic or Latino ¹	1,630	13.8%	611	12.8%	2,066	34.6%	285	4.9%	15,069	8.8%	434	6.4%	1,631	12.5%	198	4.0%	345,955	33.4%
Total Minority Population^{2,3}	4,017	34.1%	846	17.7%	2,333	39.0%	2,267	38.9%	3,552	23.6%	1,194	17.5%	2,807	21.5%	650	13.2%	512,178	49.5%

¹ The terms Hispanic and Latino can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic and Latino residents for each geographic region are tabulated separately from the racial distribution by the U.S. Census Bureau.

² A minority is defined in CEQ's environmental justice guidance as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic (CEQ 1997).

³ "Total Minority" includes all people who are not "White alone," plus Hispanics and Latinos who are white alone.

4.6.1.2 Minority Populations

CEQ (1997) defines the term "minority" as persons from any of the following groups: Black, Asian or Pacific Islander, American Indian or Alaskan Native, and Hispanic. The U.S. Census Bureau does not treat "Hispanic or Latino" as a racial category, so people identifying themselves as Hispanic or Latino make a separate selection of a racial category. This analysis is based on U.S. Census Bureau data from the American Community Survey. For the purposes of this analysis, "minority" includes all people who do not identify themselves as "white alone," plus Hispanics and Latinos who identify themselves as "white alone."

As shown in **Table 4.8**, all of the census tracts included in this analysis have minority populations less than the county average of 49.4 percent (U.S. Census Bureau 2011). The project area is not considered a minority population (U.S. Census Bureau 2011).

No Action Alternative

Because no low-income or minority populations are located in the project area, the no action alternative would not have a disproportionately high or adverse impact on low-income or minority populations.

Proposed Action

The proposed action would have a beneficial effect on all people living and working in the vicinity of the project area, including any low-income persons, as it would reduce the risk of harm to personal property and persons from wildfire. Because no low-income or minority populations are in the project area, the proposed action would not have a disproportionately high and adverse impact on a low-income or minority population. Therefore, the proposed action would comply with EO 12898.

4.6.2 Hazardous Materials

Hazardous materials are those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act. The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or to the environment when released or otherwise improperly managed.

To determine whether any hazardous waste facilities exist within the vicinity or upgradient of the project area, or whether there is a known and documented environmental issue or concern that could affect the proposed project site, a search for Superfund sites, toxic release inventory sites, industrial water dischargers, hazardous facilities or sites, and multi-activity sites was conducted using EPA's Envirofacts database.

According to the Envirofacts database, no hazardous sites, including Superfund, toxic release, industrial water dischargers, hazardous waste, or multi-activity sites, exist within the project

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area; however, 25 sites and facilities within 1 mile of the project areas have reported hazardous waste activities. Figures in **Appendix E-2** depict the location of the sites and facilities, and their proximity to the project area.

No Action Alternative

No active hazardous sites were identified within the project area that would potentially affect the existing environment. Under the no action alternative, existing conditions with respect to hazardous materials would not change.

Proposed Action

Under the proposed action, no impacts from waste storage and disposal sites are anticipated because no hazardous waste facilities are in or near the work areas (EPA 2013). Deposition or accumulation of soil, trash, ashes, refuse, waste, biosolids, or any other materials at the project sites as a result of the proposed action is prohibited. Cut, trimmed, dead, and downed vegetation would be mulched and spread on site to a depth of no more than 2 inches and in accordance with the mitigation measures described for the protection of biological resources. Appropriate measures (such as adequate setbacks or a silt fence) would be used to prevent mulch from washing into cave openings. No mulch will be placed within 262 feet of occupied cave openings and mulch placed between 262 feet and 345 feet from occupied cave openings would be thin enough to allow for herbaceous growth.

In the event that site contamination or evidence of contamination is discovered during implementation of the proposed action, Travis County would manage the contaminants in accordance with the requirements of the governing local, state, and federal regulations and guidelines.

The proposed action would involve the use of mechanical equipment, and there is always a minor threat of leaks of oils, fuels, and lubricants from the use of such equipment. The short-term nature of the project and use of equipment in good condition would reduce any potential effect to an insignificant level. Equipment staging, refueling, and storage of gasoline must occur more than 500 feet from the entrance of any occupied caves. Additionally, herbicides would not be used during project implementation or for long term operations and maintenance; therefore, no impacts are anticipated from herbicide use.

4.6.3 Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. Noise events that occur during the night (10 p.m. to 7 a.m.) are more disturbing than those that occur during normal waking hours (7 a.m. to 10 p.m.). Noise events in and the project area are presently associated with climatic conditions (wind, rain), transportation noise (traffic on roads, airplanes), and "life sounds" (people talking, children playing).

Assessment of noise impacts includes the proximity of the proposed action to sensitive receptors. A sensitive receptor is defined as an area of frequent human use that would benefit from a lowered noise level. Typical sensitive receptors include residences, schools, churches, hospitals, and libraries. Although the project area is in a large preserve, the majority of the work areas are

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adjacent to homes in a low- to medium-density residential setting. Portions of the project areas are along recreational walking trails. Noise-generating activities within these areas would have the potential to affect sensitive residential receptors and potentially trail users.

No Action Alternative

Under the no action alternative, no fire hazard mitigation measures would occur; thus, there would be no change in existing noise levels that could affect sensitive receptors in the project areas.

Proposed Action

Under the proposed action, noise would be generated by operation of equipment, such as a chainsaw, a chipper, trucks and trailers, construction and maintenance vehicles, and other required equipment. The implementation of the proposed action would increase noise levels in the immediate vicinity of the project areas. Increases in noise levels would be temporary at any one location within the project area and would occur only during normal waking hours; therefore, impacts from increased noise levels on sensitive receptors near the project area would be minor. In addition, all equipment and machinery used would comply with all applicable local, state, and federal noise control regulations.

4.6.4 Traffic

The local transportation network serving the project area includes arterial and local streets, as well as trails within the preserve. The adjacent residential neighborhoods are served by various local residential streets. The work areas would be accessed primarily via internal roads on BCP lands but some areas may be accessed via adjacent residential properties. The closest major highways are Loop 360 and Ranch to Market 620.

No Action Alternative

Under the no action alternative, existing levels of local traffic would not change, and no additional costs would be incurred for road construction or maintenance. However, a major wildfire would be more likely under the no action alternative. Nearby roads or internal trails could be closed if a wildfire approached or encompassed local areas. A wildfire near the project area could cause closure of roads that provide access to BCP as well as to the adjacent residential neighborhoods. Depending on location and wind direction, smoke from a wildfire could cause closure of sections of bordering roadways. Short-term traffic congestion could occur during street and highway closures caused by a wildfire.

Proposed Action

Under the proposed action, vehicle traffic would be generated by work crews traveling to and from work sites and trucks hauling equipment and cut vegetation. The amount of additional traffic would be temporary and minimal and would not interfere with local residents or people traveling in the vicinity of the project areas.

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Internal road networks would be used to access the project area via BCP property whenever possible. No roads would be closed to accommodate the proposed work; however, a portion of the Wild Basin Ledge trail inside WBWP may be closed for a short period of time. Any potential trail closures would be temporary, and other existing trails would still be available for recreational use during implementation of the proposed action. Therefore, there would not be a significant effect on transportation from the proposed action.

The proposed action would reduce the risk of a wildfire encompassing a road near, or trails within, the project areas. Thus, the potential for road or trail closures due to wildfire would be reduced. There would not be a significant effect on transportation from the proposed action.

4.6.5 Public Services and Utilities

4.6.5.1 Utilities

Most of the project areas, including the Steiner Ranch communities and the communities adjacent to Lake Travis, receive electrical service from Austin Energy. Austin Energy provides electrical services to more than 1 million residents and businesses over a service area of approximately 437 square miles, including most of the BCP in Travis County (Austin Energy 2014). No overhead power lines are in the project areas; however, overhead power lines are located along the roadways in the vicinity of the project areas.

Water and wastewater services to BCP and adjacent residential areas are provided by the city of Austin. Surface water from the Highland Lake system on the Colorado River is treated at the City's water treatment facilities.

No Action Alternative

Under the no action alternative, utilities in the project area would not be directly affected. However, the potential for a major wildfire would continue to be high, and electrical services provided via overhead power lines along residential roads would have the potential to spark catastrophic fires as well as being adversely affected by wildfire.

Proposed Action

The proposed action would not directly affect or require additional utilities in the project area. The proposed action would reduce the risk of a major wildfire in the project area and would contribute to the containment of wildfire, which would prevent or reduce potential damage to overhead utility lines.

4.6.5.2 Emergency Services

The project area is serviced by various fire departments in the area around BCP. Nearby fire departments provide emergency medical services, fire suppression, hazardous materials response, and technical rescue. Additional emergency response services are provided by the Travis County Fire Marshall (Travis County 2014).

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The hospitals in closest proximity to the project areas are Seton Northwest Hospital (located at 11113 Research Blvd in Austin), Westlake Medical Center (located at 5656 Bee Caves Road in Austin), and Lakeway Regional Medical Center (located at 100 Medical Parkway in Lakeway). Each provides 24-hour emergency response and intensive care (Westlake Medical Center 2014; Seton Northwest 2014; Lakeway Regional Medical Center 2014).

No Action Alternative

Under the no action alternative, there would be no change in emergency response time. The risk of wildfire in the project area would continue to exist. Existing emergency services would continue to respond to wildfires in the project area. During a wildfire, emergency personnel would not be available to respond to other emergencies in their service area.

Proposed Action

Under the proposed action, hazardous fuel reduction measures would reduce the risk of wildfire or contribute to the containment of a catastrophic wildfire in the project area. The proposed action would reduce the risk that emergency service providers within the project area would need to respond to wildfires and would allow emergency responders to remain available to respond to other emergencies throughout the area. Hazardous fuel reduction may also improve conditions for firefighters within the project areas.

4.6.6 Public Health and Safety

The risk of a catastrophic fire in the project area is high because of heavy fuel loading (closely spaced trees and shrubs and dead material on the forest floor) that has accumulated over time, specifically along the boundary of BCP. Heavy rain conditions following wildfires can contribute to sediment and debris in nearby waterways, which can affect downstream water quality and damage structures, roads, and utilities critical to the safety and well-being of citizens in and down gradient from the project area.

Population growth also has many implications related to wildfire hazards and the need for hazardous fuel reduction. With more people, there is a greater risk of human-caused wildfires and a greater need for protection from wildfires. Population growth implications intensify fire hazard risks when residences are built in the WUI, as in the project areas. The current population estimate for Travis County is 1,120,954. Travis County experienced an increase in population of 9.4 percent from 2010 to 2013 (U.S. Census Bureau 2014b).

No Action Alternative

A major wildfire in the project area would be more likely under the no action alternative. If a wildfire occurred, people and structures in and near the burned area would be at risk. Wildfires can generate substantial amounts of particulate matter, which can affect the health of people breathing the smoke-laden air. Therefore, the health of people downwind of a wildfire, especially young children, the elderly, and people with lung disease or asthma, could be adversely affected. Wildfires can also generate substantial amounts of carbon monoxide, which can pose a health concern for frontline firefighters.

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Proposed Action

Under the proposed action, the primary objective is to reduce the hazardous fuel loads to reduce the rate of spread and intensity of a wildfire along the BCP boundary. Implementation of the proposed action would create a safer environment for firefighters, which could allow them to more easily control the spread of a fire. Hazardous fuels reduction would not prevent wildfires, but could contribute to containment, reducing the intensity and frequency of wildfires, which ultimately would reduce the risk factors for people living near and recreating in the project areas. In addition, when wildfires are controlled more quickly, a smaller area is burned and less sediment and debris may be transported downstream during future precipitation events that could potentially affect water quality.

4.7 Summary of Effects and Mitigation

This section provides a summary of the potential environmental effects from implementation of the proposed action, any required agency coordination efforts or permits, and any applicable proposed mitigation or BMPs.

Table 4.9. Summary of Impacts and Mitigation

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Soils	Beneficial impacts on soils from reduced risk of major wildfire.	N/A	Cut vegetation will be mulched and left on site to prevent soil erosion except where restricted for protection of biological resources. Mulch will be no more than 2 inches thick. Appropriate barriers will be used to prevent mulch from being washed into creeks or floodplains.
Air Quality	Short-term minor impacts on local air quality from mechanical equipment emissions. Potential long-term beneficial impact on air quality by reducing wildfire emissions.	N/A	Vehicle and equipment running times will be minimized, and engines will be properly maintained.
Climate Change	Long-term beneficial effect from reduction in risk of a major wildfire and wildfire emissions.	N/A	N/A
Visual Quality and Aesthetics	Potential long-term beneficial effect by reducing loss of vegetation due to wildfires and opening up views into preserve in parts of the project area.	N/A	N/A

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Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Surface Water	Minor short-term adverse impacts on surface water quality from erosion and sedimentation caused by temporary soil disturbance. Potential beneficial impact on surface water by preventing major wildfire and reducing sedimentation and debris loading in streams.	TWDB	Cut vegetation will be mulched and spread on-site by hand to a depth of no more than 2 inches to prevent soil or sediment from reaching stream channels. Appropriate barriers will be used to prevent mulch from being washed into creeks. BMPs will be implemented to prevent erosion and sedimentation to nearby or adjacent waters, including equipment storage and staging practices to minimize erosion and sedimentation.
Groundwater	No impact.	N/A	N/A
Wetlands	No impact.	N/A	N/A
Floodplains	Some work located within floodplain but no adverse impact to floodplain.	N/A	Measures to protect surface water quality will avoid impacts on floodplains. Debris and mulch will not be placed in the floodplain. For any work in the floodplain, Travis County will be required to coordinate with the local floodplain administrator and obtain any required permits prior to initiating work. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.
Vegetation	No impact on listed species. No significant impact on vegetation communities.	N/A	N/A
Common Wildlife Species	Migratory birds may nest in project areas. Minor, short-term impacts on common wildlife species.	USFWS, TPWD	Travis County will conduct hazardous fuels reduction work only during the non-breeding season. Work is allowed from September 1 through February 28. Work cannot be conducted from March 1 through August 31. Travis County will retain larger diameter (6 inches or greater in diameter) dead trees as snags whenever practical, at an average rate of 1 to 3 per acre while still achieving fuels reduction. Snags provide sheltering, nesting, roosting, and feeding habitat for cavity nesting and migratory bird species.

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Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
<p>Threatened and Endangered Species/ Critical Habitat</p>	<p>Proposed action may affect and is likely to adversely affect the Golden-cheeked warbler, Black-capped vireo, Bone Cave harvestman, Tooth Cave ground beetle, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle. The proposed action is not likely to adversely affect the Jollyville Plateau salamander and would not adversely modify designated critical habitat for the salamander.</p> <p>The proposed action would have no effect on the Austin Blind salamander, Barton Springs salamander, Bee Creek Cave harvestman, and the Whooping crane.</p>	<p>USFWS concurrence issued 5/14/2015.</p>	<p>Vegetation management activities will only occur outside of breeding season for birds; therefore, work would not be conducted from March 1 through August 31. In addition, the following BMPs will be implemented to minimize impacts to federally threatened and endangered species:</p> <ul style="list-style-type: none"> • Mulch will not be placed within 262 feet of occupied cave openings. Any mulch placed between 262 feet and 345 feet from occupied caves must be thin enough to allow for herbaceous growth. • No work would be conducted within 100 feet of occupied cave openings. • No equipment staging, refueling, or storage of gasoline may occur within 500 feet of occupied cave openings. • Travis County staff will be present to supervise workers during work in the 345 foot cricket foraging radius of occupied cave openings. When not within this distance, staff will provide supervision as needed. The 100-, 345- and 500-foot buffers will be clearly marked for work crews with colored tape or flags prior to the commencement of work and will be removed promptly once work is complete. • The County will implement boiling water treatments on RIFA colonies within 345 feet of occupied cave openings following the first rain of the first spring after project implementation. • The County will conduct RIFA eradication efforts twice annually, during the spring and fall in treated areas within 345 feet of occupied cave openings. This should include a regimen of 2 or more treatments per month. Once RIFA levels are below the thresholds outlined in "<i>Karst Preserve Management and Monitoring Recommendations</i>" (USFWS 2014d), RIFA control can occur twice annually.

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Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
			<ul style="list-style-type: none"> Treated areas mowed during maintenance efforts must be mowed to a height of 6 inches or higher.
Cultural Resources	No impact.	SHPO/THC concurrence issued 8/15/2012.	In the event that archeological deposits, including any Native American property, stone tools, bones, or human remains, are uncovered, all work in the vicinity of the discovery must be halted immediately, and all reasonable measures must be taken to avoid or minimize harm to the discovered items. All archeological findings will be secured, and access to the sensitive area will be restricted by Travis County. Travis County will inform FEMA immediately of such findings, and FEMA will consult with the SHPO. Work in sensitive areas shall not resume until consultation is completed and until FEMA determines that the appropriate measures have been taken to ensure complete project compliance with the NHPA and its implementing regulations.
Environmental Justice	No impact.	N/A	N/A
Hazardous Materials	No impact.	TCEQ	If contaminated materials are discovered during the project activities, work would cease until the appropriate procedures and permits can be implemented. Any hazardous materials discovered, generated, or used during construction would be handled and disposed of in accordance with applicable local, state, and federal regulations.
Noise	Temporary impacts from the use of equipment.	N/A	All work will be conducted during daytime hours. All equipment and machinery will meet all local, state, and federal noise regulations.
Traffic	No impact.	N/A	N/A
Public Services and Utilities	Long-term beneficial effect on overhead utility power lines and potential for power outages, and improved emergency services due to the reduction in wildfire risk.	N/A	N/A

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Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Public Health and Safety	Reduction of the risk of a major wildfire that would threaten public health and safety.	N/A	N/A

SECTION 5 Cumulative Impacts

This section addresses the potential cumulative impacts associated with the implementation of the proposed action. Cumulative impacts can be defined as the impacts of a proposed action when combined with impacts of past, present, or reasonably foreseeable future actions undertaken by any agency or person. Cumulative impacts can result from individually minor but collectively significant actions.

No significant cumulative impacts are foreseen from implementation of the proposed action and other past, present, and future actions. Because the proposed action would have no impact or minimal impact on water resources, wetlands, floodplains, most wildlife, vegetation communities, cultural resources, environmental justice, public services and utilities, hazardous materials, or public health and safety, the proposed action would not contribute to significant cumulative impacts on these resources. Areas along the BCP boundary that might be treated under future projects (areas not treated under the proposed action) would not be located in or near wetlands or floodplains; therefore, there would be no cumulative effects on these resources.

Operation of heavy equipment during fuels reduction would disturb soils temporarily. However, with the implementation of BMPs to protect soils, a significant adverse cumulative impact on soils would not be expected.

The proposed action may affect and is likely to adversely affect the Golden-cheeked warbler, Black-capped vireo, Bone Cave harvestman, Tooth Cave ground beetle, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle. Another FEMA-funded wildfire mitigation project is planned along the boundary of WBWP in the City of West Lake Hills. That project is very similar in nature to the proposed action, and in combination with the proposed project, it could result in a cumulative impact to the Golden-cheeked warbler and Black-capped vireo. Avoidance and minimization measures to protect the listed bird species would also be implemented by the City of West Lake Hills in order to minimize impacts. In addition, the USFWS is closely monitoring any impacts to listed species associated with these projects. Therefore, no cumulative impacts to the Golden-cheeked warbler or Black-capped vireo are expected as a result of the implementation of these projects. The West Lake Hills project would not affect karst invertebrates; therefore, there would be no cumulative effect on these species.

The Texas Department of Transportation's (TxDOT's) list of Travis County projects indicates some road repair projects near the proposed project area are underway (TxDOT 2014). Because of the distance between these repair projects and the proposed action, it is unlikely to combine with the proposed action to result in a cumulative impact.

Climate change is by its nature a cumulative impact. Carbon dioxide emissions from the proposed action would make a very small contribution to climate change.

SECTION 6 Agency Coordination, Public Involvement, and Permits

This section provides a summary of the agency coordination efforts and public involvement process for the proposed Balcones Canyonlands Hazardous Fuels Reduction project. In addition, an overview of the permits that would be required under the proposed action is included.

6.1 Agency Coordination

Consultation letters and response from resource agencies are provided in **Appendix F**.

6.2 Public Participation

The public information process for the proposed project will include a public notice in the *Austin Chronicle*, the local newsweekly circulation that covers the project area. The public notice will state that information about the proposed action, including this EA, is available at the Travis County Administration Building, located at 700 Lavaca Street, 5th floor, Austin, Texas 78701. The notice will invite the public to submit comments about the proposed action, potential impacts, and proposed mitigation measures so that they may be considered and evaluated.

In compliance with EO 11988, Floodplains, the public notice will also state that the proposed action is located within 100-year floodplains in the BCP. Potential alternatives and impacts on floodplains are described in the draft EA and the public will be invited to review and comment on the findings. Public comments on floodplain impacts will be considered in the preparation of the final EA. As described in **Section 4.3.3**, there would be no impacts on floodplains from the proposed action.

6.3 Permits

No local, state, or federal permits appear to be necessary to implement the proposed fuels reduction project. The proposed action does not require coverage under Texas Pollutant Discharge Elimination System construction stormwater general permit TXR150000 because it is not a construction project and would not generate stormwater associated with industrial activity as defined in 40 CFR 122.26(a)(14). In addition, the proposed action does not require a permit from the TCEQ under the Edwards Aquifer Protection Program because clearing vegetation without disturbing the soil is not an activity that is regulated under the Edwards Aquifer rules.

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SECTION 8 List of Preparers

The following is a list of preparers who contributed to the development of the Travis County BCP Hazardous Fuels Reduction EA.

The individuals listed below had principal roles in the preparation of this document. Many others had significant roles and contributions as well and their efforts were no less important to the development of this EA. These others include senior managers, administrative support personnel, legal staff, and technical staff.

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