Draft Environmental Assessment

Bastrop County Welsh Tract Hazardous Fuels Reduction

HMGP-DR-1999-0014

Bastrop County, Texas

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FEMA

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Table of Contents

SECTION 1 Introduction 1-1

SECTION 2 Purpose and Need 2-1

SECTION 3 Alternatives 3-1

3.1 No Action Alternative 3-1
3.2 Proposed Action 3-1
3.3 Additional Action Alternatives Considered and Dismissed 3-2

SECTION 4 Affected Environment, Potential Impacts, and Mitigation 4-1

4.1 Resources Not Affected and Not Considered Further 4-1
4.1.1. Geology and Seismicity 4-1
4.1.2 Wild and Scenic Rivers 4-1
4.1.3 Coastal Resources 4-1
4.2 Physical Resources 4-2
4.2.1 Soils 4-2
4.2.2 Air Quality 4-5
4.2.3 Climate Change 4-7
4.2.4 Visual Quality and Aesthetics 4-8
4.3 Water Resources 4-10
4.3.1 Water Quality 4-10
4.3.2 Wetlands 4-12
4.3.3 Floodplains 4-15
4.4 Biological Resources 4-15
4.4.1 Vegetation 4-17
4.4.2 Wildlife 4-19
4.4.3 Threatened and Endangered Species 4-20
4.5 Cultural Resources 4-24
4.5.1 Historic Architectural Properties 4-25
4.5.2 Archaeological Sites 4-25
4.5.3 Native American Cultural/Religious Sites 4-25
4.6 Socioeconomics 4-276
4.6.1 Environmental Justice 4-276
4.6.2 Hazardous Materials 4-29
4.6.3 Noise 4-30
4.6.4 Traffic 4-32
4.6.5 Public Services and Utilities 4-33
4.6.6 Public Health and Safety 4-34
4.7 Summary of Effects and Mitigation 4-35

SECTION 5 Cumulative Impacts 5-1

SECTION 6 Agency Coordination, Public Involvement, and Permits 6-1

6.1 Agency Coordination 6-1
6.2 Public Participation 6-1

6.3 Permits 6-1

SECTION 7 References 7-1

SECTION 8 List of Preparers 8-1

Appendices

Appendix A Water Resources Data
1. Wild and Scenic Rivers Map
2. Sole Source Aquifers Map
3. FEMA Flood Insurance Rate Map
Appendix B Biological Site Visit Field Notes
Appendix C Agency Coordination Letters

Figures

Figure 1.1. General Location Map 1-2
Figure 1.2. Proposed Project Area..... 1-3
Figure 1.3. Proposed Project Area with Aerial Imagery..... 1-4
Figure 1.4. Bastrop Complex Fire on September 6, 2011 1-5
Figure 2.1. Scorched Landscape on Cottletown Road, Bastrop County..... 2-1
Figure 2.2. Potential Wildfire Threat in the Project Area 2-3
Figure 4.1. Welsh Tract–Soils Map..... 4-4
Figure 4.2. Welsh Tract–Topography..... 4-6
Figure 4.3. Existing Vegetation Near Entry to Welsh Tract 4-9
Figure 4.4. Existing Vegetation Near Entry to Welsh Tract 4-9
Figure 4.5. Existing Vegetation in the Interior of Welsh Tract..... 4-10
Figure 4.6. Welsh Tract–Wetlands Map..... 4-14
Figure 4.7. Welsh Tract–Floodplain 4-16
Figure 4.8. Welsh Tract–Vegetation Types..... 4-18
Figure 4.9. Cultural Resources near Welsh Tract 4-265
Figure 4.10. Hazardous Waste Sites Near Welsh Tract..... 4-31

Tables

Table 4.1. Properties of Soils in the Project Area..... 4-2
Table 4.2. Welsh Tract–Soils Survey Unit Codes..... 4-3
Table 4.3. Common Wildlife Species Observed Within the Project Area..... 4-19
Table 4.4. Federally Listed Species for Bastrop County, Texas..... 4-20
Table 4.5. State Listed Species for Bastrop County, Texas 4-21
Table 4.6. Income..... 4-287
Table 4.7. Minority Populations..... 4-28
Table 4.8. Summary of Impacts and Mitigation 4-36

Acronyms and Abbreviations

AfC	Edge fine sandy loam
AfC2	Edge fine sandy loam eroded
AQCR	air quality control regions
APE	area of potential effect
Atlas	Texas Archeological Sites Atlas
BMPs	best management practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
DeC	Roboco loamy fine sand
EA	environmental assessment
EO	executive order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	farm to market road
FONSI	finding of no significant impact
FPPA	Farmland Protection Policy Act
GLO	Texas General Land Office
HMGP	Hazard Mitigation Grant Program
in/hr	inches per hour
LPHCP	Lost Pines Habitat Conservation Plan
mg/L	milligrams per liter

NA	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PaE	Padina fine sand
SH	state highway
SHPO	State Historic Preservation Officer
SkC	Silstid loamy fine sand
sp.	species
TCEQ	Texas Commission on Environmental Quality
TDEM	Texas Division of Emergency Management
TDS	total dissolved solids
Tf	Tabor fine sandy loam
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WSC	water supply company

SECTION 1 Introduction

Bastrop County proposes to reduce wildfire hazards by reducing hazardous fuels on 310 acres of forested land owned and managed by the county, known as Welsh Tract. Bastrop County 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). The TDEM is the direct applicant for the grant, and Bastrop 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 nonfederal funding sources.

Welsh Tract is a 400-acre parcel of forest land in central Texas. Welsh Tract is approximately 10 miles southeast of the City of Elgin and 8 miles northeast of the City of Bastrop. **Figure 1.1** shows the general location and surrounding area. Welsh Tract is completely surrounded by private lands. Currently, 214 structures, mostly single family residences, are within 2 miles of the project site. The proposed project area is shown in **Figure 1.2. Figure 1.3** shows the project area along with aerial imagery. The project area is south of U.S. Highway 290 between Farm to Market (FM) Road 2336 and Texas State Highway (SH) 21.

In the summer of 2011, central Texas experienced severe drought conditions and record heat, setting the stage for wildfires. On September 4, 2011, the most destructive wildfire in state history ignited in Bastrop County, destroying 1,660 homes and 36 commercial buildings and causing two fatalities. The Bastrop Complex wildfire covered 32,400 acres and burned for 37 days (Texas A&M Forest Service 2011). The wildfire resulted in a moderate burn to portions of the Welsh Tract, mostly as a result of a dense understory. Figure 1.4 shows the smoke over Bastrop County, indicating an intense, wind driven fire (Austin American Statesman 2011).

The proposed project would reduce hazardous fuels on 310 acres of the 400-acre tract. The risk mitigation effort would focus on hazardous fuels in the under- and mid-story of the forest and on opening up the forest canopy.

This draft 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 to 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 Welsh Tract Understory Thinning project. FEMA will use the findings in this draft EA to determine whether to prepare an environmental impact statement or to issue a finding of no significant impact (FONSI).

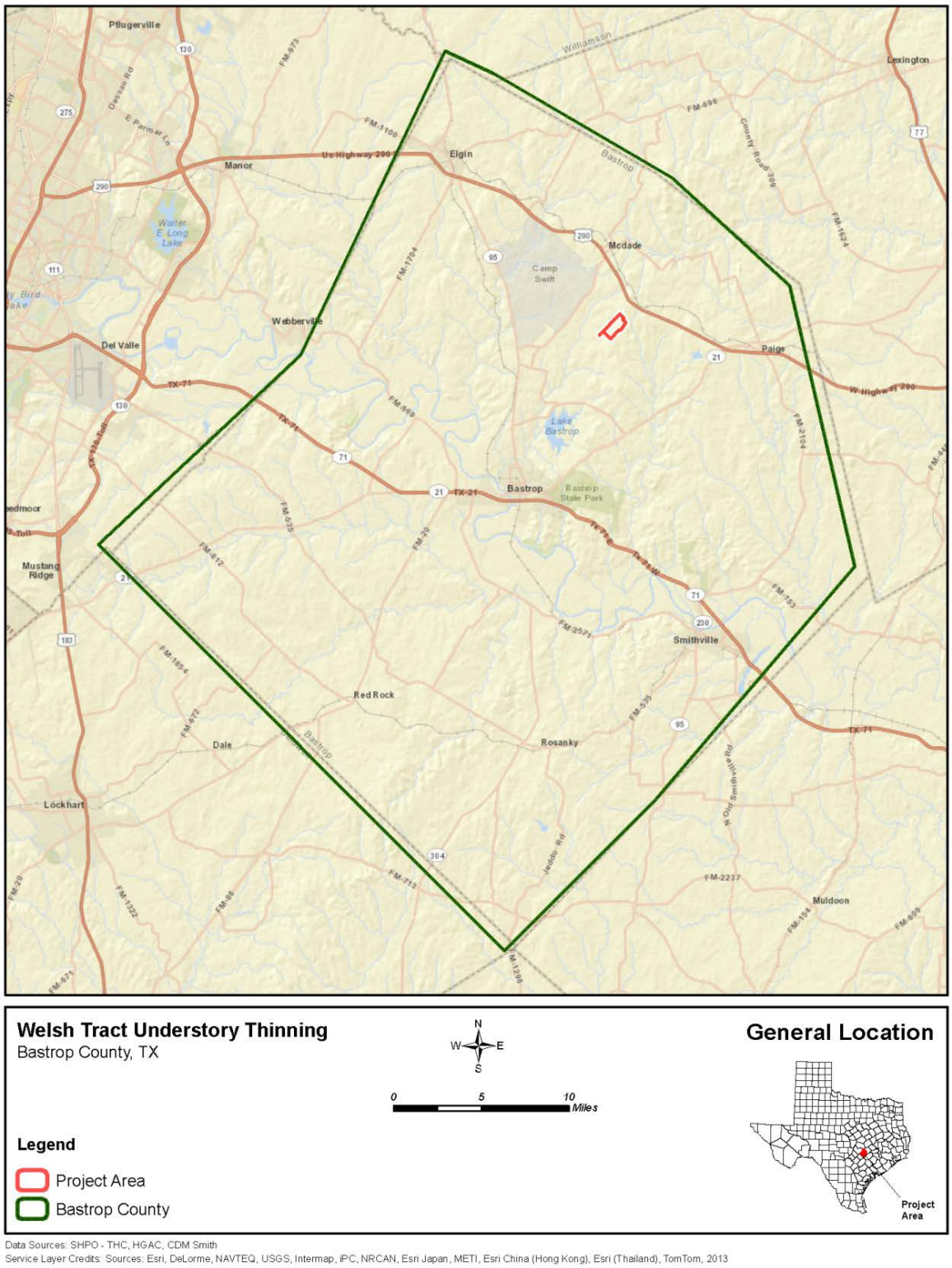


Figure 1.1. General Location Map

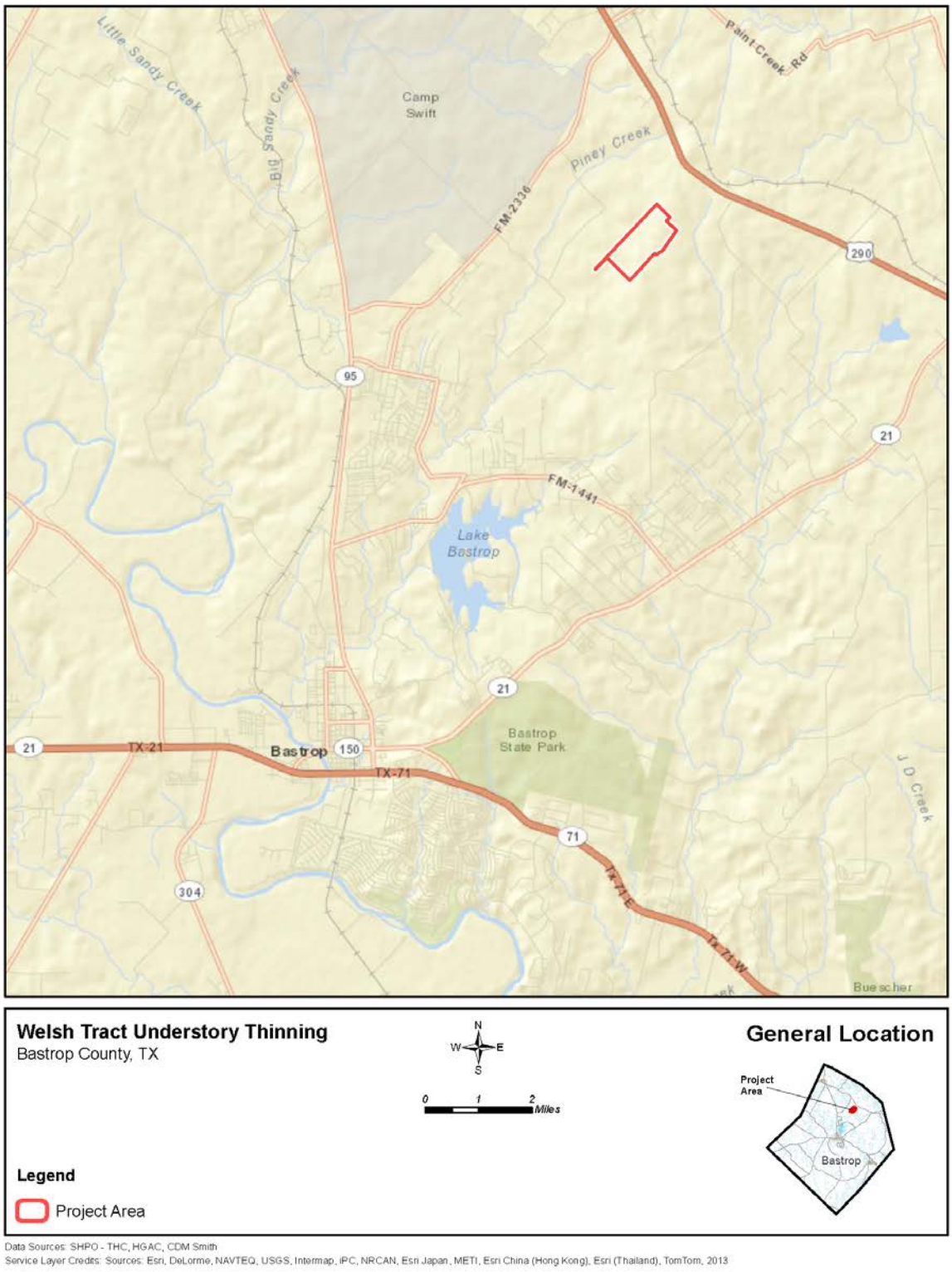


Figure 1.2. Proposed Project Area

Figure 1.3. Proposed Project Area with Aerial Imagery

Figure 1.4. Bastrop Complex Fire on September 6, 2011

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 risk mitigation measures to be implemented during the immediate recovery from a declared disaster.

The purpose of the proposed project is to reduce wildfire hazard in Bastrop County. Unmanaged forests represent areas of greater risk because hazardous fuels accumulate there. The proposed project is needed because long-term drought conditions have increased wildfire hazard by killing many trees; thus, providing a large amount of dry fuel for a potential wildfire.

During periods of drought, the residents of Bastrop County, including those near Welsh Tract and the surrounding area, face risk of property damage, injury, and loss of life from wildfires. In 2011, drought conditions and high winds caused a wildfire in Bastrop County that was the most destructive in Texas history. The fire burned from September 4 to October 11, 2011, destroying 1,660 homes. **Figure 2.1** shows a burned zone on Cottletown Road caused by the Bastrop Complex wildfire (Austin American Statesman 2011).

Figure 2.1. Scorched Landscape on Cottletown Road, Bastrop County

Bastrop County, in conjunction with the Texas A&M Forest Service and the Fire Citizens' Advisory Panel, prepared a Community Wildfire Protection Plan (CWPP) (FireCAP 2008). The CWPP, developed in accordance with the Healthy Forest Restoration Act of 2003, assessed risk throughout the county and prioritized actions that would mitigate wildfire risk. The CWPP identifies more than 70 communities as being at high risk of wildfire, including the Welsh Tract area (note that Welsh Tract is not specifically identified in the CWPP but is located near Circle D Country and Lake Bastrop developments named in the CWPP). The Texas Wildfire Risk Assessment quantifies the potential fire threat for the Welsh Tract as moderate to high, as shown in **Figure 2.2** (Texas A&M Forest Service 2013).

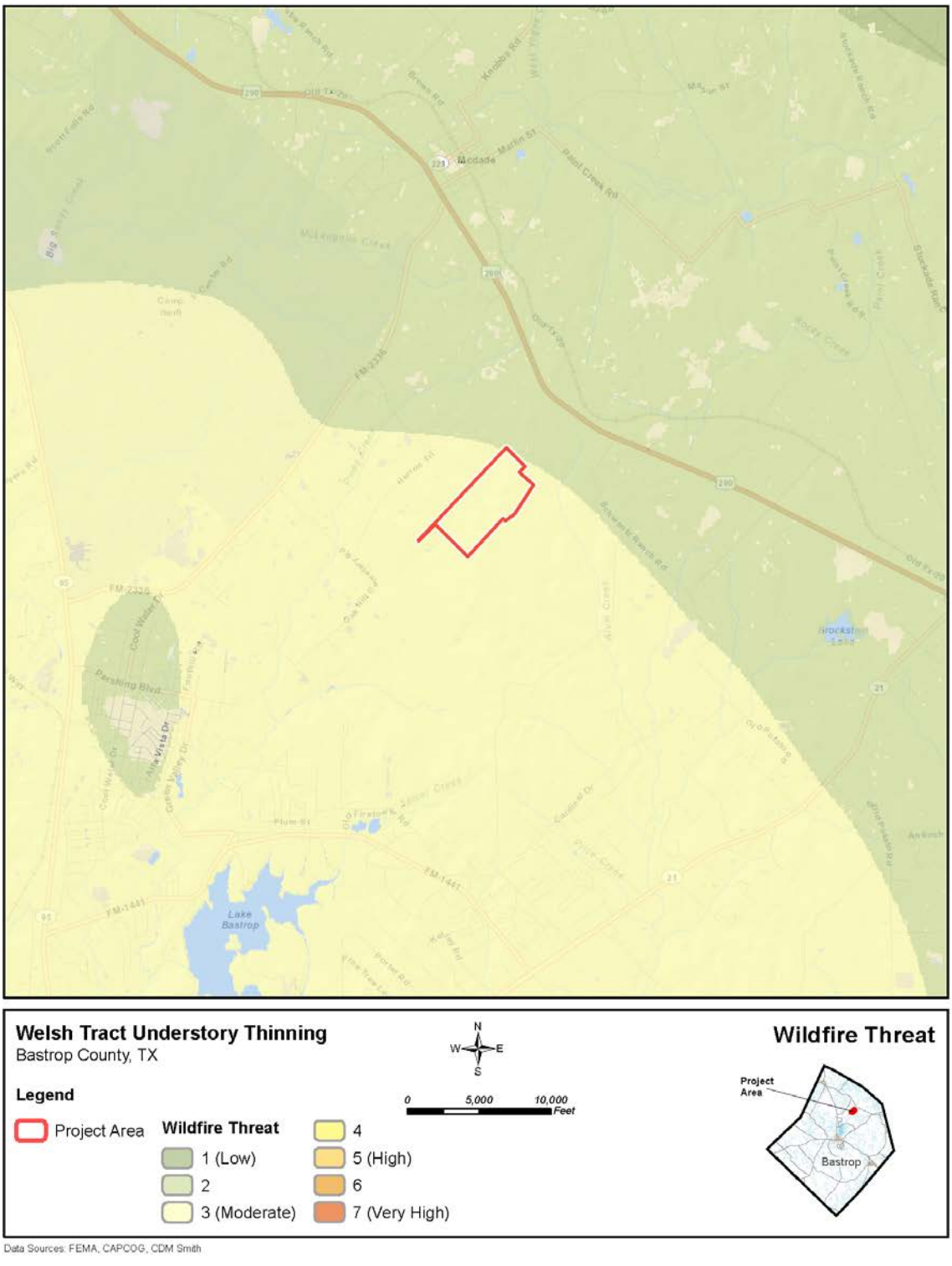


Figure 2.2. Potential Wildfire Threat in the Project Area

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 conditions in the future if no action is taken to significantly reduce the risk from wildfire hazards. Under the no action alternative, no work would be conducted to reduce fuels in the understory and midstory canopy of the forested areas in Welsh Tract.

Under the no action alternative, the minor short-term impacts of the proposed project would be avoided because there would be no work to reduce vegetative fuels. The impacts avoided would include temporary increases in noise, truck traffic, and minor short-term impacts to air quality.

The no action alternative would not reduce the current unacceptable risk of a catastrophic wildfire. Welsh Tract would not undergo any hazardous fuels reduction, and the Welsh Tract and adjacent homes would remain at elevated risk in the event of a wildfire. Welsh Tract would continue to have an elevated probability of ground fire spreading up to the canopy, creating a crown fire with the potential to spread rapidly in windy conditions, as was the case during the 2011 Bastrop Complex wildfire. The probability of loss of life and property in a wildfire would continue to be unacceptably high. A major wildfire would have a severe temporary impact on air quality.

In addition to risks to residents near Welsh Tract, the federally endangered Houston toad relies on this forest for habitat. The 2011 Bastrop Complex fire resulted in a fragmented habitat for the Houston toad, and now the toad is dependent on active breeding and “head-starting” programs to survive. Under the no action alternative, the risk of a major wildfire would continue to threaten the survival of the Houston toad.

Fighting a major wildfire could require large quantities of water at a time when water resources may already be strained by drought. For the reasons described in this section, the no action alternative would not meet the purpose and need.

3.2 Proposed Action

Bastrop County proposes to implement a hazardous fuel reduction program designed to significantly reduce the risk of damage from wildfire. The proposed action would include understory thinning and dead tree removal on 310 acres of a 400-acre property owned by the county and surrounded by private residential properties. The proposed action would reduce hazardous fuels loading in the under- and midstory and partially open up the forest canopy to mitigate the effects of a wildfire moving through Welsh Tract.

Understory thinning would be conducted with mechanical equipment, including a mulching head mounted on a skid-steer, and with limited work by hand crews using chainsaws. The work would take approximately 84 hours of effort by a saw crew to fell dead, standing timber throughout the

tract. The project would be conducted between July 1 and December 31, with completion expected within 90 days of commencement of thinning.

Vegetation that would be removed includes eastern red cedar, small diameter loblolly pine, yaupon, and other understory vegetation. Stumps of cut trees would be ground down to the surface, and the subsurface soil profiles would not be disturbed. Mulching of all vegetative materials would be left on site at a thickness of 2 to 3 inches.

Welsh Tract is surrounded entirely by privately owned land. There are currently 214 structures, mostly single family residences within 2 miles of the project site. The project would reduce the ability of a catastrophic wildfire to move across the site or originate on site; thus, providing protection to surrounding homeowners from wildfires originating from this tract.

Post-project thinning maintenance would begin after 2 to 3 years of regeneration. The remainder of the 5-year program would focus on controlling the reintroduction of certain species by hand thinning and plant-specific application of herbicides. Post-project long term maintenance would be accomplished by property owners and by Bastrop County, as necessary. Since no heavy mechanical equipment would be used for follow-up treatments, no significant air quality impacts would be expected from this activity.

3.3 Additional Action Alternatives Considered and Dismissed

The alternative of prescribed burning in order to reduce hazardous fuel loads on Welsh Tract was considered. Although prescribed burning is more economical, this alternative was rejected because prescribed burning is difficult to control and could lead to loss of life and property if the prescribed burn were to become uncontrolled. The impacts associated with this alternative are therefore not analyzed further 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 alternative and 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, which is primarily vegetation management, would have no effect on geology or seismicity, and the proposed action would not be affected by geologic or seismic conditions. Geology and seismicity are not considered further in this analysis.

4.1.2 Wild and Scenic Rivers

The National Wild and Scenic Rivers System (Public Law 90-542; 16 United States Code [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 A**) (Interagency Wild and Scenic Rivers Council 2013). 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 costal 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). Bastrop County is not a coastal county and is approximately 160 miles from the nearest coastline; therefore, it is not included in the Texas Coastal Management Program (GLO 2012). There would be no potential impacts to coastal resources under either the no action alternative or the proposed action.

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, and visual resources.

4.2.1 Soils

The project area is in the Texas claypan region, which is characterized by its dissection by perennial streams and its development from meandering streams. Soils generally consist of well-developed, clayey subsoil with sandy or loamy A and B horizons. The parent material was formed in the Eocene and Pleistocene and consists of weathered shale and siltstone, loamy colluvium from weathered sandstones, and loamy and clayey alluvium from mixed sources. Mulched material will be spread over the project area to a depth of 2 to 3 inches. The seven soil map units present within the project area include: Edge fine sandy loam (AfC), Edge fine sandy loam eroded (AfC2), Roboco loamy fine sand (DeC), Padina fine sand (PaE), Silstid loamy fine sand (SkC), and Tabor fine sandy loam (Tf) 0 to 1 percent slope (A) and 1 to 3 percent slope (B). The properties of these soil map units are summarized in **Table 4.1** (United States Department of Agriculture [USDA], Natural Resources Conservation Service [NRCS] 2013). A soil survey for the project area is shown in **Figure 4.1** (USDA NRCS 2013). Translation of the map unit symbols used on **Figure 4.2** is shown in **Table 4.2**.

The Farmland Protection Policy Act (FPPA; 7 USC 4201, et seq.) and its regulations (7 CFR Part 658) establish criteria for identifying and considering the effects of federal programs on the conversion of farmland to non-agricultural uses. The soils present within the Welsh Tract are not considered prime or unique farmland soils per the NRCS's Web Soil Survey.

Table 4.1. Properties of Soils in the Project Area

Parameters	Edge Fine Sandy Loam (AfC)	Eroded Edge Fine Sandy Loam (AfC2)	Roboco Loamy Fine Sand (DeC)	Padina Fine Sand (PaE)	Silstid Loamy Fine Sand (SkC)	Tabor Fine Sandy Loam (Tf) 0-1 percent slope (A) and 1-3 percent slope (B)
Depth	More than 80 inches	More than 80 inches	More than 80 inches	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Moderately well drained	Moderately well drained	Moderately well drained	Well drained	Well drained	Moderately well drained
Permeability	Very low to moderately low (0.00 to 0.06 inches per hour (in/hr)	Very low to moderately low (0.00 to 0.06 in/hr)	Moderately low to moderately high (0.06 to 0.20 in/hr)	Moderately high to high (0.57 to 1.98 in/hr)	Moderately high to high (0.57 to 1.98 inches per hour [in/hr])	Very low to moderately low (0.00 to 0.06 in/hr)

Parameters	Edge Fine Sandy Loam (AfC)	Eroded Edge Fine Sandy Loam (AfC2)	Roboco Loamy Fine Sand (DeC)	Padina Fine Sand (PaE)	Silstid Loamy Fine Sand (SkC)	Tabor Fine Sandy Loam (Tf) 0-1 percent slope (A) and 1-3 percent slope (B)
Parent Material	Residuum weathered from shale and siltstone in the Wilcox formation of Eocene age	Residuum weathered from shale and siltstone in the Wilcox formation of Eocene age	Loamy colluvium derived from Eocene sandstones of the Carrizo, Queen City, Simsboro, and Sparta formations	Residuum weathered from Eocene sandstones of the Carrizo, Queen City, Simsboro, and Sparta formations	Residuum weathered from sandstone in the Carrizo, Queen City Simsboro, and Sparta formations of Eocene age	Loamy and clayey alluvium of Pleistocene age derived from mixed sources
Slope	1 to 5 percent	2 to 5 percent	1 to 5 percent	1 to 12 percent	1 to 5 percent	0 to 1 and 1 to 3 percent
Depth to Water Table	More than 80 inches	More than 80 inches	18 to 42 inches	More than 80 inches	More than 80 inches	More than 80 inches
Hydric Soils	No	No	No	No	Predominantly non-hydric – a minor hydric component is 5 percent of map unit	Predominantly non-hydric – a minor hydric component is 5 percent of map unit

Table 4.2. Welsh Tract– Soils Survey Unit Codes

Code	Description	Code	Description
SkC	Silstid loamy fine sand, 1 to 5 percent slope	PaE	Padina fine sand, 1 to 12 percent slopes
DeC	Roboco loamy fine sand, 1 to 5 percent slopes	AfC2	Eroded edge fine sandy loam, 2 to 5 percent slopes
AfC	Silstid loamy fine sand, 1 to 5 percent slopes	Tf	Tabor fine sandy loam, 0 to 3 percent slopes

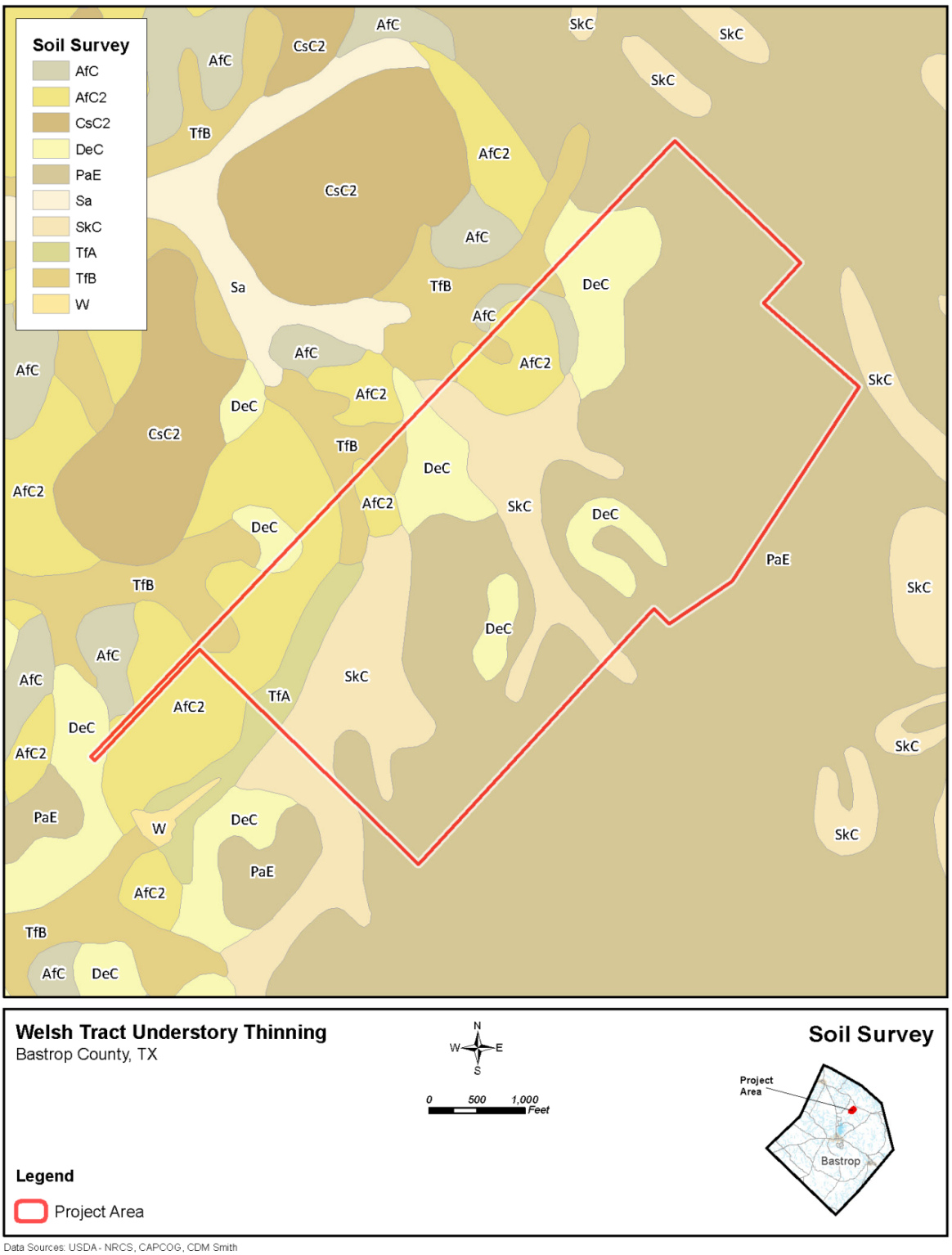


Figure 4.1. Welsh Tract - Soils Map

Hydric soils are one of the three parameters required for a location to be considered a wetland. Welsh Tract soils are not hydric or predominantly not hydric. As discussed below in Sections 4.3.2 and 4.3.3, the proposed action would not affect any wetlands or floodplains.

Topography in the area is depicted in **Figure 4.2**. Welsh Tract is located on a ridge with elevation ranging from 530 feet to 660 feet. The terrain is characterized by gently sloping topography.

No Action Alternative

In the absence of a major wildfire in the proposed project area, the no action alternative would have no effect on soils. However, a major wildfire would be more likely under the no action alternative and could alter the cycling of nutrients; the physical and chemical properties; and the temperature, moisture, and biotic characteristics of the soil. These primary impacts from a wildfire can also result in indirect impacts, including increased hydrophobicity, which could cause decreased infiltration and increased runoff that often causes increased erosion. The no action alternative would not impact prime or unique farmland soils.

Proposed Action

The proposed action would have a minimal impact on soils. The proposed fuel reduction activities would not cause soil disturbance and would not result in any significant soil and sediment removal or transport from the site. Short term soil disturbance may occur from the use of mechanical equipment; however, steps such as the use of rubber tracks on tracked equipment may be taken to reduce soil disturbance in the project area during vegetation removal. No adverse impact to soils is anticipated. In addition, prime or unique farmland would not be impacted by the proposed action.

Mulched vegetated material left on site would reduce raindrop impact and overland flow, which would enhance infiltration. Application of mulch is likely to reduce soil erosion and delay regrowth of woody vegetation (USDA Forest Service 2005). Application of mulch could lead to a temporary reduction in soil productivity. Operation of heavy equipment during the proposed action would disturb soil, which would increase erosion potential during heavy rains. Best management practices (BMPs) for preventing erosion would be implemented based on local best practices.

4.2.2 Air Quality

The Clean Air Act (CAA; 42 USC 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).

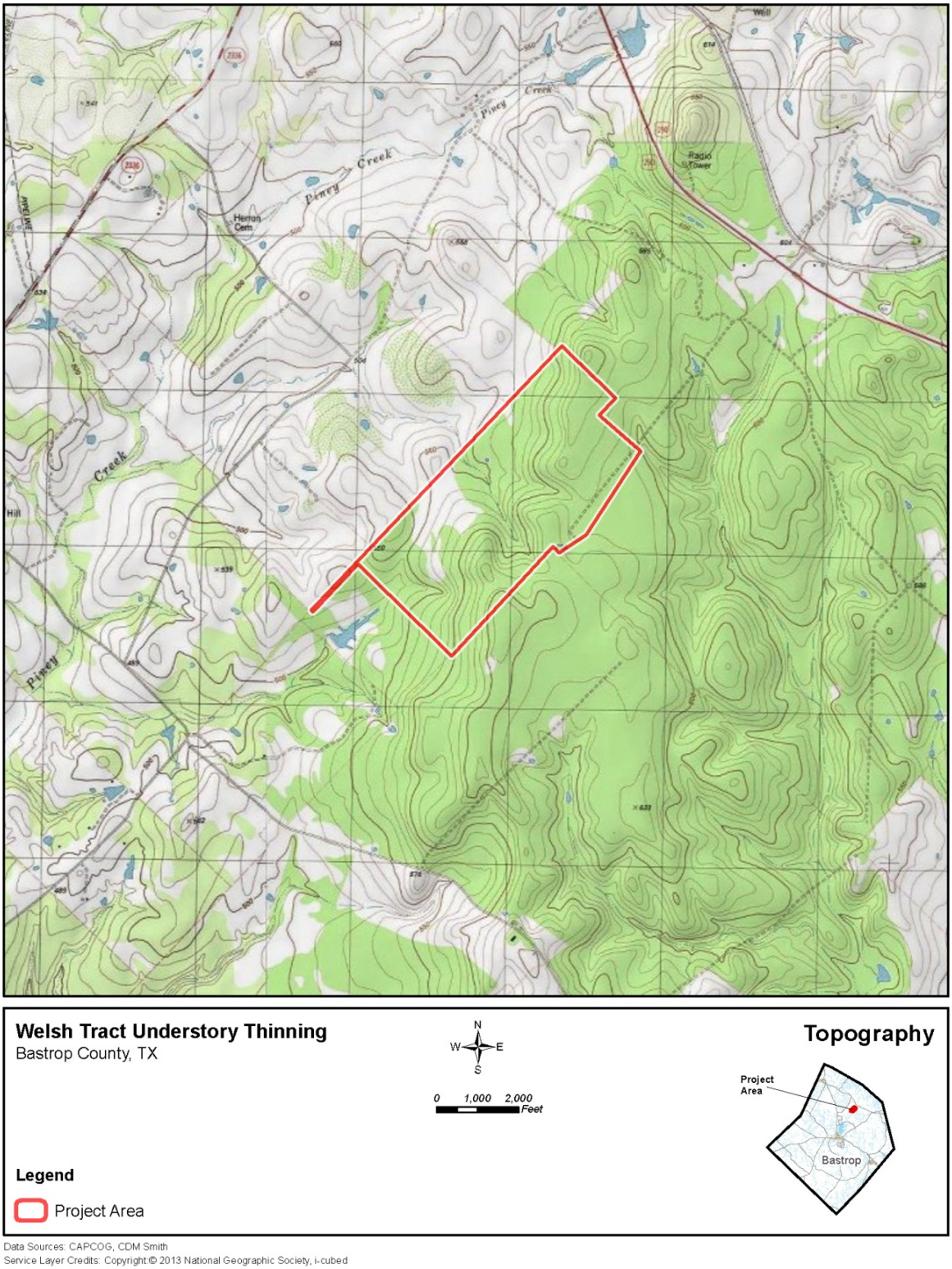


Figure 4.2. Welsh Tract – Topography

The proposed project area is in northern Bastrop County. The EPA designates this region as being in attainment of all NAAQS. The EPA air quality monitoring stations in the region have not detected levels of pollutants in exceedance of any air quality standards (EPA 2013a).

No Action Alternative

In the absence of a major wildfire in the area, no impacts would occur under the no action alternative because current air quality would not change. No changes would occur that would 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 during implementation of the fuel reduction measures. The fuels reduction would require about 6 weeks of work over a period of up to 90 days. Negligible impacts would be expected, as described below.

During project implementation, the equipment used is likely to include a skid-steer loader with a mulching head, one or more trailer trucks, several smaller trucks, a lift to raise workers into the trees, and hand-held equipment. The equipment would burn hydrocarbon fuels and cause a temporary negative impact on local air quality. To minimize impacts, fuel-burning equipment running times will be kept to a minimum and engines must be properly maintained. No heavy mechanical equipment would be used for follow-up treatments; therefore, no air quality impacts are expected from this activity.

4.2.3 Climate Change

"Climate change" refers to changes in Earth's climate caused by a general warming of the atmosphere. Its primary cause 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.

No Action Alternative

In the absence of a major wildfire, no impact on climate change is anticipated under the no action alternative, as current conditions would not change. A major wildfire would be more likely under the no action alternative and could contribute to climate change, but the contribution of the Welsh Tract project area would not be significant.

Climate change may result in more extended droughts in the project area and increase the risk of wildfire. The no action alternative would not provide any wildfire hazard reduction and a major wildfire would be more likely within the project area.

Proposed Action

Because of the small scale and short duration of the proposed action, the contribution of greenhouse gas emissions from the operation of the proposed equipment to climate change would be minor.

The proposed action would reduce the risk of a major wildfire in the project area, thereby reducing the additional hazard caused by climate change in this area.

4.2.4 Visual Quality and Aesthetics

The project area is densely vegetated with trees and understory brush in some areas, while other areas are less densely vegetated and have a partially open canopy. The majority of the tract is dominated by a closed canopy intermix of mature loblolly pine, cedar, and various oak species. Mid- and understory fuels were observed to be extremely dense and composed of species such as yaupon, mesquite, and non-native vines. The project area is in a rural area of Bastrop County and is not visually accessible to many residents. Welsh Tract is set back from nearby roads and therefore cannot be seen except from adjacent properties. **Figure 4.3** through **Figure 4.5** show existing visual conditions within the project area.

No Action Alternative

In the absence of a major wildfire, there would be no impact on visual quality and aesthetics under the no action alternative, as current conditions would not change. A major wildfire would be more likely under the no action alternative and would have significant negative impacts on visual quality immediately after the fire for the few adjacent landowners that would have visual access to the tract.

Proposed Action

This project would remove some trees and understory and would change the visual aesthetics. In some cases, the proposed project would open up views from adjacent properties onto Welsh Tract that may have been obscured previously. Because the project is aimed at removing certain species and understory thinning, the proposed action would not have a significant impact on visual quality and aesthetics.

Figure 4.3. Existing Vegetation Near Entry to Welsh Tract

Figure 4.4. Existing Vegetation Near Entry to Welsh Tract

Figure 4.5. Existing Vegetation in the Interior of Welsh Tract

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

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. 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) characterizes the quality of Texas surface waters and identifies those waters that do not meet water quality standards on the 303(d) list, an inventory of impaired waters (TCEQ 2013). Streams are classified by segment within their respective basins.

Welsh Tract drains to Piney Creek via an unnamed intermittent stream. Piney Creek is an unclassified segment and is not listed on the 303(d) list for any impairment.

No Action Alternative

In the absence of a major wildfire in the area, the no action alternative would have no 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 that are 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 water. Infiltration properties of soils may be altered when fire destroys vegetation cover within a watershed. These changes in vegetation and subsequent changes in soil often result in decreased infiltration, increased overland flow, and ultimately increased stream flow (USDA Forest Service 2005).

Proposed Action

The proposed action could cause minor adverse impacts to the surface water of Piney Creek over a period of about 2 months from erosion and sedimentation during the vegetation clearing operations. Operation of heavy equipment during the proposed action would disturb soil, which would increase erosion potential during heavy rains. BMPs would be implemented to minimize transport of sediment to Piney Creek. Mulch created from cut vegetation would be required for temporary erosion control to prevent soil or sediment from reaching the creeks. Appropriate barriers would be used to prevent mulch from being washed into the creeks, and mulch would be removed from the site when it is no longer needed for erosion. With the implementation of these BMPs, the potential impact on water quality would not be significant.

4.3.1.2 Groundwater

The major aquifer underlying the proposed project area is the Carrizo-Wilcox aquifer. This aquifer is primarily composed of sand locally interbedded with gravel, silt, clay, and lignite. The Carrizo-Wilcox aquifer extends from the Louisiana border to the border with Mexico in a wide band. The groundwater is generally fresh and typically contains less than 500 milligrams per liter (mg/L) of total dissolved solids (TDS) in the outcrop, whereas softer groundwater with TDS of more than 1,000 mg/L occurs in the subsurface. Parts of the aquifer are slightly to moderately saline with TDS ranging from 1,000 to 7,000 mg/L (Texas Water Development Board [TWDB] 2006a and TWDB 2006b).

The project is not near any designated sole source aquifers (see **Appendix A)**.

No Action Alternative

In the absence of a major wildfire in the 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, which could impact groundwater. Infiltration properties of soils are often altered when fire destroys vegetation and litter cover. These changes in the soil often result in decreased infiltration, increased overland flow, and decreased aquifer recharge (USDA, Forest Service 2005).

Proposed Action

The proposed action would reduce the risk of catastrophic wildfires and thus would reduce the potential impact to groundwater recharge from a wildfire. The proposed vegetation thinning would not cause any impacts on the Carrizo-Wilcox aquifer. Impacts to infiltration rates and runoff in the project area are not anticipated from the proposed action; therefore, no impacts to the Carrizo-Wilcox aquifer are anticipated.

4.3.2 Wetlands

Executive Order (EO) 11990, Protection of Wetlands, requires that federal agencies avoid to the extent possible the long and short term adverse impacts associated with destruction or modification of wetlands. Agencies that provide funding for improvements or for activities affecting land use should "consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:

(a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;

(b) maintenance of natural systems, including conservation and long-term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and

(c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses." (Section 5)

Executive Order 11990 defines wetlands as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds."

The USDA NRCS Web Soil Survey provides information about soils at a site. Soil maps are divided into soil map units, which represent one or more major soil series (see Section 4.2.1). Of the soil map units within the project area, all of the units have upland soil characteristics for the dominant soil series (e.g., well drained soils and a depth to water table at or below 24 inches) (USDA NRCS 2013). Three of the soil map units contain a minor component that is characteristic of a hydric soil and covers 5 percent of the soil map unit (**Table 4.1** and **Figure 4.1**). This percentage is not sufficient to classify the soil as hydric, and these soils (SkC, TfA, and TfB) are identified as predominantly non-hydric. Site visits indicated that wetlands are not present where these soils exist.

U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps were overlaid on aerial photography to indicate the potential presence of wetlands within the project area. Google Earth Pro was then used to measure the area of mapped wetlands on site. One palustrine unconsolidated bottom pond is within the project site (**Figure 4.6**) and has an area of approximately 3,400 square feet. Although this pond is labeled as permanently flooded and diked

or impounded on the NWI map, it was dry and determined to be a manmade ephemeral pond during the June 2013 site visit. The ephemeral pond found during the June 2013 site visit is not considered a wetland. One ephemeral stream that is a tributary to Piney Creek is present within the project site (**Figure 4.1**). No other wetlands are shown on the NWI maps (USFWS 2012).

The purpose of the site visit was to identify potentially suitable habitat for protected species or species of concern. Water bodies and ephemeral drainages were identified and briefly described; however, boundaries of wetlands and streams were not determined.

No Action Alternative

In the absence of a major wildfire in Bastrop County, the no action alternative would have no effect on wetlands because existing conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and could result in the destruction of vegetation in wetlands. Although there are no wetlands within the project area, a major wildfire could be expected to affect lands and potentially wetlands beyond the project boundaries. Vegetation destruction in wetlands would destroy habitat for wildlife and lessen the effectiveness of wetlands to filter pollutants and maintain water quality.

Proposed Action

The proposed project would be conducted in compliance with EO 11990. While wetlands may be adjacent to the proposed work, they are off site of Welsh Tract, and none of the proposed action would occur in wetlands. Under the proposed action, BMPs would be implemented to prevent impacts on nearby wetlands. With the implementation of these BMPs, potential impacts on water quality would not be significant.

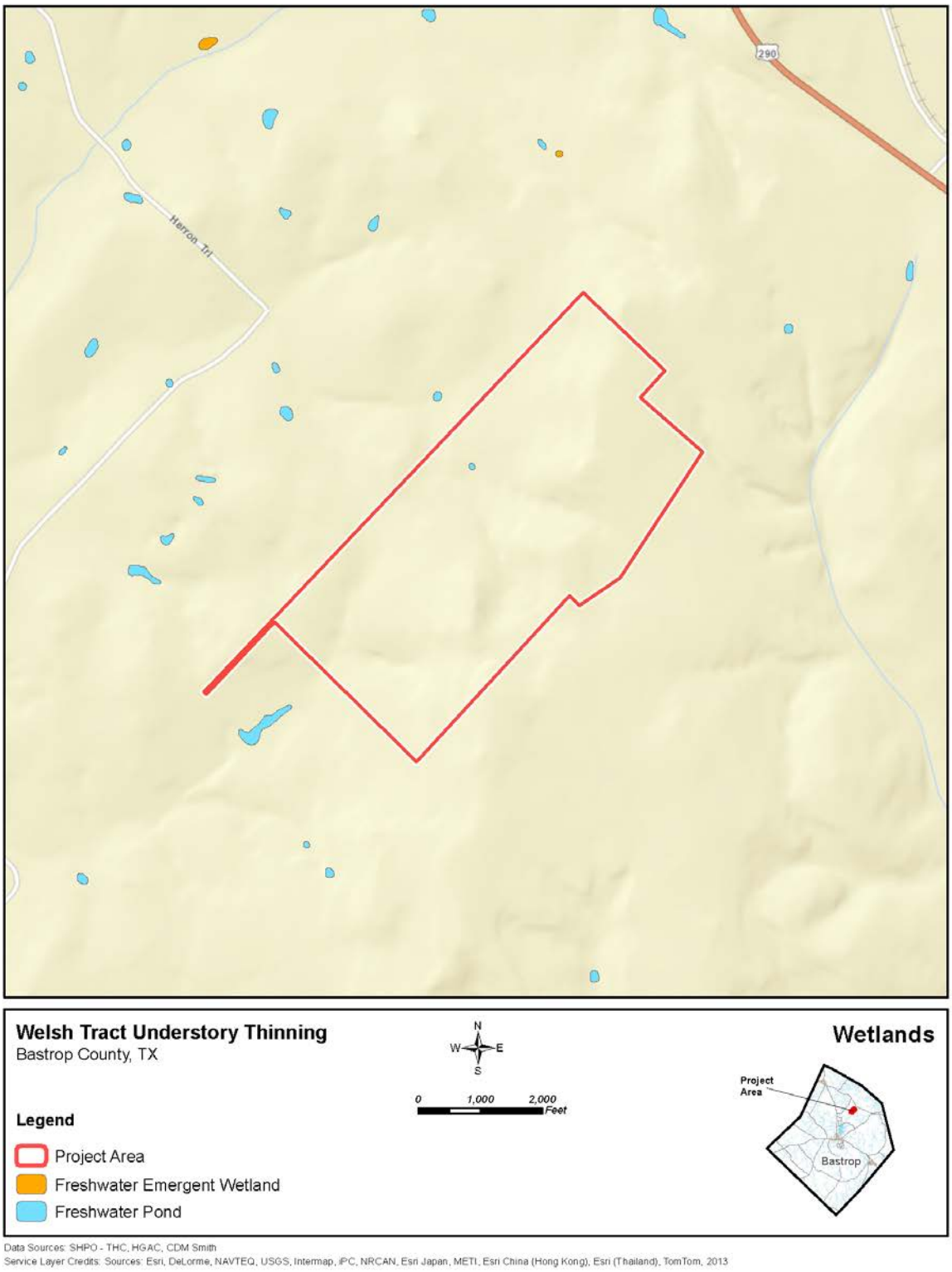


Figure 4.6. Welsh Tract - Wetlands Map

4.3.3 Floodplains

EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for actions including federal funding of improvements.

EO 11988 guidelines prepared by the Interagency Task Force on Floodplain Management describe 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 required in Section 2(a) of the EO. The first step is to determine if the proposed action is in the 100-year floodplain.

Figure 4.7 depicts the proposed work areas and extent of the floodplain and indicates that no work would be conducted in or near the 100-year floodplain. FEMA Flood Insurance Rate Maps (FIRMs) map floodplain areas and illustrate the extent of the 100-year floodplain within the project area. The pertinent portion of the FEMA FIRM for the project area from map 48021C0250E is included in **Appendix A**.

No Action Alternative

In the absence of a major wildfire in Bastrop County, the no action alternative would have no effect on floodplains because current conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and could have impacts on floodplains both in Welsh Tract and outside of the project area. 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 flooding.

Proposed Action

The proposed project area is not in or near the 100-year floodplain; therefore, the proposed vegetative thinning would have no impact on floodplains. **Appendix A** includes a detailed floodplain map that shows the proposed work areas in relation to the 100-year floodplain.

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.

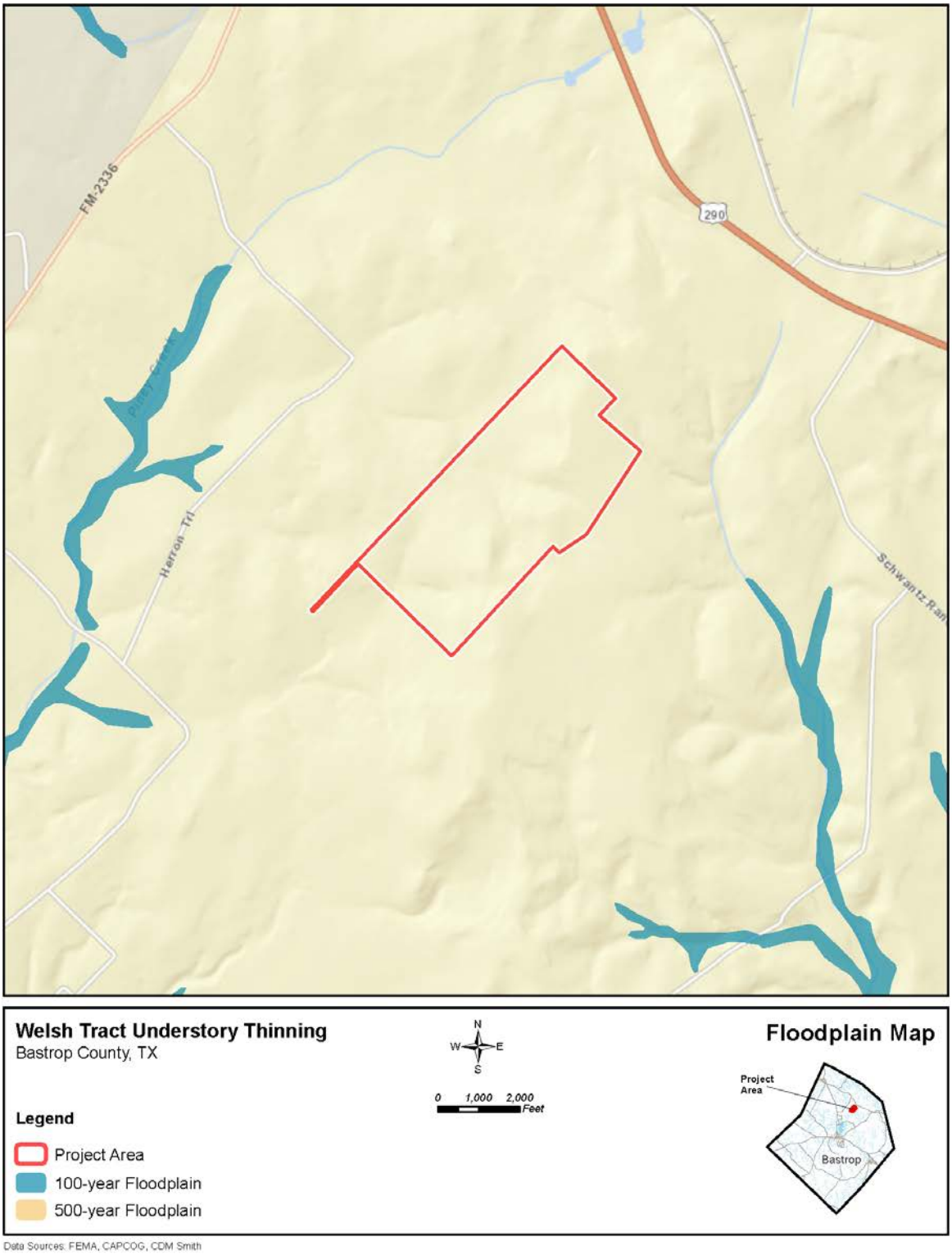


Figure 4.7. Welsh Tract – Floodplain

4.4.1 Vegetation

The Welsh Tract is in the Post Oak Savannah Ecoregion according to the Gould Ecoregions of Texas, as recognized by Texas Parks and Wildlife Department (Gould et al. 1960).

The June 24 and 25, 2013, wildlife and habitat survey determined that the project area is characterized primarily by post oak and cedar flatwoods with interspersed areas of pine flatwoods and mixed flatwoods (see **Figure 4.8**). Data collected during the field visits indicate that four general types of habitat are present (see **Appendix B**):

- Post Oak/Cedar Flatwoods – dominated by post oak (*Quercus stellate*), eastern red cedar *(Juniperus virginiana*), yaupon *(Ilex vomitoria*), American beautyberry (*Callicarpa americana*), prickly pear cactus (*Opuntia species* [*sp*.]), panicgrass (*Panicum sp*.), dewberry (*Rubus* sp.), greenbriar (*Smilax* sp.), little bluestem (*Schizachyrium scoparium*), and horsemint (*Monarda citriodora*)

- Cedar Flatwoods – dominated by eastern red cedar, yaupon, American beautyberry, post oak saplings, and dewberry

- Pine Flatwoods – dominated by loblolly pine (*Pinus taeda*), eastern red cedar, yaupon, American beautyberry, dewberry, and dog fennel (*Eupatorium capillifolium*)

- Mixed Flatwoods – dominated by post oak, eastern red cedar, loblolly pine, yaupon, and panicgrass

One federally endangered plant species occurs in Bastrop County, the Navasota ladies'-tresses (*Spiranthes parksii*); however, Welsh Tract is not known to support individuals of this species or its habitat. Michael Forstner, Ph.D., a professor at Texas State University, has been conducting biological research on the Welsh Tract for the past 8 years, and he has not observed the Navasota ladies'-tresses on the project site (Forstner 2013). The Navasota ladies'-tresses was not identified during the field survey in June 2013.

No Action Alternative

In the absence of a major wildfire in the county, the no action alternative would have no effect on vegetation 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.

Proposed Action

The proposed action would affect approximately 310 acres of forested area by removing understory and dead trees to reduce fuels that could carry fires into tree canopies. Vegetation that would be removed includes eastern red cedar, small diameter loblolly pine, yaupon, non-native vines, and other understory vegetation. The proposed action would not have a significant impact on vegetation. Since the Welsh Tract is not known to support Navasota ladies'-tresses or its habitat, the proposed action would not affect this federal and state listed endangered plant species.

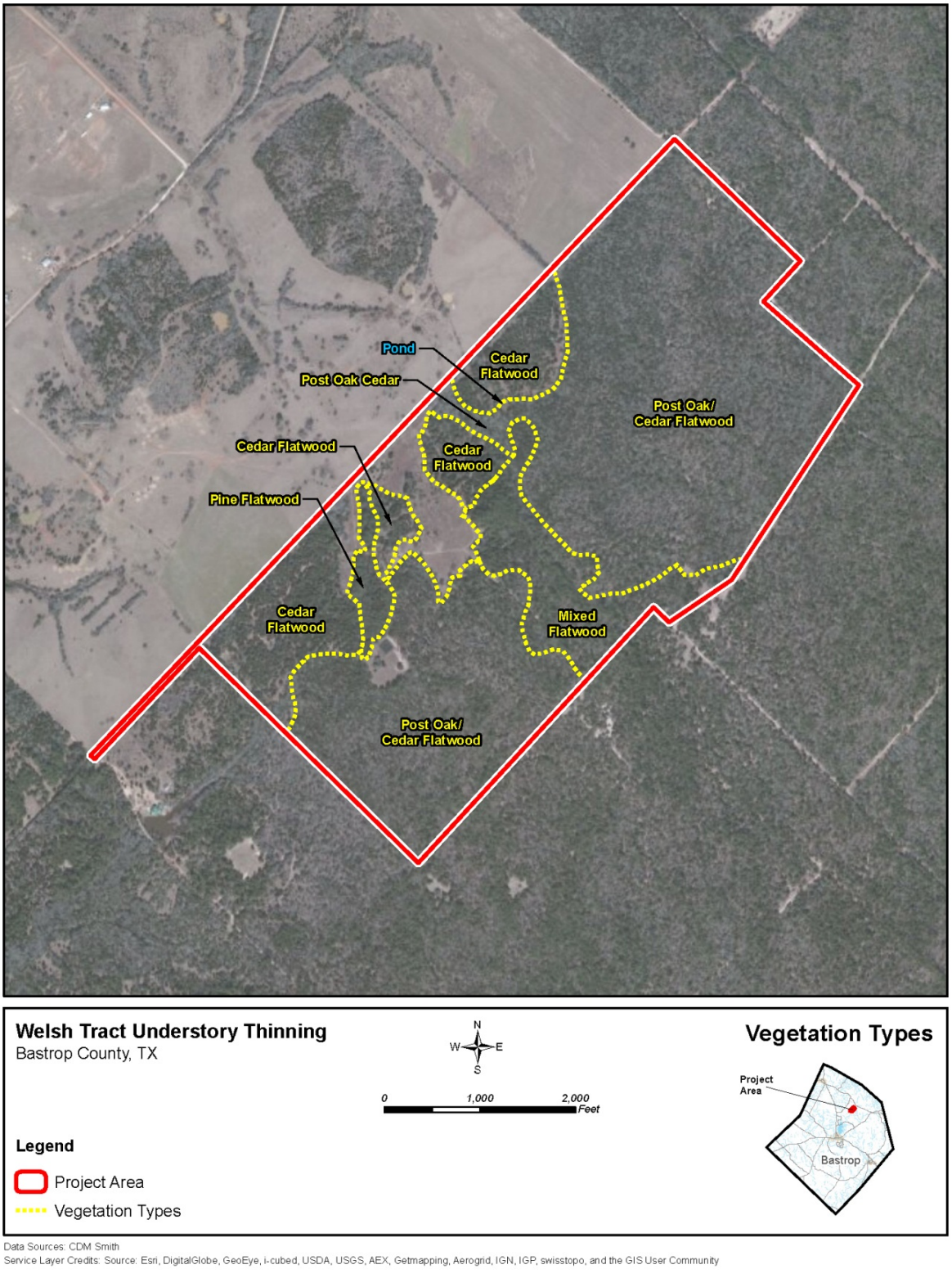


Figure 4.8. Welsh Tract - Vegetation Types

4.4.2 Wildlife

In addition to the listed species discussed 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 species that were recorded during site surveys conducted in June 2013.

Table 4.3. Common Wildlife Species Observed within the Project Area

Common Name	Scientific Name
Birds	
Blue Jay	*Cyanocitta cristata*
Eastern Bluebird	*Sialia sialis*
Greater Roadrunner	*Geococcyx californianus*
Ground Dove	*Columbina passerina*
Indigo Bunting	*Passerina cynea*
Mourning Dove	*Zenaida macroura*
Northern Cardinal	*Cardinalis cardinalis*
Red-bellied Woodpecker	*Melanerpes carolinus*
Red-eyed Vireo	*Vireo olivaceus*
Yellow-rumped Warbler	*Dendroica coronata*
Mammals	
White-tailed Deer	*Odocoileus virginianus*
Fox Squirrel	*Sciurus niger*

The common species observed during the field surveys are typical of farmland-forest fringe. In addition, the post oak, cedar, and pine flatwoods habitats are likely to support additional species adapted to these habitats, including snakes, sparrows, and hawks.

The Magnuson-Stevens Fishery Conservation and Management Act applies to saltwater fish, including anadromous fish, which swim up rivers from coastal areas to spawn in freshwater. The Texas striped bass is an anadromous species. The ephemeral stream in Welsh Tract does not provide a suitable, unobstructed habitat for anadromous fish.

No Action Alternative

In the absence of a major wildfire in the county, 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 and mammals observed and expected in the project area are common species of field and forest and are well adapted to habitats that are heavily influenced by human activity. While several of these species use canopy trees and understory shrubs for foraging, nesting, and other life functions, they are highly mobile species that are likely to move to adjacent suitable habitat

during vegetation reduction activities. Cutting of vegetation with active nests will be avoided as a BMP. The majority of potential impacts would likely be temporary and have little effect on local populations. Therefore, significant adverse impacts from the proposed action on the various songbird and mammal species documented within the project area would not be expected.

4.4.3 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) 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). The Texas Parks and Wildlife Department (TPWD) Code prohibits take of state-listed threatened and endangered species. The proposed project site is in Bastrop County, Texas. Three species are federally listed as endangered and are known to occur in Bastrop County. An additional two species are state listed as endangered and 11 as threatened in Bastrop County by TPWD. All federally listed species potentially found in Bastrop County are shown in **Table 4.4** (USFWS 2013), and the state-listed species are shown in **Table 4.5** (TPWD 2012).

A field survey was conducted on June 24 and 25, 2013, to characterize the wildlife community and habitat types within the project area. In addition to documenting general wildlife observations and the dominant vegetation types present, the survey focused on determining the presence or absence of listed species and their habitats (**Appendix B**).

There is a low potential for federally listed species to occur within the project area, with the exception of the Houston toad. The Whooping crane is known to occur in Bastrop County; however, Welsh Tract does not provide suitable foraging or nesting habitat for the crane. As discussed in Section 4.4.1 above, the one federally endangered plant species that occurs in Bastrop County, Navasota ladies'-tresses, is not known to occur in Welsh Tract. Therefore, the proposed action would not affect this species or its habitat.

The project area is within designated critical habitat for the Houston toad.

Table 4.4. Federally Listed Species for Bastrop County, Texas

Common Name	Scientific Name	Federal Status
Amphibians		
Houston Toad	*Anaxyrus houstonensis*	Endangered
Birds		
Bald Eagle	*Haliaeetus leucocephalus*	aRecovery
Whooping Crane	*Grus americana*	Endangered
Plants		
Navasota Ladies'-tresses	*Spiranthes parksii*	Endangered

Table 4.5. State Listed Species for Bastrop County, Texas

Common Name	Scientific Name	State Status
Amphibians		
Houston Toad	*Anaxyrus houstonensis*	Endangered
Birds		
American Peregrine Falcon	*Falco peregrinus anatum*	Threatened
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Interior Least Tern	*Sterna antillarum athalassos*	Endangered
Peregrine Falcon	*Falco peregrinus*	Threatened
Whooping Crane	*Grus americana*	Endangered
Wood Stork	*Mycteria americana*	Threatened
Fish		
Blue sucker	*Cycleptus elongates*	Threatened
Mollusks		
False Spike Mussel	*Quadrula mitchelli*	Threatened
Smooth Pimpleback	*Quadrula houstonensis*	Threatened
Texas Fawnfoot	*Truncilla macrodon*	Threatened
Texas Pimpleback	*Quadrula petrina*	Threatened
Reptiles		
Texas Horned Lizard	*Phrynosoma cornutum*	Threatened
Timber/Canebrake Rattlesnake	*Crotalus horridus*	Threatened
Plants		
Navasota Ladies'-Tresses	*Spiranthes parksii*	Endangered
Sandhill Woollywhite	*Hymenopappus carrizoanus*	Endangered

The Houston toad is dependent on ephemeral wet-weather ponds and other water features (e.g., stock tanks, creeks, streams, wetlands, seeps, springs, and vernal pools) with shaded edges for breeding and healthy and mature forest ecosystems with mixed species composition, significant canopy cover, and an open understory layer with a diverse herbaceous component for non-breeding habitat. The majority of the breeding occurs from February to April but has been reported into late June. Water must persist for at least 60 days for successful breeding, with larvae hatching in 4 to 7 days and metamorphosis in 3 to 9 weeks. Habitat for the Houston toad in Bastrop County was in poor condition prior to the Bastrop County Complex Fire due to the worst 1-year drought in recorded history for this area (Lost Pines Recovery Team 2011). Following the fire, approximately 41 percent of the habitat that was considered to be highly suitable within Bastrop County was moderately to heavily burned (Forstner et al. 2011).

The Houston toad Headstart Program facility was established on Welsh Tract by Texas State University. Houston toad tadpoles are raised and released on the Welsh Tract. The facility includes a 5-acre fenced pasture where tadpoles are raised in plastic pools, several 20-foot by 20-foot exclosures, and a 20-acre fenced and predator-proof wildland area. The proposed action would not occur within the 5-acre fenced pasture or the exclosures. Activities associated with the proposed action would occur within the large 20-acre fenced and predator-proof wildland area as well as other parts of the Welsh Tract that may also provide habitat for the Houston toad.

Natural long-term breeding habitat (ephemeral pools) for the Houston toad were not observed during the ecological field surveys, which occurred during a period of hot weather with minimal or no rain immediately preceding the field survey effort. The pond described in Section 4.3.2 above was noted during the field surveys, but it was dry at the time of the surveys. Houston toad upland habitat is present across all habitat types found in the project area. All habitat types exhibit soft sandy soil, leaf litter, and debris consistent with Houston toad upland habitat requirements. Farm ponds adjacent to the project area may also provide breeding habitat. There were no observations of the Houston toad within the survey area.

Welsh Tract provides habitat for a number of migratory bird species, which are protected by the Migratory Bird Treaty Act. In addition, the bald eagle, which is protected by the Bald and Golden Eagle Protection Act, may occur in Bastrop County. Bald eagles nest from October through July; therefore, the nesting season is difficult to avoid. Bald eagle nests are large and readily identifiable, so trees containing bald eagle nests can be avoided.

Both the bald eagle and peregrine falcon have recently been delisted by the USFWS; however, both species remain protected by other regulations at the federal and state levels. The state listed threatened peregrine falcon is not likely to nest within the project area because its preferred nesting habitat – tall cliffs – is not present.

The timber/canebrake rattlesnake and sandyhill woolywhite, which are state listed species, have the potential to occur within the project area but were not observed during the site visit. Consultation with TPWD concerning state-listed species would be the responsibility of the subapplicant.

No Action Alternative

In the absence of a major wildfire in Welsh Tract, the no action alternative would have no effect on endangered species because existing conditions would continue unchanged. However, a major wildfire would be more likely under the no action alternative and would damage existing Houston toad habitat.

Proposed Action

In 2007, Bastrop County issued the Lost Pines Habitat Conservation Plan (LPHCP) for Bastrop County, Texas. USFWS issued Permit# TE-113500-0, which became effective on April 21, 2008 and expires April 21, 2038. The LPHCP covers various activities that may affect the Houston toad within the Lost Pines area of Bastrop County, which includes Welsh Tract.

Bastrop County is the applicant for the FEMA HMGP grant for the Welsh Tract project, Bastrop County owns the Welsh Tract property, and Bastrop County is an entity that is party to and covered by the LPHCP. In addition, the proposed project at the Welsh Tract is in the geographic area covered by the LPHCP. The LPHCP and corresponding USFWS permit cover various activities within the Lost Pines area of Bastrop County, including wildlife management. The proposed fuels reduction project at the Welsh Tract qualifies as a wildlife management activity under the LPHCP. Per the LPHCP, incidental take resulting from activities that enhance Houston toad or other native wildlife habitat are covered by the LPHCP if they are implemented in accordance with the Wildlife Management Guidelines in Appendix F of the LPHCP. The Wildlife Management Guidelines specify that management activities eligible for coverage under the LPHCP must be part of a management program, such that the landowner currently receives the 1-d-1 open space agricultural property tax appraisal for wildlife management use (the wildlife appraisal on his/her property and at least one of the three required management activities specifically addresses the Houston toad). Bastrop County, the owner of Welsh Tract, qualifies for this guideline.

Bastrop County must comply with the following practices as conditions of federal funding. Bastrop County must conduct activities in line with the Lost Pines Habitat Conservation Plan and comply with all conditions of USFWS permit #TE-113500-0 during the implementation of the proposed FEMA-funded wildfire mitigation project at the Welsh Tract. In particular, Bastrop County must comply with the terms of and avoidance and minimization measures outlined in "Appendix F: Wildlife Management Guidelines for Participation in the Lost Pines Habitat Conservation Plan." In addition to permit requirements, should a Houston toad be encountered during project implementation, work must cease immediately. The U.S. Fish and Wildlife Service's Clear Lake Ecological Services Office will be contacted at (281) 286-8282.

The fuel reduction activities proposed by Bastrop County do not involve the removal of large living trees; therefore, the canopy that provides shaded habitat for toad dispersal would not be adversely impacted. USFWS recognizes mechanical thinning as a management tool that can help restore habitat for the Houston toad by removing non-native vegetation, increasing light availability to the forest floor. This may subsequently increase vegetation diversity, which can increase insect diversity and abundance, enhancing a food source for the toad. Although the proposed action may adversely affect the Houston toad for a short period during the implementation phase of the project, long-term benefits to Houston toad habitat and the species are expected from the proposed action. FEMA has determined that the proposed action may adversely affect the Houston Toad. FEMA also determined that the proposed project would not adversely modify critical habitat for the Houston toad.

On May 13, 2013, FEMA initiated consultation with USFWS under Section 7 of the Endangered Species Act. On August 21, 2013, USFWS concurred that the project would have a short-term adverse impact on the Houston toad and that those potential impacts have been previously analyzed and permitted under the LPHCP. USFWS also concurred that there would be long-term beneficial effects on toad habitat from the project. There would be no adverse modification of designated critical habitat for the toad.

With implementation of measures specifically designed to protect the Houston toad, and compliance with the LPHCP, potential impacts to the toad would not be significant.

No impacts from the proposed action on other federally or state listed species are expected. Due to lack of suitable habitat for these species, there would be no effect on Whooping crane or Navasota ladies'-tresses from the proposed action.

The following mitigation measures would be required to avoid and/ reduce potential impacts on migratory birds. Bastrop County will limit vegetation management work during the peak migratory bird nesting period of March through August as much as possible to avoid destruction of individuals, nests, or eggs. If vegetation reduction activities must occur during the nesting season, Bastrop County will deploy a qualified biological monitor with experience conducting breeding bird surveys to survey the vegetation management area for nests prior to conducting work. The biologist will determine the appropriate timing of surveys in advance of work activities. If an occupied migratory bird nest is found, work within a buffer zone around the nest will be postponed until the nest is vacated and juveniles have fledged. The biological monitor will determine an appropriate buffering radius based on species present, real-time site conditions, and proposed vegetation management methodology and equipment. For work near an occupied nest, the biological monitor would prepare a report documenting the migratory species present and the rationale for the buffer radius determination, and submit that report to FEMA for inclusion in project files. In addition, Bastrop 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.

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 of 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 Officer (SHPO) as the entity responsible for administering state-level programs. The NHPA also created the Advisory Council on Historic Preservation, the federal agency responsible for overseeing the process described in Section 106 of the NHPA (16 U.S.C. §470f) and for providing commentary on federal activities, programs, and policies that affect historic properties.

Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) contain the procedures for federal agencies to follow to take into account the effect of their actions on historic properties. The Section 106 process applies to any federal undertaking that has the potential to affect historic properties, defined at 36 CFR §800.16(l)(1) as "any prehistoric or

historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places." Although buildings and archaeological sites are most readily recognizable as historic properties, the NRHP contains a diverse range of resources that includes roads, landscapes, and vehicles. Under Section 106, federal agencies are responsible for identifying historic properties in the Area of Potential Effects (APE) for an undertaking; assessing the effects of the undertaking on these historic properties, if present; and considering ways to avoid, minimize, or mitigate any adverse effects. Because Section 106 is a process by which the federal government assesses the effects of its undertakings on historic properties, it is the primary regulatory framework that is used in the NEPA process to determine impacts on cultural resources.

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. The APE for the proposed project is the Welsh Tract project area, approximately 310 acres of forested land. No structures are in the project area; however, 214 structures, mostly single family homes, are within 2 miles of the project site.

Coordination with the SHPO, which is housed at the Texas Historical Commission (THC), was initiated via letter on July 19, 2012. On July 26, 2012, the SHPO concluded that the project was in an area of low probability for impacting archeological resources and that the project could proceed as planned without further consultation. See **Appendix C** for copies of the SHPO correspondence letters.

4.5.1 Historic Architectural Properties

Archival research conducted via the THC Texas Archeological Sites Atlas (Atlas) indicates that no previously recorded archeological sites are in the APE. According to the Atlas, Bastrop County has 953 registered historic sites (historic county courthouses, national register properties, state archeological landmarks, historical markers, cemeteries, museums, and military sites); however, no historic sites are within 500 feet of the proposed project area. The state registered historic sites in closest proximity to the project area include the Oak Hill and Herron cemeteries located west of the project area (THC 2013). **Figure 4.9** below shows a THC map of the project vicinity (THC 2013).

4.5.2 Archaeological Sites

Archival research conducted via the THC's Atlas indicated that no previously recorded archaeological sites have been identified within or in the immediate vicinity of the proposed project area.

4.5.3 Native American Cultural/Religious Sites

No federally recognized Indian tribes or traditional cultural properties are on or near the proposed project site. The Alabama and Coushatta Tribe in Livingston, Texas, is the closest of the three federally recognized Indian tribes in Texas. Livingston, Texas, is approximately 175 miles from Bastrop County (National Conference of State Legislatures 2013).

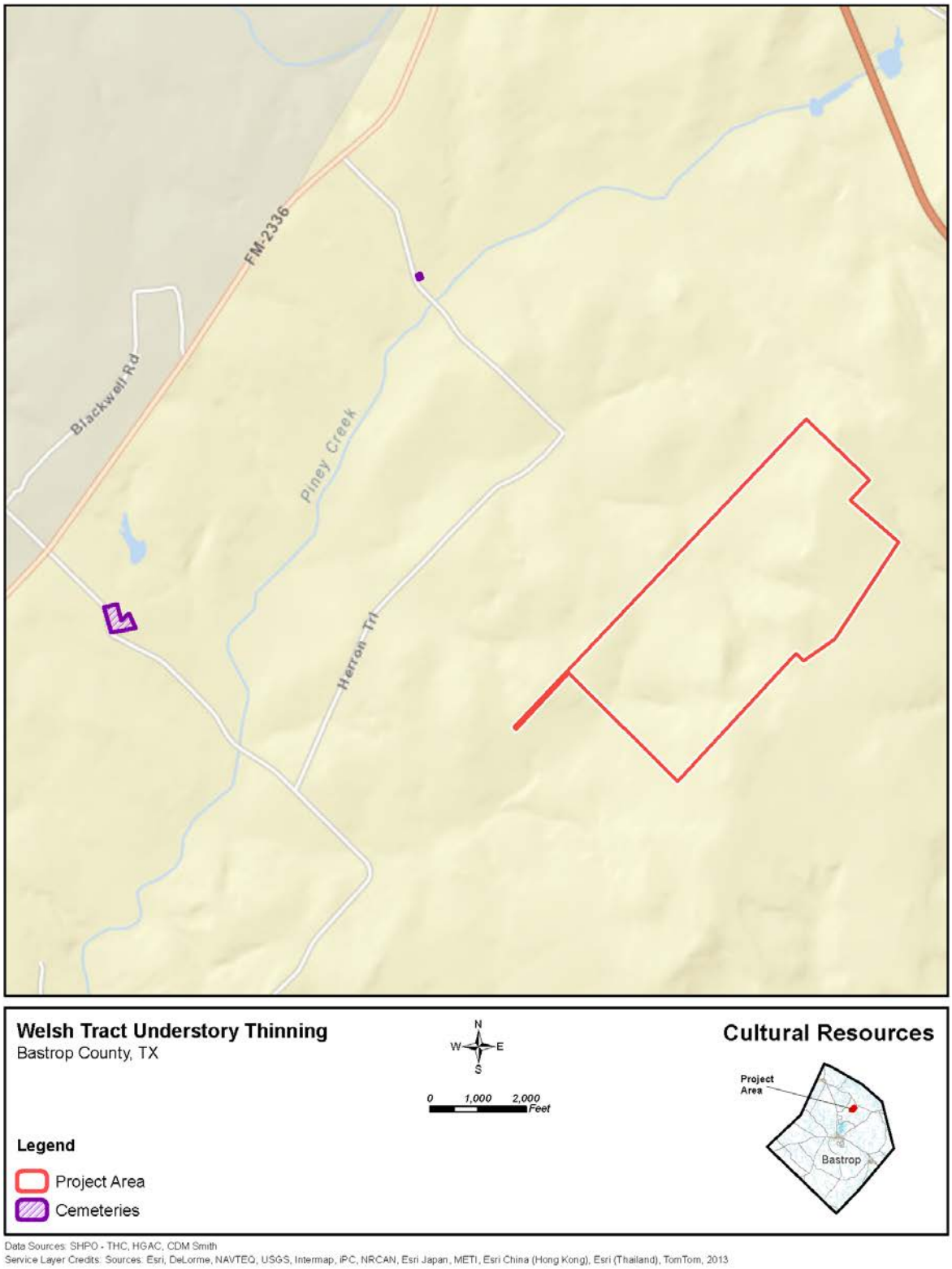


Figure 4.9. Cultural Resources near Welsh Tract

No Action Alternative

Under the no action alternative, no vegetation thinning would occur; therefore, this alternative would result in no effect on cultural resources, including historic properties.

Proposed Action

Based on archival research and correspondence with the SHPO, FEMA has determined that the proposed action would have no impact on historic properties. In the event that archeological deposits, including any Native American property, stone tools, bones, or human remains, are uncovered, Bastrop County shall stop all work immediately in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. All archeological findings will be secured and access to the sensitive area will be restricted. Bastrop 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.

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.

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 program alternatives may cause disproportionately high and adverse human health or environmental impacts on those populations.

This environmental justice analysis is focused at the local (census tract) level. The local area included in this analysis is where project-related activities would occur, or project-related traffic would increase, potentially causing an adverse and disproportionately high effect on neighboring minority and low-income populations. For this project, the analysis includes Census Tract 9505.1 in Bastrop County, inclusive of Welsh Tract. **Table 4.6** and **Table 4.7** provide economic and demographic characteristics for Census Tract 9505.01 (U.S. Census Bureau 2011). Information for Bastrop County as a whole is presented for comparison.

Table 4.6. Income

Parameter	Census Tract 9505.01	Bastrop County
Percentage of population below poverty level	12.3%	14.2%
Median family income	$61,123	$62,108
Median household income	$53,368	$52,882

Table 4.7. Minority Populations

Ethnic Composition	Census Tract 9505.01	Percentage	Bastrop County	Percentage
White alone	4,049	53.7%	42,405	57.8%
Black or African American alone	656	8.7%	5,847	8.0%
Asian alone	13	0.2%	493	0.7%
American Indian alone	11	0.2%	196	0.3%
Some Other Race/Multi-Ethnic	12	0.2%	130	0.2%
Total Population	**7,537**	**--**	**73,368**	**--**
Hispanic or Latino[1]	2,625	34.8%	23,349	31.8%
Total Minority Population[2,3]	**3,488**	**46.2%**	**30,963**	**42.2%**

Notes:
[1] The term "Hispanic" is an ethnic category and can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic 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.

Low-Income Populations

Persons living with an income below the poverty level are identified as "low-income," according to the annual statistical poverty thresholds established by the U.S. Census Bureau. For the purpose of this analysis, this guidance was applied at the regional level. Bastrop County has 14.2 percent of its population currently living in poverty; therefore, a local population with a total of 22.16 percent of its population living in poverty is considered to be meaningfully greater for this analysis. This analysis also considered whether an area's median household and per capita incomes were substantially lower than that of the county average.

According to **Table 4.6**, Census Tract 9505.01 has a median family income slightly lower and a median household income slightly higher compared to Bastrop County. Census Tract 9505.1 has

a level of poverty slightly lower than the county average, and it does not surpass the 22.16 percent poverty threshold. Therefore, the project area is not considered a low-income population.

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 4.7**, Census Tract 9505.1 has a total minority population larger than the county average but does not exceed the 50 percent minority threshold. The project area is not considered a minority population (U.S. Census Bureau 2011).

No Action Alternative

Under the no action alternative, all populations within the project area would continue to be at risk of a catastrophic wildfire. The no action alternative would not have a disproportionately high and adverse human health or environmental effect on low-income or minority populations and meets the requirements of EO 12898.

Proposed Action

The proposed action could have temporary air quality and traffic related effects on minority populations in close proximity to the project area. However, no residents reside within 200 feet of the proposed project area; therefore, any effects would be minor. See Section 4.2.2 Air Quality and Section 4.6.4 Traffic for additional information.

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

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 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.

The Envirofacts database contains no records of potentially hazardous sites, including Superfund, toxic release, industrial water dischargers, hazardous waste, or multi-activity sites, in the project area (EPA 2013b). The potentially hazardous site closest to the project area is the McDade Water Treatment Plant, located approximately 1 mile northeast from Welsh Tract. **Figure 4.10** below shows the potentially hazardous sites in Bastrop County closest to the project area (EPA 2013b).

No Action Alternative

Under the no action alternative, existing conditions with respect to hazardous materials would not change.

Proposed Action

Under the proposed action, no impacts from hazardous materials are anticipated because no Superfund sites, toxic release inventory sites, industrial water dischargers, hazardous waste facilities or sites, or multi-activity sites are in or within 1 mile of the proposed project site (EPA 2013b). Excavated soil and waste materials would be managed and disposed of in accordance with applicable local, state, and federal regulations. 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. There is always a minor threat of potential leaks of oil, fuels, or lubricants from mechanical equipment. The short-term nature of the project and use of equipment in good condition would reduce any potential effect to an insignificant level.

No herbicide use is proposed for project implementation. However, long term fuel reduction maintenance may include the use of herbicides. Any herbicides used would be species specific and adjusted for appropriate seasonal application. Herbicide application would be designed and supervised by licensed pesticide applicator personnel; therefore, no impacts are anticipated from potential herbicide use during maintenance.

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 (9 p.m. to 7 a.m.) are more annoying than those that occur during normal waking hours (7 a.m. to 9 p.m.). Noise is typically associated with climatic conditions (wind, thunder), transportation (traffic on roads, airplanes), and other "life sounds" (people talking, children playing). The potential effects of noise are related to distance from the source, background levels, and the randomness of a noise.

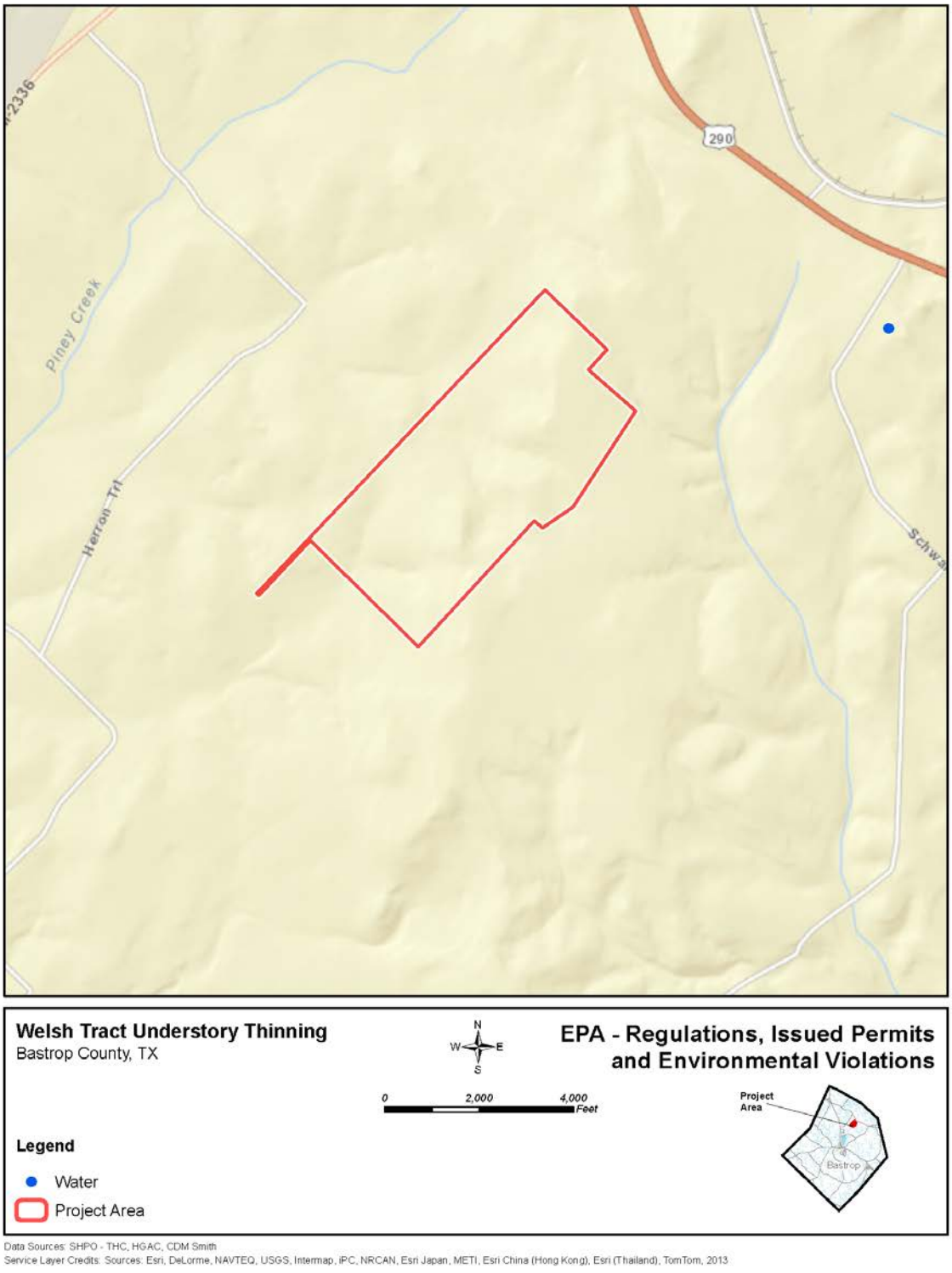


Figure 4.10. Hazardous Waste Sites near Welsh Tract

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. The project area is in a 400-acre vegetated tract of land owned and managed by Bastrop County. Although, approximately 213 residences are within a 2-mile radius of the Welsh Tract, the project site is a remote forested area with minimal internal traffic. Noise-generating activities within the project area have little potential to affect sensitive receptors because the nearest residences are more than 1,000 feet from the proposed work.

No Action Alternative

Under the no action alternative, no vegetation reduction activities would occur, and there would be no effect on noise levels in the project area.

Proposed Action

Under the proposed action, noise would be generated by operation of vegetation reduction equipment such as skidsteers with mulching heads, chainsaws, wood shredders, and trucks. Thinning actions would increase noise levels in the vicinity of the treatment areas. The increase in noise levels would be temporary (up to 90 days occurring over a period of approximately 6 weeks) and would occur during daytime hours. Because the nearest sensitive receptors are more than 1,000 feet from the proposed work and because noise attenuates with distance, the potential impacts would not be significant. All equipment and machinery at the proposed project site will meet all applicable local, state, and federal noise-control regulations.

4.6.4 Traffic

The project area is accessible via an unnamed gravel road off Herron Trail. The gravel road consists of a shared driveway with a private residence west of the project site. There is no formal circulation pattern within the project area, and unmaintained roads that do traverse the property are typically suited for high clearance vehicles with four-wheel drive. The closest major roadways to the project area are U.S. Highway 290 to the north, FM Road 2336 to the northwest, and Texas SH 21 to the southeast.

The Bastrop CWPP evaluated the existing access, egress, and evacuation conditions for the county in case of wildfire. The plan has identified more than 70 communities within the county that have inadequate emergency access, including the Welsh Tract area (Bastrop County Office of Emergency Management 2008). The forested nature of the project area does not allow for adequate entrances and exits, roads or pathways, sufficient turning spaces, or adequate space for firefighting operations.

No Action Alternative

Under the no action alternative, existing levels of local traffic would not change in the short-term, and no additional costs would be incurred from road construction or maintenance. Existing levels of traffic are likely to increase if surrounding development occurs.

Roads could be closed if a wildfire approached or encompassed local roads. A wildfire near the project area could close access roads. Depending on location and wind direction, smoke from a wildfire could close sections of bordering roadways or sections of U.S. Highway 290, FM 2336 or Texas SH 21. Short-term traffic congestion could occur during street and highway closures caused by a wildfire.

Limited emergency access, in combination with the heavily vegetated condition of the project area, would remain an issue under existing conditions and could contribute to difficulty in efficiently combating wildfires.

Proposed Action

Under the proposed action, vehicle traffic would be generated by work crews traveling to and from work sites. The amount of additional traffic would be temporary and minor and would not interfere with local residents or people traveling in the vicinity of the project area. In addition, all cut material would be mulched and left on site; therefore, there would be no hauling activities or effects from haul trucks.

Vegetative thinning would reduce the risk of a wildfire encompassing a road near the project area. Thus, the potential for road closures due to wildfire would be reduced. Thinning would also improve emergency access to and within the project site in the event of a wildfire, improving conditions for firefighters and reducing the potential for a catastrophic fire.

4.6.5 Public Services and Utilities

4.6.5.1 Utilities

Presently, the rural nature of the project area means the demand for utility services is low. The project area energy provider is Bluebonnet Regional and Economic Development, an electric cooperative that serves more than 80,000 meters and maintains more than 11,000 miles of power lines in its 14-county region, which includes Bastrop County. Overhead power lines are present on the southwestern corner of the project area and provide power to a small support structure near the project area entrance. No other power lines traverse or service the project area (Bluebonnet Regional and Economic Development No date).

The Aqua Water Supply Company (WSC), a nonprofit resident-owned corporation, is the water provider in the vicinity of the project area (Aqua WSC 2013). However, the project area itself is not currently serviced by Aqua WSC since no potable water source is available on site. The site does have a private groundwater well available for fire suppression.

No Action Alternative

Under the no action alternative, utilities in the project area would not be directly affected. However, the potential for wildfires would continue to be high in the project area, and electrical services provided via overhead power lines could be adversely affected by a wildfire.

Proposed Action

Under the proposed action, vegetative thinning actions would not directly affect or require additional utilities in the project area. The proposed action would reduce the risk of a wildfire in the project area causing damage to overhead utility lines.

4.6.5.2 Emergency Services

Bastrop County is serviced by nine fire stations staffed mainly by volunteers. The project area is centrally located between the Elgin Fire Department in the City of Elgin and the Paige Volunteer Fire Department in the City of Paige. The Elgin Fire Department has 45 volunteer staff, and the Paige Volunteer Fire Department has 15 volunteer staff. Both departments provide fire suppression and rescue services (Elgin Volunteer Fire Department 2013 and Fire Department Directory 2013). Various informal volunteer firefighting groups have also been established by Bastrop County residents.

The Bastrop County CWPP states that sufficient and consistent volunteer involvement is an issue for many of the departments, making maintenance of an adequate level of firefighting skills a concern for the county. In addition, the county experiences difficulty in obtaining and maintaining sufficient gear and protective clothing required to combat catastrophic wildfires.

Medical services within the county are provided by two hospitals: Smithville Regional Hospital in the City of Smithville and Lakeside Hospital in the City of Bastrop. Emergency medical transport (ambulance) services are provided through a private contracted service. In addition, the county promotes a volunteer first responders program in cooperation with the contracted service provider (Bastrop County, Office of Emergency Management 2008).

The project area is serviced by the Bastrop County Sherriff's Department (Bastrop County No date).

No Action Alternative

Under the no action alternative, there would be no change in emergency response time. The risk of a major wildfire in the project area would continue at its current high level. During a major wildfire, these emergency personnel would not be available to respond to other emergencies in their service area.

Proposed Action

Under the proposed action, vegetative thinning 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 potential for emergency services to be directed to controlling a wildfire and would allow emergency responders to remain available to respond to other emergencies throughout the county.

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.

Heavy rain 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 downstream from the project area.

Population growth has many implications related to wildfire hazards and the need for vegetation management. With more people, there is a greater risk of human-caused wildfires and a greater need for protection from wildfires. The current population for Bastrop County is 75,115. Bastrop County experienced an increase in population of 0.8 percent from 2010 to 2012 (U.S. Census Bureau 2013).

No Action Alternative

A major wildfire in the project area would be more likely under the no action alternative. If a wildfire occurred, people 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. Major wildfires are also a major threat to the health and safety of frontline firefighters.

Proposed Action

Under the proposed action, the primary objective of the thinning of existing vegetation would be to reduce the rate of spread and intensity of a wildfire in the project area. Thinning would create a safer environment from which firefighters could fight a wildfire, reduce the rate at which fires spread, and would make fires more feasible to control. Thinning would not prevent wildfires but could contribute to containment, which would reduce risk for people and their homes.

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 or permits, and proposed or required mitigation or BMPs.

Table 4.8. Summary of Impacts and Mitigation

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Soils	Short-term soil disturbance from mechanical equipment. Mulched vegetated material left on site would reduce soil erosion, enhance infiltration and delay regrowth of woody vegetation. Applying mulch could cause a temporary reduction in soil productivity. No impact to prime and unique farmland.	Not applicable (NA)	When feasible, heavy machinery would be equipped with rubber tracks to reduce soil disturbance. Temporary silt fences will be put up to reduce erosion effects as necessary.
Air Quality	Short-term and localized minor impacts from vegetation removal equipment emissions.	NA	Fuel-burning equipment running times will be kept to a minimum and engines must be properly maintained.
Climate Change	No impact.	NA	NA
Visual Quality and Aesthetics	Change in visual aesthetics from tree and understory removal.	NA	NA
Water Quality - Surface Water	Minor short-term adverse impacts on surface water quality from erosion and sedimentation caused by temporary soil disturbance.	TCEQ	Cut vegetation would be mulched and utilized for temporary erosion control to prevent soil and sediment from reaching nearby creeks. Appropriate barriers would be used to prevent any mulch from being washed into the creeks.
Water Quality - Groundwater	No impact.	TWDB	NA

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Wetlands	No impact.	USDA and USFWS	No fuel reduction work would be done in wetlands. Barriers and other BMPs to reduce sedimentation of nearby waters and wetlands.
Floodplains	No impact.	FEMA	No fuel reduction work would be done in floodplains.
Vegetation	Long-term reduction in understory and certain vegetation species.	USFWS	NA
Wildlife	Short-term minor impact to nesting birds.	USFWS	Removal of vegetation with active migratory bird nests will be avoided.

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Threatened and Endangered Species/Critical Habitat	Short-term adverse impact to Houston toad, with a long-term benefit to Houston toad habitat. No effect on Whooping crane and Navasota ladies'-tresses. No take of migratory birds is anticipated.	USFWS	Bastrop County must conduct activities in line with the LPHCP, Appendix F in particular, and comply with all conditions of USFWS permit #TE-113500-0. Should a Houston toad be encountered during project implementation, work must cease immediately. The USFWS's Clear Lake Ecological Services Office will be contacted at (281) 286-8282. Bastrop County will limit work during March through August as much as possible. For activities during nesting season, Bastrop County will deploy a qualified biological monitor to survey area for nests prior to conducting work. If an occupied migratory bird nest is found, work within a buffer zone around the nest will be postponed until the nest is vacated and juveniles have fledged. Bastrop 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. 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.

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Cultural Resources	No impact.	THC	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 finds. Bastrop County must secure all archeological findings and restrict access to the sensitive area. Bastrop County 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.
Environmental Justice	No impact.	NA	NA
Hazardous Materials	No impact.	TCEQ	Excavated soil and waste materials would be managed and disposed of in accordance with applicable local, state, and federal regulations. 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	Short-term minor impacts.	NA	Work would be limited to daytime hours. All equipment and machinery will meet all local, state, and federal noise requirements.
Traffic	Short-term minor impacts.	NA	Vegetation thinning would be conducted during daytime hours, and alternate access would be provided to the maximum extent possible.

Affected Environmental Resource Area	Impacts	Agency Coordination/ Permits	Mitigation/BMPs
Public Services and Utilities	Beneficial effect on utilities and emergency services by reducing the risk of a major wildfire, which could affect overhead power lines and stress emergency services.	NA	NA
Public Health and Safety	Beneficial effect on public health and safety from reduction in wildfire hazard.	NA	NA

SECTION 5 Cumulative Impacts

Cumulative impacts are the combined impacts of the proposed action and other past, present, and reasonably foreseeable future actions, regardless of who undertakes the actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions.

As previously mentioned, the most destructive wildfire in Texas history ignited in Bastrop County in September 2011, destroying approximately 1,700 structures and burning approximately 33,000 acres. The wildfire resulted in a moderate burn to portions of the Welsh Tract. In addition to this past impact to Welsh Tract and its surroundings, Bastrop County and the City of Bastrop have several other hazardous fuels reduction and defensible space projects planned for the near future in the areas around the City of Bastrop.

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 essentially no impact on water resources, wetlands, floodplains, wildlife or vegetation, cultural resources, and environmental justice and would have a beneficial impact on public services and utilities and public health and safety, the proposed action would not contribute to significant cumulative impacts on these resources. Similarly, the proposed action is not expected to have an impact related to hazardous materials and would therefore not contribute to a cumulative impact.

Operation of heavy equipment during fuels reduction would disturb soils. In addition to hazardous fuels reduction work proposed on Welsh Tract, two other wildfire mitigation projects are proposed in the surrounding area, and the proposed work could have a cumulative effect. However, with the implementation of BMPs to protect soils, a significant adverse cumulative impact on soils would not be expected.

Temporary noise, traffic, and air quality impacts of the proposed action could combine with similar impacts of other projects occurring at the same time, but the combined impact is not expected to be significant.

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 Bastrop County Welsh Tract 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 responses from resource agencies are provided in **Appendix C**.

6.2 Public Participation

The public information process for the proposed project will include a public notice in the *Bastrop Advertiser*, the local general circulation newspaper that covers Bastrop County. The public notice will state that information about the proposed action, including this environmental assessment, is available at the Office of the Bastrop County Judge located at 804 Pecan Street, Bastrop, Texas 78602. The notice will invite the public to submit their comments about the proposed project, potential impacts, and proposed mitigation measures so that they may be considered and evaluated. FEMA will consider and respond to all public comments in the final EA. If no substantive comments are received, the draft EA will become final, and a FONSI will be issued for the project. At this time, a public meeting is not planned because the proposed action is not considered controversial.

6.3 Permits

Bastrop County will conduct the proposed project in line with USFWS Permit# TE-113500-0, which covers the incidental take of the federally endangered Houston toad for activities included in the LPHCP. No other local, state, or federal permits appear to be necessary to implement the proposed fuel reduction project. The proposed action does not require coverage under Texas Pollutant Discharge Elimination System construction storm water 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).

SECTION 7 References

Aqua Water Supply Corporation. 2013. Zone Boundaries Map. Accessed on: June 14, 2013. Available at: http://aquawsc.com/content/AQUA.ZoneMap.11X17_3.pdf.

Austin American Statesman. 2011. Collective Vision: Statesman Photo & Multimedia Blog. Accessed on: June 5, 2013. Available at: http://photoblog.statesman.com/2011/09.

Bastrop County. No date. Webpage. Accessed on: June 13, 2013. Available at: http://www.co.bastrop.tx.us/.

Bastrop County Office of Emergency Management. 2008. *Bastrop County Community Fire Wildfire Protection Plan.* Approved June 23.

Bluebonnet Regional Economic Development Department. No date. Website. Accessed on: June 14, 2013. Available at: http://www.bluebonnetregion.com/.

Council on Environmental Quality. 1997. *Environmental Justice—Guidance Under the National Environmental Policy Act.* Accessed on: June 13, 2013. Available at: http://ceq.hss.doe.gov/nepa/regs/ej/justice.pdf.

Elgin Volunteer Fire Department. 2013. Texas, Bastrop County Fire Departments, Webpage. Accessed on: June 13, 2013. Available at: http://elginvfd.org/news.php.

Federal Emergency Management Agency. 2012. What is the Hazard Mitigation Grant Program Webpage. Accessed on: May 22, 2013. Available at: http://www.fema.gov/news/newsrelease.fema?id=60756.

Federal Emergency Management Agency. Flood Insurance Rate Maps. Obtained from FEMA Map Service Center. Accessed on: July 21, 2013. Available at: https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1.

FireCAP, Inc. 2008. Bastrop County Community Wildfire Protection Plan. Available at: http://www.firecap.org/PDF/Approved_Bastrop_County_Wildfire_Protection_Plan.pdf.

Fire Department Directory. 2013. Webpage. Accessed on: June 13, 2013. Available at: http://firedepartmentdirectory.com/.

Forstner, M. R. J., D. Wallace, J. Bell, D. Stout, and J.T. Jackson. 2011. Houston toad 2011 data and final report for the Lost Pines Habitat Conservation Plan annual monitoring, Bastrop County, Texas. Bastrop County Lost Pines Habitat Conservation Plan Office, Bastrop Texas.

Forstner , M.R. 2013. Personal Communication. Email dated July 18, 2013 to Roger Schenk.

Gould, F. W., Hoffman, G. O., and Rechenthin, C. A. 1960. Vegetational Areas of Texas, Texas A&M University. Texas Agricultural Experiment Station, Leaflet No. 492.

Interagency Wild and Scenic Rivers Council. 2013. Designated Wild and Scenic Rivers Webpage. Accessed on: June 3, 2013. Available at: http://www.rivers.gov/wsr-rio-grande-texas.html.

Lost Pines Recovery Team. 2011. *Bastrop County Complex Fire Lost Pines Region Resources Assessment and Response Report.* November 10. Accessed on: July 21, 2013. Available at: http://www.co.bastrop.tx.us/.

National Conference of State Legislatures. 2013. Federally Recognized Tribes, Texas. Accessed on: June 13, 2013. Available at: http://www.ncsl.org/issues-research/tribal/list-of-federal-and-state-recognized-tribes.aspx.

Texas A&M Forest Service. 2011. 2011 Texas Wildfires: Common Denominators of Home Destruction.

Texas A&M Forest Service. 2013. Wildfire Risk Assessment Portal Website. Accessed on: June 13, 2013. Available at: http://www.texaswildfirerisk.com/.

Texas Commission on Environmental Quality. 2013. 2012 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) Webpage. Accessed on: June 17, 2013. Available at: http://www.tceq.texas.gov/waterquality/assessment/10twqi/10twqi.

Texas General Land Office. 2012. Coastal Management Program Website. Accessed on: June 13, 2013. Available at: http://www.glo.texas.gov/what-we-do/caring-for-the-coast/grants-funding/cmp/index.html.

Texas Historical Commission. 2013. Texas Historical Sites Atlas, Bastrop County. Accessed on: June 13, 2013. Available at: http://atlas.thc.state.tx.us/shell-county.htm.

Texas Parks and Wildlife Department. 2012. Annotated County Lists of Rare Species – Bastrop County. Accessed on: July 21, 2013. Available at: http://www.tpwd.state.tx.us/gis/ris/es/ES_Reports.aspx?county=Bastrop.

Texas Water Development Board (TWDB). 2006a. Major Aquifers of Texas Webpage. Accessed on: June 17, 2013. Available at: http://www.twdb.state.tx.us/mapping/doc/maps/aqu_maj_8x11.pdf.

Texas Water Development Board (TWDB). 2006b. Minor Aquifers of Texas Webpage. Accessed on: May 16, 2013. Available at: http://www.twdb.state.tx.us/mapping/doc/maps/aqu_min_8x11.pdf.

U.S. Census Bureau. 2011. American Community Survey 1 Year Estimates, Bastrop County. Accessed on: June 13, 2013. Available at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

U.S. Census Bureau. 2013. State and County QuickFacts, Bastrop County. Accessed on: June 13, 2013. Available at: http://quickfacts.census.gov/qfd/states/48/48021.html.

U.S. Department of Agriculture, Forest Service. 2005. Wildland Fire in Ecosystems: Effects of Fire on Soil and Water. General Technical Report RMRS-GTR-42-volume4.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NCRS). 2013. Web Soil Survey Webpage. Accessed on: June 10, 2013. Available at: http://websoilsurvey.nrcs.usda.gov.

U.S. Environmental Protection Agency. 2013a. The Green Book Nonattainment Areas for Criteria Pollutants. Accessed on: June 18, 2013. Available at: http://www.epa.gov/oar/oaqps/greenbk/.

U.S. Environmental Protection Agency. 2013b. Envirofacts database. Accessed on: June 13, 2013. Available at: http://www.epa.gov/enviro/.

U.S. Fish and Wildlife Service. 2012. National Wetlands Inventory Website. Accessed on: June 13, 2013. Available at: http://www.fws.gov/wetlands/Data/Mapper.html.

U.S. Fish and Wildlife Service. 2013. Species by County Report: Bastrop County, Texas Available at: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=48021. Accessed August 26, 2013.

SECTION 8 List of Preparers

The following is a list of preparers who contributed to the development of the Bastrop County Welsh Tract Hazardous Fuels Reduction EA for FEMA.

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.

CDM Smith

Preparers	Experience and Expertise	Role in Preparation
Beverly, Howard	Senior Cultural Resource Specialist	Cultural Resources
Boucher, Hank	Environmental Engineer and Planner	Project Manager
Evans, Selena	Environmental Planner	Cultural Resources, Environmental Justice, Hazardous Materials, Noise, Traffic, Public Utilities, Public Health and Safety, Agency Coordination, Public Involvement and Permits
Kase, Sydney	GIS Specialist	Data Collection, Data Management, General GIS Support, Figure Production
McAuley, Erin	Environmental Planner	Introduction, Purpose and Need, Alternatives, Soils, Air Quality, Cumulative Impacts, Field Work
Poyant, Andrew	Environmental Scientist	Biological Resources
Rugg, Mack	Senior Environmental Scientist	Technical Review and Editing
Schenk, Roger	Senior Environmental Scientist	Field Work
Stenberg, Kate	Senior Biologist, Senior Planner	NEPA Documentation, Technical Review
Wade, Murray	Senior Environmental Scientist	Biological Resources, Water Resources

CH2M Hill

Preparer	Experience and Expertise	Role in Preparation
Speights, Jason	Biologist	Biological Site Visit and notes
Willey, Jack	Environmental Engineer, EIT	Biological Site Visit and notes

Federal Emergency Management Agency

Reviewers	Role in Preparation
Jaynes, Kevin, Regional Environmental Officer	Technical Review and Approval
Weir, Dorothy, Environmental Specialist	Technical Review and Approval

Appendices

Appendix A
Water Resources Data

1. Wild and Scenic Rivers Map
2. Sole Source Aquifer Map
3. FEMA Flood Insurance Rate Maps

Welsh Tract Understory Thinning
Bastrop County, TX

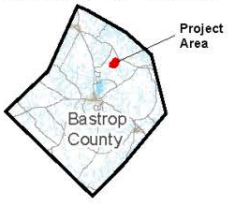
N
W E
S

0 50 100 Miles

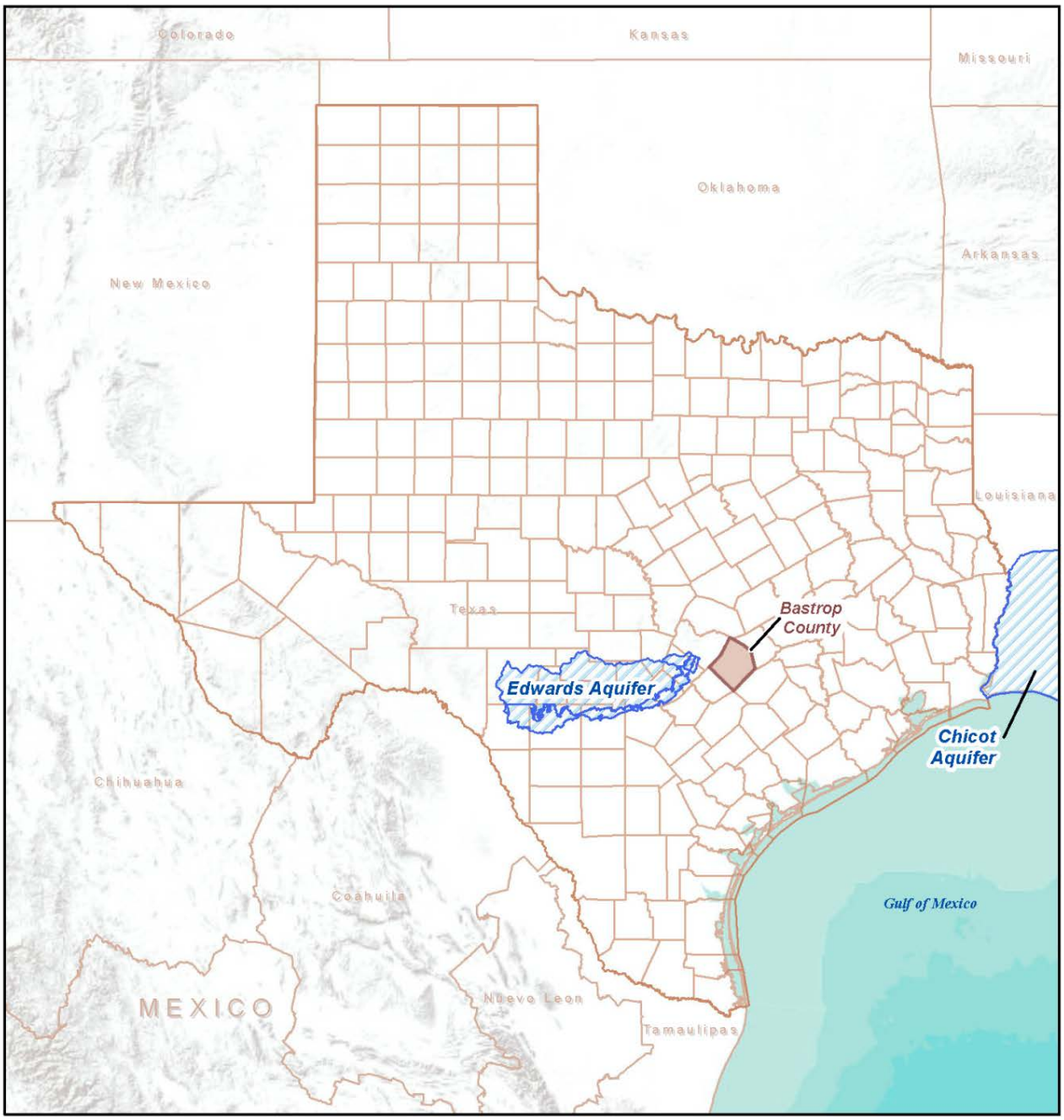
Legend

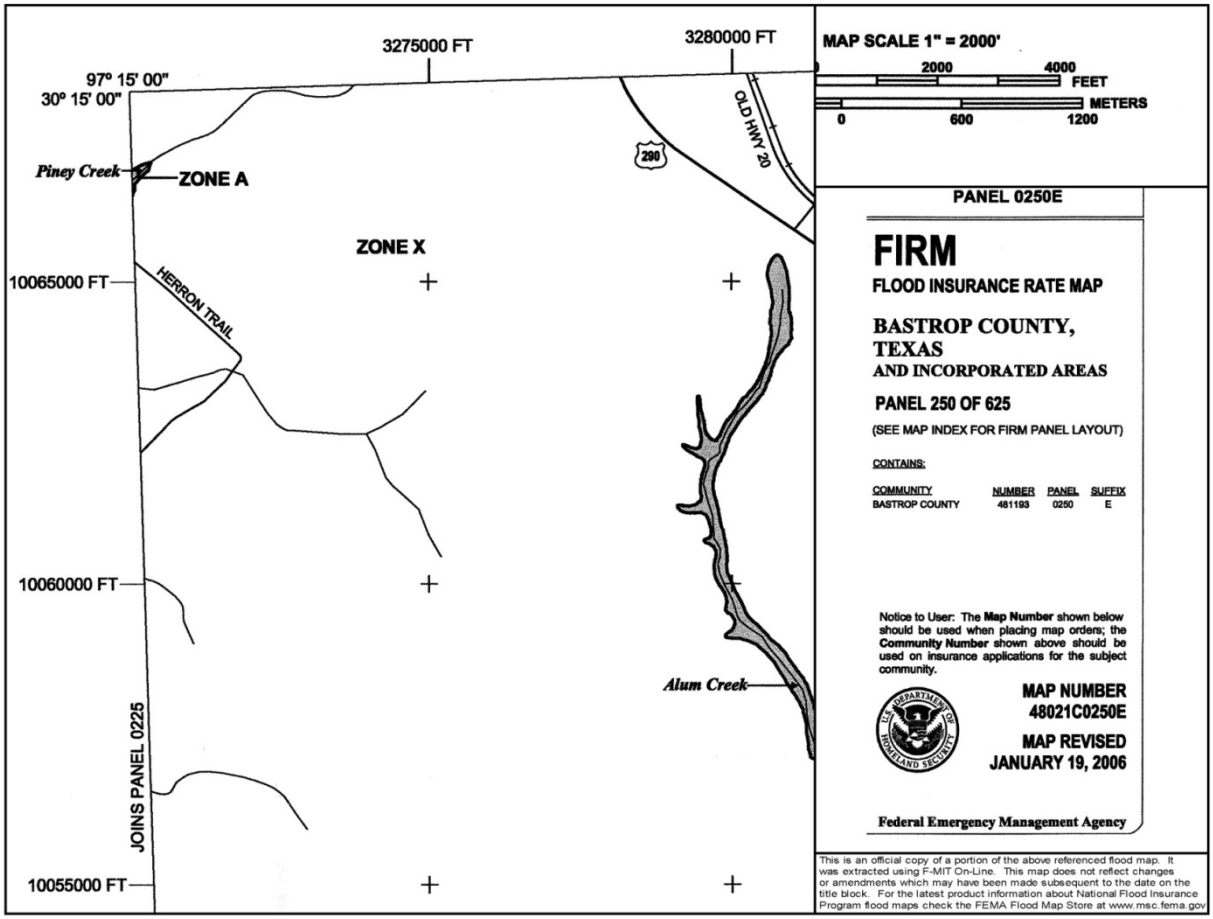
- Designated River Segment
- Nondesignated River Segment
- Area of Interest

Designated Wild and Scenic Rivers of Texas



Data Sources: EPA; TNRIS
Service Layer Credits: Sources: Esri, USGS, NOAA


Colorado
Kansas
Missouri
Oklahoma
Arkansas
New Mexico
Louisiana
Texas
Bastrop County
Edwards Aquifer
Chicot Aquifer
Chihuahua
Coahuila
Gulf of Mexico
MEXICO
Nuevo Leon
Tamaulipas
Welsh Tract Understory Thinning
Bastrop County, TX
N
W
E
S
0 50 100 Miles
Sole Source Aquifers
Project Area
Bastrop County
Legend
Sole Source Aquifer
Area of Interest
Data Sources: EPA; TNRIS
Service Layer Credits: Sources: Esri, USGS, NOAA


3275000 FT
3280000 FT
97° 15' 00"
30° 15' 00"
Piney Creek
ZONE A
ZONE X
OLD HWY 20
290
10065000 FT
HERRON TRAIL
10060000 FT
Alum Creek
JOINS PANEL 0225
10055000 FT
MAP SCALE 1" = 2000'
2000
4000
FEET
METERS
0
600
1200
PANEL 0250E
FIRM
FLOOD INSURANCE RATE MAP
BASTROP COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 250 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
BASTROP COUNTY 481193 0250 E
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
48021C0250E
MAP REVISED
JANUARY 19, 2006
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix B
Biological Site Visit Field Notes

Appendix B Table 1 Habitat Type Summary FEMA HMTAP Welsh Tract

Habitat Type	Dominant Plant Species	Animal Species Observed
Post Oak/Cedar Flatwoods Located at S1, S8, S12, S13, S14 and S24	Canopy: post oak, eastern red cedar, sparse blackjack oak on higher elevations. Canopy cover 95 percent. Midstory: Yaupon, American beautyberry. Cover 30 percent. Ground cover: Prickly pear cactus, panicum sp., dewberry, greenbriar, little bluestem, horsemint. Ground cover 40 percent	White-tailed deer, fox squirrel, greater roadrunner, eastern bluebird, mourning dove, yellow-rumped warbler, indigo bunting.
Pine Flatwoods. Located at S2	Overstory: Loblolly pine. Canopy cover 90 percent Midstory : Eastern red cedar, American beautyberry, yaupon. Cover 30 percent Ground Cover: Dog fennel, dewberry. Cover 80 percent	Red-eyed vireo, northern cardinal
Cedar Flatwoods at S3, S7, S10	Canopy: Eastern red cedar, post oak. Cover 90 percent Midstory: Yaupon, American beautyberry, post oak saplings. Cover 80 percent Ground cover: Greenbriar. Cover 20 percent	Northern cardinal, white-tailed deer, mourning dove, ground dove, blue jay, Red-beliied woodpecker, indigo bunting
Mixed Flatwoods. Located at S4	Canopy: Eastern red cedar, post oak, loblolly pine. Cover 80 percent Midstory: Yaupon, eastern red cedar. Cover 80 percent. Ground cover: Panicum sp., prickly pear. Cover 10 percent	Northern cardinal, red-eyed vireo, yellow-rumped warbler.

Appendix B Table 2 Listed Species Summary FEMA HMTAP Welsh Tract

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
Amphibians						
Houston toad	*Anaxyrus houstonensis*	LE	E	Endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations.	Potential to occur in suitable pond habitat within the project area. From the NWI map it appears that a site or two may have some pond habitat. These should be checked.	Low quality habitat present. Ephemeral pond was dry despite recent rains and not likely to support breeding. No other breeding habitat present.
Birds						
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	Unlikely to occur. No breeding habitat occurs and is also a migratory transient.	No breeding or stopover habitat present.
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	--	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	Unlikely to occur. No suitable lake shore, coastline, or barrier island habitat occur in the project area and this species is a transient migrant.	No breeding or stopover habitat present.
Bald Eagle	*Haliaeetus leucocephalus*	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	Unlikely to occur. No suitable river or large lake habitat.	No foraging habitat present.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
Henslow's Sparrow	*Ammodramus henslowii*	--	--	Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking	Potential to occur in limited suitable habitat within the project area. However the project should not pose potential impacts since wintering habitats preferred by this species will not be decreased.	Unlikely to occur. Weedy fields present, but have dense ground cover.
Interior Least Tern	*Sterna antillarum athalassos*	LE	E	Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony.	Unlikely to occur. No suitable river habitat occurs near or in the project area.	Unlikely to occur. No river habitat present.
Mountain Plover	*Charadrius montanus*	--	--	Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.	Unlikely to occur. No suitable praire habitat in the project area.	Unlikely to occur. No prairie habitat present.
Peregrine Falcon	*Falco peregrinus*	DL	T	Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	Low potential to occur as no breeding habitat occurs and is also a migratory transient.	No breeding or stopover habitat present.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
Sprague's Pipit	*Anthus spragueii*	C	--	Only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	Low potential to occur as no breeding habitat occurs and is also a migratory transient.	Unlikely to occur. No large native prairie habitat present.
Western Burrowing Owl	*Athene cunicularia hypugaea*	--	--	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	Low potential to occur. Limited suitable habitat in the project area.	Unlikely to occur. No prairie, plain, or savanna habitats present.
Whooping Crane	*Grus americana*	LE	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Low potential to occur as no breeding habitat occurs in the project area and this species is also a migratory transient.	Unlikely to occur. No coastal prairie or large open habitats present for stopover.
Wood Stork	*Mycteria americana*	--	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960	Low potential to occur in limited suitable habitat at the western limit of the project. From the aerials it appears that limited pond habitat and field habitat may be present.	Unlikely to occur. No permanent aquatic resources present.
Crustaceans						
A crayfish	*Procambarus texanus*	--	--	Ponds	Unlikely to occur due to the limited number of ponds onsite.	Unlikely to occur. Ephemeral ponds present.
Fishes						
Blue sucker	*Cycleptus elongatus*	--	T	Larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles.	Unlikely to occur. No suitable riverine habitat.	Unlikely to occur. Ephemeral ponds present.
Guadalupe bass	*Micropterus*	--	--	Endemic to perennial streams of the Edward's Plateau region;	Unlikely to occur. No suitable riverine	Unlikely to occur. Ephemeral

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
	treculii			introduced in Nueces River system.	habitat.	ponds present.
Mammals						
Cave myotis bat	*Myotis velifer*	--	--	Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.	Unlikely to occur. No suitable cave habitat in the project area and limited foraging habitat in the project area.	Unlikely to occur. No cave habitat or large abandoned structures present.
Elliot's short-tailed shrew	*Blarina hylophaga hylophaga*	--	--	Sandy areas in live oak mottes, grassy areas with a Loblolly pine (Pinus taeda) overstory, and grassy areas near Post oak (Quercus stellata) stands; burrows extensively under leaf litter, logs, and into soil, but ground cover is not required; needs soft damp soils for ease of burrowing.	Potential to occur in suitable habitat within the project area. Soils mapped as Silstid loamy fine sand with 1 to 5 percent slopes occurs in various places of the project property.	Potential to occur. Habitat present in the Pine and post oak/cedar habitats.
Plains spotted skunk	*Spilogale putorius interrupta*	--	--	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Potential to occur in suitable habitat within the project area. From aerial photography, it appears that approximately 29 acres of non-forest habitat occurs along with forest edge and field habitat on the project property.	Potential to occur. Habitat present at field edges
Red wolf	*Canis rufus*	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	Unlikely to occur. Not known to occur in project area.	Unlikely to occur. Extirpated.
Mollusks						
Creeper (squawfoot)	*Strophitus undulatus*	--	--	Small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins	Unlikely to occur. No suitable stream habitat in the project area.	Unlikely to occur. No permanent aquatic resources present.
False spike mussel	*Quadrula mitchelli*	--	T	Possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the	Unlikely to occur. No suitable riverine habitat in the project area.	Unlikely to occur. No permanent aquatic resources present.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
				site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins.		
Smooth pimpleback	*Quadrula houstonensis*	C	T	Small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins.	Unlikely to occur. No suitable stream or reservoir habitat in the project area.	Unlikely to occur. No permanent aquatic resources present.
Texas fawnsfoot	*Truncilla macrodon*	C	T	Little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins.	Unlikely to occur. No suitable stream habitat in the project area.	Unlikely to occur. No permanent aquatic resources present.
Texas pimpleback	*Quadrula petrina*	C	T	Mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins.	Unlikely to occur. No suitable stream habitat in the project area.	Unlikely to occur. No permanent aquatic resources present.
Reptiles						
Texas garter snake	*Thamnophis sirtalis annectens*	--	--	Wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August.	Low potential to occur in suitable habitat within the project area. Wet and moist habitats may occur in a few areas, as indicated by aerial photography.	Unlikely to occur. No moist or wet habitats present.
Texas horned lizard	*Phrynosoma cornutum*	--	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	Unlikely to occur due to a lack of preferred habitat in the project area.	Unlikely to occur. Ground cover dense in open areas.
Timber/Canebrake rattlesnake	*Crotalus horridus*	--	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto	Potential to occur in suitable habitat within the project area.	Likely to occur. Habitat present across all habitat types.

Species (Common) [1]	Species	Federal Status	State Status	Habitat Description	Habitat Present in Survey Areas (Desktop Assessment)	Habitat Present in Survey Areas (Field Assessment)
Plants						
Green beebalm	*Monarda viridissima*	--	--	Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white.	Potential to occur in suitable habitat within the project area.	Potential to occur. Sandy soils in post oak woodlands present.
Navasota ladies'-tresses	*Spiranthes parksii*	LE	E	Texas endemic; openings in post oak woodlands in sandy loams along upland drainages or intermittent streams, often in areas with suitable hydrologic factors, such as a perched water table associated with the underlying claypan; flowering populations fluctuate widely from year to year, an individual plant does not flower every year; flowering late October-early November (-early December).	Potential to occur in suitable habitat within the project area.	Unlikely to occur. Sandy soils in post oak woodlands present, but no evidence of perched water table
Sandhill woollywhite	*Hymenopappus carrizoanus*	--	--	Texas endemic; disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June.	Potential to occur in suitable habitat within the project area.	Potential to occur. Sandy soils in post oak woodlands present.
Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*	--	--	Mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country.	Potential to occur in suitable habitat within the project area.	Unlikely to occur. No coastal prairie or brush habitat present.

Status Keys:
LE - Federally Listed Endangered
C - Federal Candidate for Listing; formerly Category 1 Candidate
DL - Federally Delisted
E, T - State Listed Endangered/Threatened
1 -Based on information provided at http://www.tpwd.state.tx.us/gis/ris/es/SpeciesList.aspx?parm=Bastrop

Appendix C
Agency Coordination Letters

1. Texas Commission on Environmental Quality July 25, 2012

2. Texas Historical Commission July 26, 2012

3. Section 7 Endangered Species Act Consultation

    - U.S. Fish and Wildlife Concurrence Letter August 21, 2013
    - Federal Emergency Management Agency Consultation Initiation Letter and attachments May 13, 2013

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 25, 2012

Mr. Mike Fisher
Bastrop County
804 Pecan Street
Bastrop , Texas 78602

Re: TCEQ Grant and Texas Review and Comment System (TRACS) #2012-281, City of Bastrop, Bastrop County – Bastrop County plans to reduce hazardous fuels on 310 acres of forested land owned and managed by the county.

Dear Mr. Fisher:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers following comments:

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 indicates that the proposed action is located in the City of Bastrop, Bastrop County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, General Conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any and particulate emissions should be easily controlled by using standard dust mitigation techniques.

We do not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities associated with it are completed in accordance with applicable local, state, and federal environmental permits and regulations. We recommend that the applicant take necessary steps to insure that best management practices are utilized to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Thank you for the opportunity to review this project. If you have any questions, please contact Ms Janie Roman at (512)239-0604 or Janie.roman@tceq.texas.gov.

Sincerely,

Jim Harrison, Director
Intergovernmental Relations Division

TEXAS HISTORICAL COMMISSION
real places telling real stories

July 26, 2012

Mike Fisher
Bastrop County, Emergency Management Coordinator
804 Pecan Street
Bastrop, Texas 78602

Re: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas
Hazardous Fuels Reduction on 310 Acres of Forested Land Owned and Managed by the County, Bastrop County, Texas.

Dear Mr. Fisher:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed federal undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

The review staff, led by Jeff Durst, has examined our records. According to our maps, the proposed location of the hazardous fuels reduction project appears to be located in an area of low probability for impacting archeological resources. This project may proceed without further consultation with this office, provided that no significant archeological deposits are encountered during the clearing project. In the event that any cultural materials (including human remains or burial features) are discovered, all work at the location should cease immediately and the Texas Historical Commission should be notified of the discovery.

Thank you for your cooperation in this federal and state review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Jeff Durst at 512/463-8884.**

Sincerely,

Patricia Mercado-Allinger
for
Mark Wolfe, State Historic Preservation Officer
MW/jjd

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Coastal Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, Texas 77058
281/286-8282 / (FAX) 281/488-5882

In Reply Refer To:
FWS/R2/CLES/

August 21, 2013

Kevin Jaynes
U.S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, Texas 76209-3698

Dear Mr. Jaynes:

Thank you for your letter dated May 13, 2013, initiating consultation pursuant to Section 7 of the Endangered Species Act (Act) for the Federal Emergency Management Agency's (FEMA) funding of recovery operations related to the Bastrop County Complex Fire of September 2011. FEMA is providing funding to undertake wildfire mitigation (mechanical thinning of understory vegetation) within approximately 310 acres of the 400-acre Bastrop County-owned Welsh Tract. The fire recovery actions considered herein occur within Bastrop County, Texas.

As described in the original request and subsequent additional information dated July 1 and July 7, 2013, the project includes removal of ladder fuels (understory vegetation) that will reduce the wildfire fuel load on the property. FEMA determined that the wildfire mitigation actions are likely to adversely affect the federally endangered Houston toad *Bufo houstonensis*. FEMA has proposed to fund these activities, which are to be completed by Bastrop County (or its contractors) and requested that any related take of Houston toads be authorized through an existing Section 10 permit, #TE-113500-0. This permit was issued to Bastrop County in 2008 and is implemented through the Lost Pines Habitat Conservation Plan (LPHCP). FEMA's funding of the activities will have no direct impact on the Houston toad. Indirect effects of the action will be short term and related to the mechanical thinning of vegetation. However, these effects will result from Bastrop County's (or its contractors) efforts and were previously analyzed in the Service's biological opinion accompanying the aforementioned permit. The effects from the activity contemplated herein were previously evaluated and permitted pursuant to the Act and are fully within the activities contemplated in the Wildlife Management Guidelines of the LPHCP. Based on your current letter and Wildlife Management Guidelines (Appendix F) contained in the LPHCP, FEMA and Bastrop County have requested to utilize permit TE-113500-0 to cover take of the Houston toad incidental to FEMA's action. The determination is based on the following information:

1. The work will be conducted in accordance with the Lost Pines Habitat Conservation Plan and comply with all conditions of U.S. Fish and Wildlife Service (Service) permit #TE-113500-0 during the implementation of the proposed FEMA-funded wildfire mitigation project at the Welsh Tract. In particular, work must comply with the terms of and avoidance and minimization measures outlined in "Appendix F: Wildlife Management Guidelines for Participation in the LPHCP."

2. In addition to permit requirements, should a Houston toad be encountered during project implementation, work must cease immediately. The U.S. Fish and Wildlife Service's Coastal Ecological Services Field Office in Houston, Texas will be contacted at (281) 286-8282.

Based on the aforementioned information, the Service concurs that the fuel reduction/wildfire mitigation will potentially have a short term negative impact on the Houston toad. The effects of these impacts have been previously analyzed and permitted by the Service and implemented by Bastrop County through the LPHCP. The Service likewise believes that the short term effects of understory thinning will give way to long term beneficial outcomes for the affected forest through stimulation of herbaceous plant growth in the understory, which has been demonstrated to benefit native insect populations, which are in turn beneficial to the Houston toad as prey. Our concurrence with FEMA's determination and use of permit TE-113500-0 is based upon a review of the Service's files, our multiple site inspections in Bastrop County and the Welsh Tract since the fire, communications with species experts and others, and is contingent upon adherence to the Wildlife Management Guidelines referenced herein. In the event the project changes or additional information on listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Our comments are provided in accordance with the provisions of the Act of 1973 (16 U.S.C. 1531 et seq.). If you have any questions, or need additional information, please contact staff biologist Jeff Hill, or myself at 281/286-8282.

Sincerely,

Edith Erfling
Field Supervisor

U. S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX 76209-3698

FEMA

May 13, 2013

Ms. Edith Erfling
Field Supervisor
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite #211
Houston, TX 77058

Dear Ms. Erfling:

This letter is to initiate consultation between the Federal Emergency Management Agency (FEMA) and your office under Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) regarding wildfire mitigation activities at the Welsh Tract, Bastrop County, Texas (Latitude: 30.228636; Longitude: -97.233810), using funds associated with FEMA's Hazard Mitigation Grant Program (HMGP); DR-1999-TX Project #14.

Three federally endangered species are known to occur in Bastrop County: Houston toad (*Bufo houstonensis*); Navasota ladies'-tresses (*Spiranthes parksii*); and whooping crane (*Grus Americana*). In addition, the Welsh Tract is located in designated critical habitat for the Houston toad.

FEMA is making a "no effect" determination for Navasota ladies'-tresses (*Spiranthes parksii*) and the whooping crane (*Grus Americana*) and therefore is not consulting with the U.S. Fish and Wildlife Service (USFWS) regarding these species.

However, the proposed action is taking place in critical habitat for the Houston toad, and the Houston toad is known to be present at the project site. Therefore FEMA is requesting consultation with your office in regard to this species.

FEDERAL ACTIONS INCLUDED IN THIS CONSULTATION

Through a FEMA HMGP grant, Bastrop County proposes to conduct fuel reduction activities within approximately 310 acres of the 400-acre Welsh Tract, which is owned by the county. The Welsh Tract is dominated by a closed-canopy intermix of mature loblolly pine, cedar, and various oak species. Mid- and understory fuels are extremely dense and include species such as yaupon, mesquite, and non-native vines. The intent of the project is to reduce fuel loading in the mid- and understory and partially open up the canopy to promote the re-growth of healthy, native vegetation. The project would mitigate the wildfire potential in an existing wildland-urban interface and help protect approximately 200 structures surrounding the Welsh Tract.

The project would remove the mid- and understory fuels that consist of undesirable species such as yaupon, eastern red cedar, mesquite, and non-native vines. Understory thinning will be conducted with a tractor-mounted mulching head mounted on a low ground pressure, rubber tire machine. In addition, a Bastrop County crew will hand-cut dead, standing timber with chainsaws. All vegetative material will be shredded and left on site. The depth of mulch distributed on site is expected to be between 2 to 3 inches thick. Tree stumps will be ground to surface level. Stumps would not be excavated or otherwise mechanically removed. Herbicide treatment would not be used in the vegetation reduction process. Bastrop County anticipates that the project will take about 90 days to complete.

STATUS OF HOUSTON TOAD IN PROJECT AREA

The Houston toad depends on healthy and mature forest ecosystems with mixed species composition, significant canopy cover, an open understory layer with a diverse herbaceous component, and breeding areas (ephemeral wet-weather ponds and other water features, such as stock tanks, creeks, streams, wetlands, seeps, and springs) with shaded edges. They are most commonly found within the surrounding upland habitat adjacent to breeding sites. The toad uses drainages and riparian areas for dispersal and movement. The edges of breeding ponds are used by emerging juvenile toadlets after they metamorphose from their larval (tadpole) stage (USFWS, 2011a).

This species is largely inactive during hot, dry seasons and during the coldest months, though surface movement has been documented during the summer months (Brown et al, 2011; SSAR, 2012) depending on weather conditions. Most breeding occurs from February to April, when the minimum air temperature is above 14 C. Breeding has been reported as late as June. Breeding habitat consists of a body of water supporting the reproductive and larval toad life stages. Eggs and larvae develop in shallow water. For successful breeding, water must persist for at least 60 days. Larvae hatch in four to seven days and metamorphose in three to nine weeks, depending on the water temperature. This species locally migrates between breeding and non-breeding habitats. The adjacent uplands support adults year round and provide patch connectivity outward from the ponds for juvenile dispersal (USFWS, 2011b). The toad tends to occupy areas with 60 percent to100 percent canopy cover (Forstner et al, 2011). Upland forests in the Lost Pines area of Bastrop County serve as occupied and dispersal habitat for the Houston toad and cover/shade is a necessity to facilitate distribution without desiccation (LPRT, 2011).

Prior to the Bastrop County Complex Fire, the Houston toad range in Bastrop County was in poor condition as a result of what is speculated to be the worst one-year drought on recorded history for this area (LPRT, 2011). Approximately 41 percent of the high suitability habitat for the Houston toad within Bastrop County was moderately to heavily burned (Forstner et al, 2011). Dr. Forstner and his team have detected Houston toad chorusing and breeding events in Bastrop County during both the 2012 and 2013 Houston toad chorusing seasons. In addition, approximately 30 individual Houston toads have been encountered during FEMA recovery operations within in the burn perimeter from February to October of 2012. Dr. Forstner's surveys and FEMA's encounters have substantiated that the Houston toad survived the 2011 wildfire and that it is present inside and outside the burn area in Bastrop County.

The Welsh Tract is the location of the Houston toad head start facility that is managed by Texas State University personnel. The facilities that comprise Houston toad research areas at the Welsh Tract include 1) a 5-acre fenced off pasture; 2) several 20 ft. x 20 ft. exclosures and 3) a 20- acre fenced and predator proof wildland area. The 5-acre pasture contains plastic pools where Houston toad tadpoles are raised. Work associated with this grant will not take place in this area. The smaller exclosures include various vegetation types where Houston toad juveniles and adults are studied. Work associated with this grant will not take place inside these exclosures. The 20-acre predator proof wildland area includes toad breeding areas and Houston toads are released in this area as well. The proposed federal action will take place within this larger 20-acre area where Houston toads are known to be present. Houston toads may also exist within the remaining acreage of the Welsh Tract where fuels reduction activities are proposed.

ADOPTION OF LOST PINES HABITAT CONSERVATION PLAN FOR SECTION 7 CONSULTATION

In 2007, Bastrop County issued the Lost Pines Habitat Conservation Plan (LPHCP) for Bastrop County, Texas (Loomis Austin, 2007). In response, the USFWS issued Permit # TE-113500-0 which became effective on April 21, 2008, and which expires April 21, 2038. Bastrop County is the applicant for the FEMA HMGP grant for the Welsh Tract project, Bastrop County owns the Welsh Tract property, and Bastrop County is an entity that is party to and covered by the LPHCP. In addition, the proposed project at the Welsh Tract falls within the geographic area covered by the LPHCP (see enclosure).

The LPHCP and corresponding USFWS permit cover various activities within the Lost Pines area of Bastrop County. These activities include Single-Family Residential Construction and Use; Commercial and Multi-Family Construction and Use; Conservation Subdivision Development; Agricultural Management; Forest Management; Wildlife Management; Bastrop County Infrastructure Maintenance and Improvement; Emergency Services; and Ongoing Use of Previously Developed Land.

The proposed FEMA fuels reduction project at the Welsh Tract qualifies as a Wildlife Management activity under the LPHCP. Per the LPHCP, incidental take resulting from activities that enhance Houston toad or other native wildlife habitat are covered by the LPHCP if they are implemented in accordance with the Wildlife Management Guidelines in Appendix F of the LPHCP. The Wildlife Management Guidelines specify that management activities eligible for coverage under the LPHCP must be part of a management program, such that: (1) the landowner is a member of a wildlife management association with a TPWD-approved wildlife management plan that incorporates these guidelines; (2) the landowner currently receives the 1-d-1 open-space agricultural property tax appraisal for wildlife management use (the wildlife appraisal) on his/her property and at least one of the three required management activities specifically addresses the Houston toad; or (3) the landowner has another type of wildlife management agreement with TPWD or other conservation group that incorporates these guidelines. Bastrop County qualifies under number (2) above.

The Wildlife Management Guidelines address management planning, brush management, reforestation, prescribed burning, strip disking, planting food plots, overseeding pastures, restoring native grassland, constructing Houston toad breeding ponds, and controlling fire ants. Activities that may be associated with the implementation of these types of habitat management practices include the limited clearing of vegetation, use of heavy machinery to construct ponds, mowing and turning soil to create or maintain firebreaks and stimulate forb production, and similar activities.

Specific provisions to help reduce any negative impacts to the Houston toad from the implementation of wildlife management practices include the designation of Water Management Zones around potential breeding areas, deferment of certain practices until outside of the Houston toad breeding and emergence period, retention of a residual stand of trees during brush management activities, avoidance of highly erodible soils, the construction of ephemeral breeding ponds, and others.

DETERMINATION

As noted above, the federal actions covered by this consultation are taking place in designated critical habitat and FEMA has a responsibility to ensure that its actions will not likely result in the destruction or adverse modification of this habitat. Destruction or adverse modification of critical habitat is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include those adversely modifying any physical or biological features that were the basis for determining the habitat to be critical. Primary constituent elements have not been designated for the critical habitat of the Houston toad, but typical habitat for the species includes areas with a soil type that allows for the weak burrowing behavior of the species and both temporary and permanent ponds (White et al, 2006). The activities proposed by Bastrop County will not impact temporary or permanent ponds nor will they alter soil type. The fuels reduction activities proposed by Bastrop County do not involve the removal of large living trees, therefore the canopy which provides shaded habitat for toad dispersal will not be adversely impacted. The LPHCP, specifically Appendix F, and the USFWS permit include measures to minimize the amount and type work that is conducted immediately adjacent to potential breeding areas. USFWS has recognized mechanical thinning as a management tool that can help restore habitat for the Houston toad (Najvar, personal communication October 20, 2010). Mechanical thinning and removal of undesirable vegetation is expected to increase light availability on the forest floor, which subsequently may increase vegetation diversity which can support insect diversity and abundance, a food source for the Houston toad. FEMA has determined that its actions will not adversely modify critical habitat.

FEMA is adopting the LPHCP and resulting USFWS permit as the basis for its Section 7 consultation based on the explanation above. Based on a review of the Houston toad and its habitat requirements; the known presence of Houston toads in portions of the project area; the minimization measures provided in the permit and through the LPHCP; and the proposed scope of work, FEMA has determined that the federally funded work described above may adversely affect the Houston toad during the short-term implementation phase of the project. However,

long-term benefits to Houston toad habitat and the species itself are expected to result from the project.

Bastrop County must comply with the following as conditions of federal funding:

1. Bastrop County must conduct activities in line with the Lost Pines Habitat Conservation Plan and comply with all conditions of USFWS permit #TE-113500-0 during the implementation of the proposed FEMA-funded wildfire mitigation project at the Welsh Tract. In particular, Bastrop County must comply with the terms of and avoidance and minimization measures outlined in "Appendix F: Wildlife Management Guidelines for Participation in the Lost Pines Habitat Conservation Plan."

2. In addition to permit requirements, should a Houston toad be encountered during project implementation, work must cease immediately. The U.S. Fish and Wildlife Service's Clear Lake Ecological Services Office will be contacted at (281) 286-8282.

FEMA requests your concurrence with this effect determination and input on any additional conservation measures required to ensure accuracy of this determination. Thank you for your attention and assistance. Should you have any questions, please contact FEMA Environmental Specialist, Dorothy Weir at Dorothy.Weir@fema.dhs.gov or at 940-435-9275.

Sincerely,

Kevin Jaynes
Regional Environmental Officer
FEMA Region 6

Attachments: Project Map
LPHCP Area
"Mechanical thinning and the Houston toad," Email correspondence from Paige Najvar to Bastrop County dated October 20, 2010

REFERENCES

Brown, D., J. Baccus, D. Means, and M.R. Forstner. 2011. Potential positive effects for fire on juvenile amphibians in a southern USA pine forest. Journal of Fish and Wildlife Management 2(2): 135-145.

Forstner, M. R. J., D. Wallace, J. Bell, D. Stout, and J.T. Jackson. 2011. Houston toad 2011 data and final report for the LPHCP annual monitoring, Bastrop County, Texas. Bastrop County Lost Pines Habitat Conservation Plan Office, Bastrop, Texas.

Loomis Austin. 2007. Lost Pines Habitat Conservation Plan for Bastrop County, Texas. Available online at *http://www.co.bastrop.tx.us/site/content/lostpineshabitat.* Accessed March 25, 2013.

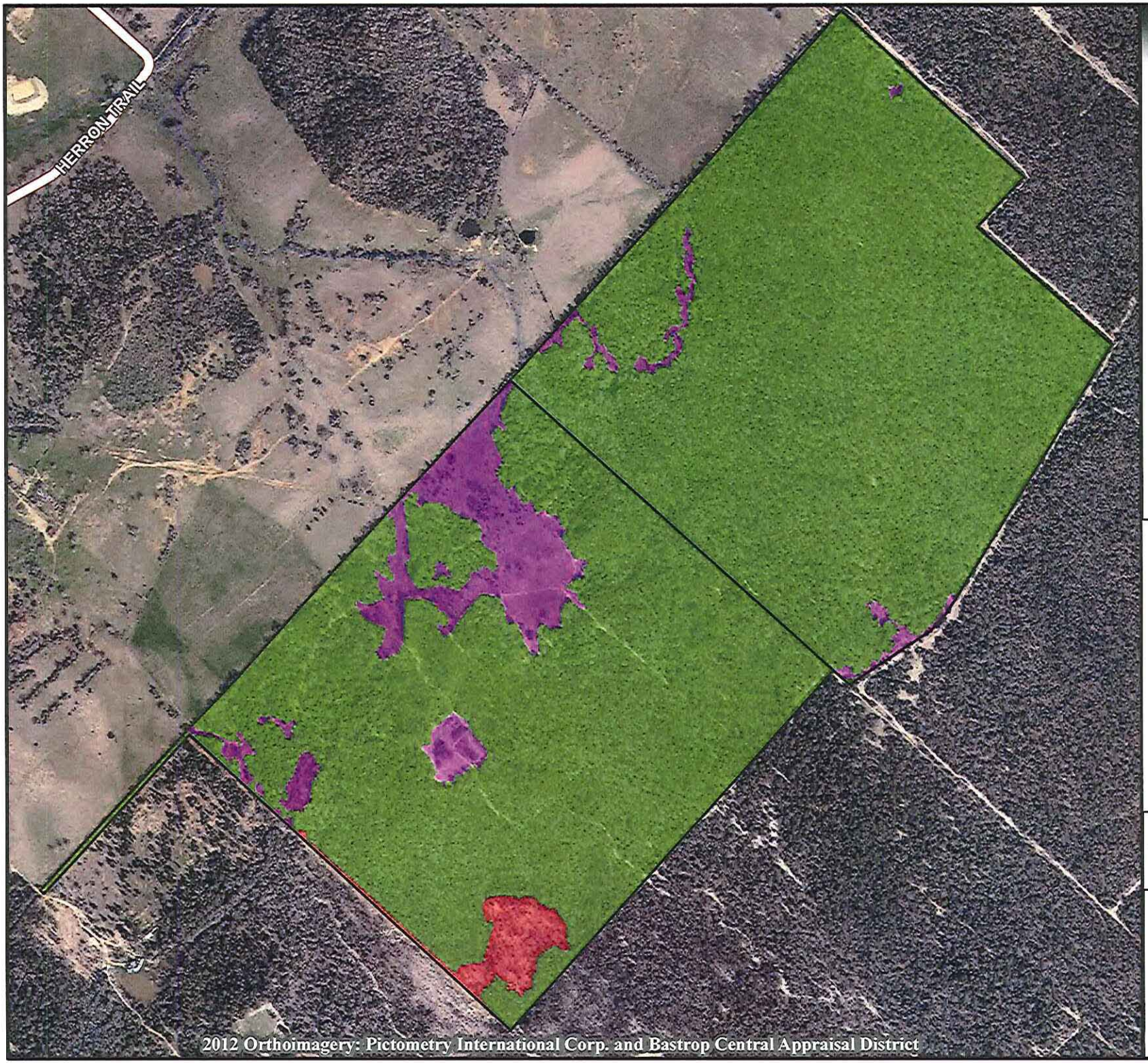
LPRT (Lost Pines Recovery Team). 2011. Bastrop County Complex Fire—Lost Pines Region—Resources Assessment and Response Report. Available online at *http://co.bastrop.tx.us/bcdisaster/files/PDF_Files/LPRT%20Recovery%20Report%20FINAL%2011-10-11%20reduced.pdf.* Accessed March 25, 2013.

SSAR (Society for the Study of Amphibian and Reptiles). 2012. Natural History Notes. Herpetological Review 43(2): 117-118.

USFWS (U.S. Fish and Wildlife Service). 2011a. Post-Wildfire Clean-Up and Response in Houston Toad Habitat Best Management Practices. Available online at *http://www.fws.gov/southwest/es/Documents/R2ES/Fire_CleanUp_and_Response_BMPs20110924.pdf.* Accessed March 25, 2013.

USFWS. 2011b. Houston toad (*Bufo houstonensis*) 5-Year Review: Summary and Evaluation. Available online at *http://www.fws.gov/southwest/es/Documents/R2ES/HoustonToad_5-yr_Review_Nov2011.pdf.* Accessed March 25, 2013.

White, J., C. Giggleman, and P. Connor. 2006. Recommended Water Quality for Federally Listed Species in Texas. Available online at *http://www.fws.gov/southwest/es/Documents/R2ES/Recommended_Water_Quality_for_Federally_Listed_Species_in_Texas.pdf.* Accessed March 25, 2013.



Bastrop County

Welsh Tract

N

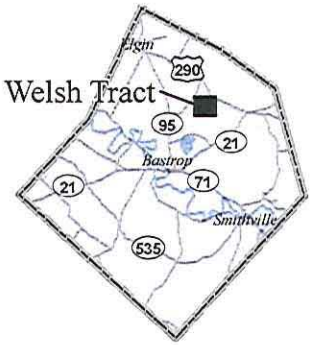
0 250 500
Feet

Legend

- Non Forest (29 acs)
- Burnt Forest (7 acs)
- Forest (362 acs)

Map Produced: 04/23/2013

Vicinity Map



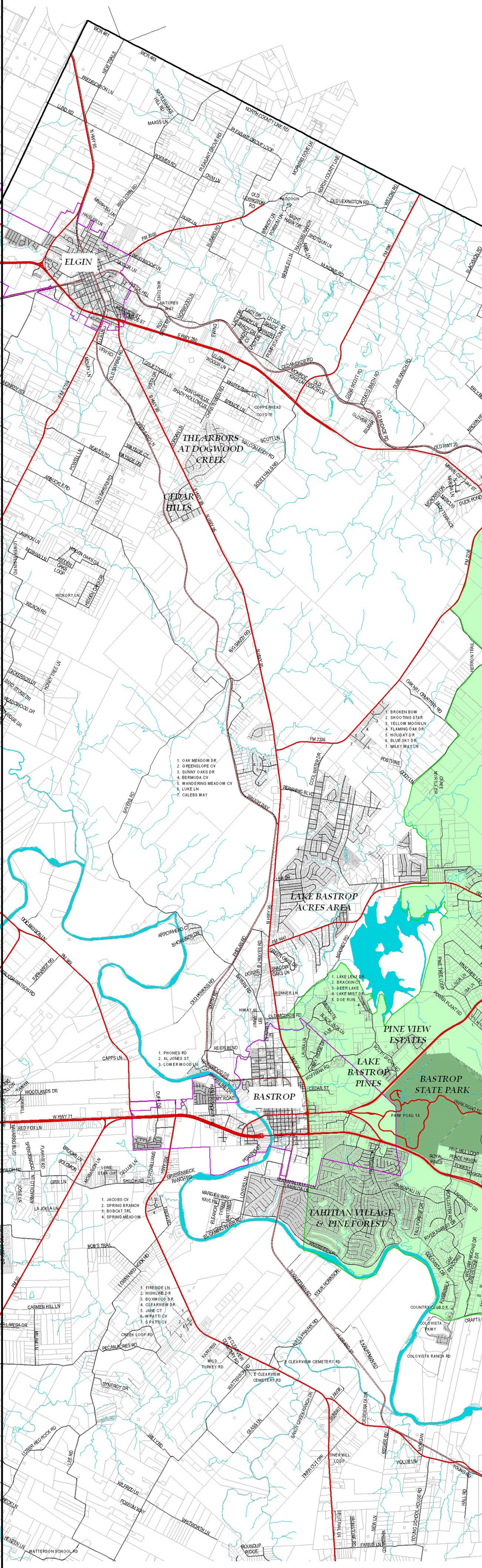
1 in = 25 miles

BASTROP COUNTY TEXAS

DISCLAIMER

Bastrop County provides this map "as is" and assumes no liability for its completeness or accuracy. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

LOST PINES HABITAT CONSERVATION PLAN AREA
BASTROP COUNTY, TEXAS



The Lost Pines Habitat Conservation Plan (LPHCP) covers an area of approximately 124,000 acres in Bastrop County, Texas (Plan Area). This area roughly corresponds to the ecological area locally known as the Lost Pines. The LPHCP establishes a conservation program for the Houston toad that minimizes and mitigates for the expected impacts to the species arising from certain human activites within the Plan Area. The overall biological goal of the LPHCP is the long-term preservation, restoration, enhancement, and management of habitat for the Houston toad in Bastrop County.

To obtain information regarding the LPHCP, the Houston toad, incidental take authorization and/ or participation in LPHCP contact the LPHCP Administrator at (512) 581-7176.

2008

From: Paige_Najvar@fws.gov
Sent: Wednesday, October 20, 2010 11:29 AM
To: Hernandez, Roxanne
Subject: mechanical thinning and the Houston toad

Hi Roxanne,

It is my understanding from our October 15, 2010 conversation that you need information regarding the U.S. Fish and Wildlife Service's (Service) opinion on the impacts that mechanical thinning may have on the federally listed Houston toad. It is also my understanding that Bastrop County plans to engage in mechanical thinning activities on the Welsh property located in Bastrop County, Texas and that Houston toads are known to occur on this property.

The Service recognizes mechanical thinning as a management tool to help restore habitat for the Houston toad. The following information best describes the long-term impacts we would expect from mechanical thinning in areas that could potentially support Houston toads.

The suppression of wildfires has led to a dramatic increase in the understory density within the range of the Houston toad. The positive correlation between insect and plant community diversity on the forest floor is commonly recognized, as explained and demonstrated by Siemann et al. (1998). Thus, a reduction in vegetation community diversity on the forest floor may account for a decline in insect diversity and abundance, which is the food source for the Houston toad.

Forest thinning is the practice of removing undesirable vegetation (this may include select trees or understory vegetation) from a forested area. Thinning is expected to increase light availability and penetration, which may increase the herbaceous vegetation diversity on the forest floor. This technique may also provide conditions that will facilitate the survival of native herbaceous plants and prevent the extensive growth of coastal Bermuda grass or other heavy, rhizomatous mat-forming grasses that inhibit Houston toad movement.

Because the Welsh tract is covered under the Lost Pines Habitat Conservation Plan (HCP), it is important to comply with all the terms, conditions, and best management practices outlined within the HCP and its associated incidiental take permit, as this will cover Bastrop County for any short-term effects to the Houston toad that may occur as a result of the above mentioned mechanical thinning activities. As you know, there are specific terms and conditions related to mechanical thinning provided in this document.

We thank Bastrop County for their continued efforts toward Houston toad recovery. Please let me know if you have any more questions regarding this issue.

Paige Najvar

Paige A. Najvar
U. S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, TX 78758
512/490 0057 Ext. 229
512/490 0974 Fax

Wildlife Management Guidelines for Participation in the Lost Pines Habitat Conservation Plan

1.0 Introduction

These Wildlife Management Guidelines were prepared for private landowners engaging in wildlife management activities in the Lost Pines Habitat Conservation Plan (LPHCP) permit area (the Plan Area) in Bastrop County[1]. While some incidental take of the endangered Houston toad (*Bufo houstonensis*) may occur as a result of implementing these guidelines, the implementation of these guidelines is generally considered to have an overall net benefit (self-mitigating) for the Houston toad, even if the intent of the landowner is to implement these guidelines for wildlife other than the Houston toad.

1.1 Long Term Benefits To The Houston Toad

The Houston toad depends on healthy and mature forest ecosystems with mixed species composition, moderate canopy cover, an open understory layer with a herbaceous component, and shaded breeding pools. Unmanaged forests and forests that sustain other types of land uses, such as residential, recreational, or agricultural activities, can become less suitable as Houston toad habitat over time. Without active management, forests can become too dense and shaded, accumulate dangerous levels of burnable duff and debris, and be negatively impacted by cattle, pollutants, and vehicles. These and other changes may reduce the ability of forest ecosystems to provide quality Houston toad habitat by altering the toad's food base and competitive environment, increasing the risk of catastrophic fires that could destroy large blocks of habitat, and reducing Houston toad reproductive success. Active management of existing forests and reducing negative impacts from various types of land uses within, and adjacent to, forested areas is essential to the long-term sustainability of Houston toad habitat in the Plan Area.

The LPHCP identifies the characteristics of suitable Houston toad habitat and provides the guidance, the mechanism, and the incentive for individual property owners to develop and sustain healthy and mature forests on their property.

However, many common land management activities have the potential to negatively impact Houston toads in the short-term, such as using equipment to remove brush or thin

[1] Technical terms are identified in bold at the first use of the term and are defined in Section 11.0 (Definitions).

forest stands, implementing prescribed burns to manipulate forest vegetation and prevent large forest fires, and using chemicals to help control non-native or invasive wildlife or plants. The guidelines presented in the LPHCP provide specific guidance for avoiding and minimizing short-term negative impacts to Houston toads resulting from common management practices in, and adjacent to, forest habitat.

The guidelines prepared under the LPHCP are the primary focus of the LPHCP conservation program. The guidelines are voluntary and designed to be compatible with local attitudes and views towards land management and property ownership, regardless of whether a landowner is seeking authorization for incidental take. This approach seeks to remove as many barriers as possible to long-term planning and management with regard to forest habitat. The development, distribution, and promotion of these guidelines throughout the community is the County's maximum practicable effort to avoid and minimize negative impacts to the Houston toad from management activities, while still being able to realize the long-term benefits of managing for healthy and mature forests.

2.0 Management Planning

Management practices covered for incidental take by the LPHCP must be performed under one of the following management plan options:

1. Landowner is a member of a Wildlife Management Association with a Texas Parks and Wildlife Department (TPWD) Wildlife Management Plan that incorporates these guidelines;

2. Landowner receives the 1-D-1 open-space agricultural property tax appraisal for wildlife management use on their property, and at least one of the three required activities in the required wildlife management plan specifically addresses the Houston toad; or,

3. Landowner has any other type of agreement with TPW or other conservation organization, agency, or professional wildlife management consultant that incorporates these guidelines.

Water Management Zones[2] (WMZ) must be designated around all identified water features, including, ponds, creeks, streams (with three feet or more scoured width), wetlands, seeps, and springs that are immediately adjacent to a forested area. However, minor

[2] The term Water Management Zone is used instead Streamside Management Zone in order to clarify that wetlands, water and ponding areas other than streams are also to be protected. The term Water Management Zone has the same meaning as Streamside Management Zone.

depressions and mud holes that hold water only for a short period after a rain are not included and will not require an WMZ. WMZs must extend at least 50 feet from the edges of each water feature adjacent to a forested area or evolving forested areas (more than 40 percent canopy cover). Water features that are not adjacent to a forested area or an evolving forested area but are located within a pasture or crop land are not considered toad habitat. The buffering provided by a WMZ will lessen the disturbance of wildlife management practices on these important habitat sites that might be used by Houston toads for breeding or dispersal.

2.1 Obtaining Incidental Take Coverage

To receive incidental take authorization under the LPHCP for wildlife management activities, the landowner must receive a Notice of Receipt from the LPHCP Administrator stating that a Notice of Intent to be covered by the LPHCP has been filed with the LPHCP Administrator. A landowner must submit to the LPHCP Administrator a signed Notice of Intent to be covered by the LPHCP along with a copy of the landowner's land management plan that meets the criteria described in Section 2.0 above. The Notice of Intent will include a statement that the landowner authorizes the County of Bastrop to enter the property for purposes of monitoring compliance with this guideline and biological monitoring. Additionally, the land management plan must include a map of the property showing the location of all water features and WMZs. The LPHCP Administrator does not approve land management plans. It is the obligation of the landowner to ensure that the landowner's land management plan complies with applicable governmental requirements and accurately incorporates the requirements of this guideline. Failure to properly incorporate the requirements of this guideline into the land management plan or the failure to properly implement the requirements of this guideline may result in no incidental take coverage under the LPHCP.

3.0 Brush Management

Brush control in forestlands is recommended to landowners to create additional openings or clearings within post oak (*Quercus stellata*) and pine forests (*Pinus taeda*) to create more edge effect for wildlife. The idea is to allow additional sunlight to reach the soil surface and increase grass, forb, and browse production. Cedar trees (Juniperous spp.) and yaupon (*Ilex vomitoria*) are typically the targeted vegetation, but other trees within the forest may be included.

The guidelines below represent means for avoiding or minimizing the take of individual toads during brush management activities. Brush management will mitigate any

short-term negative impacts to the Houston toad by increasing the quality and quantity of land that can provide habitat for the Houston toad.

The guidelines for brush management within the Plan Area include:

1. Removal of trees and brush with heavy mechanical equipment (e.g., bulldozers or tractors) must be conducted outside of the breeding season and emergence period of the Houston toad (January 1 through June 30). Hand clearing (e.g., chainsaws, clippers, axes, etc.) for the selective removal of trees and branches may be used at any time. However, no hand clearing is allowed within WMZs during the breeding season and emergence period of the Houston toad;

2. Brush removal practices using heavy mechanical equipment are prohibited within WMZs. Hand clearing and manually stacking slash and brush is allowed within WMZs outside of the Houston toad breeding season and emergence period, but a minimum fifty percent canopy must remain within the WMZ. The guidelines (when available) for constructing toad friendly ponds (see Section 8.2) should be consulted for determining recommended vegetation layout adjacent to water features. For example, the deep end of a pond should receive more sunlight than the shallow end of a pond;

3. The application of herbicides for brush management is prohibited within WMZs;

4. Herbicides may be used outside of the Houston toad breeding season and emergence period (January 1 through June 30) according to the product label, as necessary, outside of WMZs, but application is limited to individual plant treatment or ground application only; and,

5. Whether using heavy mechanical equipment, hand clearing, or herbicides to remove trees and brush, landowners must use the single-tree selection or group selection techniques listed below, and not exceed the allowable amount of tree removal listed under each technique.

    A. Single-tree selection is an allowed method of thinning/harvest in occupied Houston toad habitat. The residual stand (trees remaining following the timber operation) must contain no less than 80 square feet per acre (18.4 square meters per hectare) basal area which simultaneously maintains toad habitat; or

    B. Group selection is allowable within occupied Houston toad habitat if implemented using the following criteria:

- Group selection is not allowed within WMZs;
- Maximum group size is not to exceed five acres regardless of tract size but cannot exceed 20 percent of the tract;
- Maximum width of any group is not to exceed 100 feet (30.5 meters);
- Harvest cycles for group cuts are set at intervals of 7 years or more;
- Consecutive (by harvest cycle), adjacent group harvests are not allowed. Harvests should cycle in a mosaic pattern on each parcel;

Brush control techniques within tame pasture or native pasture are not restricted because these areas are not considered to be Houston toad habitat. However, landowners are encouraged to maintain trees and brush within pastures to provide cover for wildlife. Brush found in tame or native pastures within 50 feet (15 meters) of a water feature without any adjacent forested area should be removed by hand clearing. Landowners are encouraged to maintain brush piles, where practicable, to supply cover for wildlife.

4.0 Reforestation

Reforestation for wildlife management traditionally takes place within tame or native pastures where woody cover or browse is lacking for wildlife. However, if planting is occurring within forestlands, landowners must follow the recommendations of the Forest Management Guidelines (Appendix E).

The guidelines below represent a means for avoiding or minimizing take of individual toads during reforestation activities within previously unforested areas including tame pastures, native pastures, old fields, or cropland. Reforestation will mitigate any short term negative impacts to the Houston toad by increasing the quality and quantity of land that can provide habitat for the Houston toad.

1. Machine planting within a WMZ is not allowed at any time; and
2. Hand planting native tree and shrub seedlings is an acceptable practice at any time of the year within WMZs.

5.0 Prescribed Burning

5.1 Forestlands

Prescribed burning is a wildlife management tool practiced within forestlands to remove excess tree litter and understory vegetation, such as cedar and yaupon, to prevent the understory from becoming too thick and shading out desirable grasses, forbs, and browse. Prescribed burns in post oak-dominated forestlands are most successful just after leaf drop and prior to the onset of winter rains in November or December. For guidelines regarding prescribed burning within forested stands see the Forest Management Guidelines of the LPHCP. The prescribed burning in forestlands guidelines represent a means for avoiding or minimizing the take of individual toads during prescribed burns. The removal of excess tree litter and understory vegetation will mitigate any short term negative impacts to the Houston toad by increasing the quality and quantity of land that can provide habitat for the Houston toad.

5.2 Native Pastures

Prescribed burning is used to maintain oak savannah and native grassland communities, where native grasslands are interspersed with forest mottes. Prescribed burning will remove old grass litter and any young, invasive woody plants (e.g., cedar, locust (*Gleditsia triacanthos*), or elm (Ulmus spp.) within the native pastures. The removal of the grass litter will increase bare ground area, thus promoting forb growth that will provide browse for deer, seeds for birds, and insects for many wildlife species, including the Houston toad. Late summer (e.g., August and September) burns are very effective in killing unwanted woody growth within pastures, but the combination of low humidity and high temperatures make these fires more difficult to manage. Safer conditions exist just after the first frost between November and December when humidity levels are higher and temperatures are lower.

The guidelines for prescribed burning in native pastures represent a means for avoiding or minimizing the take of individual toads during prescribed burns. The removal of excess tree litter and understory vegetation will mitigate any short term negative impacts to the Houston toad by increasing the quality and quantity of land that can provide habitat for the Houston toad.

1. Prescribed burning within native pastures is allowed at any time, but all water features must be avoided;

2. The burn must be conducted in accordance with Texas Commission on Environmental Quality (TCEQ) rules (Texas Administrative Code Title 30 - Part 1 - SubChapter B Chapter 111.211 and 111.219, as amended);

3. Prescribed burning should be conducted on approximately one-third of native pasture acreage each year; and,

4. Disked firebreaks and firelines will be 10 to 20 feet (3.0 to 6.1 meters) wide and will not be constructed during the breeding season and emergence period of the Houston toad (January 1 through June 30). Firebreaks will not be constructed within WMZs.

6.0 Supplemental Food

6.1 Strip Disking

Strip disking is a method of soil disturbance that encourages the growth of forbs and other annual plants. Common seed producing forbs enhanced through disking include doveweed (*Croton* sp.), sunflower (*Helianthus annuus)*, and ragweed (*Ambrosia artemisiifolia*). The forbs produced with disking provide supplemental forage, seeds, and insects for wildlife.

The guidelines below represent a means for avoiding or minimizing the long-term impacts of disking on the Houston toad within tame or native pastures.

1. Disking is discouraged in areas where erosion may occur;

2. Disking is not allowed within WMZs;

3. Disked strips should be 15 to 30 feet (4.6 to 8.2 meters) wide, with strips being disked on a three-year rotating basis. Landowners should disk a strip 15 to 30 feet wide and then skip an area twice as wide (e.g., 30 to 60 feet (8.2 to 16.4 meters) wide) before disking another strip. During the second year, landowners should disk a strip 15 to 30 feet wide adjacent to the first year's strip. The practice should be repeated annually with the first year's strips being re-disked during the fourth year; and

4. Disking must be conducted at a depth of six inches or less.

5. Disking is not allowed within forestlands during the breeding season and emergence period of the Houston Toad (January 1 through June 30).

6.2 Food Plots

Planting food plots can be an effective method to supplement well-managed native habitats. Food plots are traditionally planted to supplement the diets of white-tailed deer (*Odocoileus virginianus*), turkey (*Meleagris gallapavo intermedia*, quail (*Colinus virginianus)*, and doves (*Zenaida spp.*), but other wildlife species also benefit. There is no minimum or maximum acreage size for food plots, but one to five percent of the total acreage is recommended. One-half of the plots should be planted in cool season species (planted in September or October with forage available during winter stress periods) and one-half in warm season species (planted April through June with forage available during the summer stress period). Typical cool season food plots consist of one or two cereal grains (e.g., wheat, oats, or rye) and an addition of a cool season legume (e.g., clover, Austrian winter pea, or vetch) to increase protein content. Perennials or reseeding annuals such as Illinois bundleflower, bush sunflower, Engelmann daisy, or maximillian sunflower can be used to create permanent food plots.

Food plots are typically planted within native or tame pastures where sunlight is optimum, but some landowners with extensive forestlands may plant along fence lines, interior roadways, forest clearings where trees have been removed, existing or created senderos, or firebreaks.

The guidelines below represent a means for avoiding or minimizing the long-term impacts of planting food plots on the Houston toad.

1. Disking must be conducted at a depth of 6 inches (15 centimeters) or less when preparing food plots;

2. Disking for food plot preparation is not allowed within forestlands during the breeding season and emergence period of the Houston Toad (January 1 through June 30). Landowners are encouraged to utilize perennial and reseeding annuals within forestlands for warm season food plots, as these can be planted during the fall to avoid disking during the Houston toad breeding season and emergence period;

3. Disking, grain drills, broadcast spreaders, drags, and rollers can be used to establish cool and warm season food plots within native and tame pastures. However, food plot construction is not allowed within WMZs;

4. Herbicides may be used to control invasive grass and weeds, but they must be used in strict accordance with the product label. Within forestlands, chemicals may only be used outside of the Houston toad breeding season and emergence period (January 1 through June 30); and

5. Fencing around food plots is allowed to control livestock and deer access to the supplemental food. Fence construction within forestlands is discouraged during the breeding season and emergence period of the Houston toad (January 1 through June 30).

6.3 Overseeding Tame Pastures

Overseeding tame pastures with oats, rye, Austrian winter peas, or clover is allowed to provide additional forage for wildlife during winter months. Pastures can be overseeded using grain drills or by broadcasting. If a grain drill is used, a 50-foot (15.2 meters) buffer must be placed around WMZs. Because tame pastures are not considered to be Houston toad habitat, no further restrictions apply.

7.0 Native Grassland Restoration

The planting of native grasses and forbs within tame pastures is considered to be self-mitigating due to the fact that these areas are not considered to be Houston toad habitat. Seed mixtures used to reseed tame pastures should include species of native perennial forbs in addition to native grasses to increase the food supply for wildlife. Herbicide application to control the improved grasses and weeds is allowed, but they must be used in strict accordance with the manufacturer's directions. Traditional planting techniques including disking, broadcasting, and drilling are allowed, but a 50-foot buffer must be maintained around WMZs. Native grasses and forbs may be broadcast by hand within WMZs.

8.0 Houston Toad Breeding Ponds

8.1 Protecting Pond Habitat

Within Houston toad habitat, avoid modification or disturbance of temporary wet-weather ponds and other small natural ponds located within 50 feet of a forested area or evolving forested area. These small ephemeral wetlands are a breeding habitat for the Houston toad. Isolated ephemeral ponds located more than 50 feet from a forested area may support breeding activity but are not likely to support a successful emergence of toadlets. Isolated ephemeral ponds may operate as breeding sinks and provide no long term benefit to the Houston toad. Extensive clearing of native vegetation and alteration of drainage patterns should be avoided in and around these ponds.

8.2 Creating Breeding Ponds

Ponds can be constructed within Houston toad habitat using current, approved methodology to increase potential breeding sites. The guidelines below represent an approximate means for avoiding or minimizing the negative long-term impacts of constructing breeding ponds on the Houston toad.

1. Pond construction is prohibited during the Houston toad breeding season and emergence period (January 1 through June 30);
2. Ponds should be located within 0.5 mile (0.8 kilometer) of deep sands and adjacent or within woodlands with 50 percent or more canopy cover (Forstner 2002);
3. Ponds should be located as far from permanent water as practicable and have a maximum bottom slope of 5:1 (excluding the face of the dam);
4. During pond construction, equipment operators must avoid as many trees as practicable;
5. Landowners and/or equipment operators may clear up to 0.25 acre (0.1 hectare) to stack and burn trees and brush removed during pond construction;
6. Pond edges must be revegetated with native perennial bunch grasses. However, annual grasses (e.g., ryegrass, oats, wheat, or rye) should be planted to provide cover for emerging toadlets during the first year after pond construction;
7. In the event that the surrounding tree canopy does not provide sufficient shade, logs and/or tree limbs should be located in piles along newly constructed pond edges to provide shade for emerging toadlets; and
8. Consultation with a TPWD or U. S. Fish and Wildlife Service biologist or the LPHCP Administrator is recommended.

9.0 Fire Ant Control

Although the full impact of red imported fire ants (*Solenopsis invicta*) (fire ants) on the Houston toad is not known, fire ants are believed to be a serious and increasingly important threat (Campbell 1995). Controlling heavy fire ant infestations in Houston toad habitat may help minimize their impact. The guidelines below represent a means for avoiding or minimizing any negative long-term impacts of red imported fire ant control on the Houston toad.

1. Landowners can help to control red imported fire ant infestations by limiting soil disturbance, inspecting imported soil and nursery products thoroughly for fire ants, and properly disposing of trash; and

2. Individual mound treatment - Individual fire ant mounds can be treated with commercial fire ant bait or by environmentally sensitive means (e.g., boiling water, diatomaceous earth, etc.). Baits containing the active ingredients hydramethylnon or fenoxycarb, such as Amdro, Award, or Logic, are recommended for areas other than pastures or cropland. Baits must be used in strict accordance with the product label and must only be placed near fire ant mounds and not near the mounds of native ant species. To avoid adverse effects on non-target species, the bait should only be applied when ants are actively foraging to prevent accumulations of excess bait.

3. Treatment in larger areas – Individual mound treatment may not be practical in larger areas. Where fire ant control is needed in pastures or other large areas, use a product that is labeled for pasture use (e.g., Extinguish or Justice), and follow the label directions.

10.0 Census Counts

Landowners are encouraged to actively participate in conducting Houston toad census counts. Information and assistance can be obtained from the LPHCP Administrator.

11.0 Definitions

Basal area – The total cross-sectional area (in square feet) of tree stems at breast height (approximately 4.5 feet (1.4 meters) from ground level), inclusive of the bark. Basal area is a measure of the degree of crowding or density of trees in a stand.

Cropland – Land used for the production of cultivated crops or land where some sort of tillage or cultivation is performed each year.

Firebreak – A naturally occurring or man-made barrier that helps reduce or eliminate the spread of fire. Firebreaks can include mechanically or hand cleared fire lines.

Forbs – Wildflowers and other weeds.

Forestland – Land upon which the climax vegetation is composed principally of trees and understory shrubs with various quantities of grasses, grasslike plants, and forbs occupying the intervening, unoccupied ground area. Typical forested areas include pine forests, pine and hardwood forests, and bottomland hardwood forests along major streams.

Group selection – A timber harvest system in which one or more "groups" are cut. All the trees in the designated area or group are harvested; likened to a small-scale clear-cut.

The maximum harvest width for a group is sometimes set at approximately twice the height of mature trees.

Hand clearing – Brush removal technique involving the use of motorized and non-motorized hand tools, including, but not limited to, chainsaws, handsaws, axes, and clippers. Walk behind mowers and trimmers are also considered to be hand-clearing tools.

Hand planting – Planting tree and shrub seedlings with the use of dibble bars, shovels, pick-mattocks, etc. Vehicles can be used to transport seedlings, equipment, and personnel.

Machine planting – Planting tree and shrub seedlings with motorized equipment that mechanically plants seedlings or creates an opening in the soil to facilitate tree planting.

Native pasture – Land on which the native vegetation (climax or natural potential plant community) is forest, but which is used primarily for production of native grasses for forage. Native pasture includes cutover forestland and forested areas that were cleared and used in the past for cropland.

Old field – Cropland or pastures that are reverting naturally to native woodlands.

Prescribed burning – The controlled application of fire under certain conditions of weather and fuel moisture, which allow the fire to be confined to a predetermined area and produce the intensity of heat and rate of spread needed to accomplish certain planned objectives, such as stand improvement, wildlife habitat management, grazing, fire hazard reduction, etc.

Primary Habitat – High-quality Houston toad habitat is characterized by treed cover (either continuous, closed-canopy forest or open woodlands with an understory of native bunch grasses) adjacent to potential breeding sites (particularly ephemeral ponds and drainages with a treed edge).

Self-mitigating – Practices that initially may have short-term negative impacts on the Houston toad, but are considered to result in positive benefits to the species in the long-term.

Senderos – Straight or meandering, long, linear clearings within the forest created to allow sunlight to reach the soil and encourage the production of beneficial grasses, forbs, and shrubs for wildlife.

Single-tree selection – A timber harvest system in which individual trees are removed from a stand.

Tame pasture – Pasture land in which the dominant grass species are introduced turf forming grasses such as bermudagrass, coastal bermudagrass, bahiagrass, or any of their related varieties. Tame pasture and improved pasture are terms that can be use interchangeably and are generally not considered habitat for the Houston toad.

12.0 References

Forstner, M.R.J. 2002. Houston toad research and surveys: CAC-Lost Pines & Griffith League Ranch, Bastrop County, Texas. Final Technical Report. Capital Area Council-Boy Scouts of America.

Campbell, L. 1995. Endangered and threatened animals of Texas: Management guidelines for the Houston toad. Texas Parks and Wildlife Department, Endangered Resources Branch. Texas Parks and Wildlife Press, Austin, Texas. 109 – 110 p.

Contributors

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