United States Department of Agriculture
Animal and Plant Health Inspection Service

Cattle Fever Tick Eradication Program Use of Ivermectin-treated Corn in 41 Counties, Texas

Draft Environmental Assessment

Unique ID: EAXX-005-32-24V-1734008235

April 2025

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1 Introduction and Purpose and Need

1.1 Background

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS), Veterinary Services is responsible for (1) protecting and improving the health, quality, and marketability of the United States (U.S.) animals by eliminating animal diseases, and (2) monitoring and promoting animal health and productivity. The Animal Health Protection Act of 2002, as amended (7 United States Code (U.S.C.) § 8301-8317), provides broad authority for USDA APHIS to prevent the introduction into or dissemination within the United States of any pest or disease of livestock (§ 8303-8305). The Act authorizes prohibition and restriction of the importation, exportation, and interstate movement of animals moving in trade and strays, as well as exportation, inspection, disinfection, seizure, quarantine, destruction, and disposal of animals and conveyances (§ 8303-8308). This includes the ability to "carry out operations and measures to detect, control, or eradicate any pest or disease of livestock" and identifies specific cooperative programs as one way to achieve these actions (§ 8308).

Cattle fever ticks (CFTs), known scientifically as *Rhipicephalus* (formally *Boophilus*) *annulatus* and *R. (B) microplus* are agricultural pests that pose serious threat to U.S. livestock, particularly cattle and horses. These ticks feed on blood, causing anemia, and transmit protozoan parasites that lead to bovine babesiosis, a severe and often fatal disease. Cattle fever ticks are endemic in Central and South America and can enter the U.S. through transported animals and materials {Busch, 2014 #48;Nakayima, 2014 #68}. Infestations can spread rapidly, causing economic and agricultural damage.

USDA APHIS initiated the Cattle Fever Tick Eradication Program (CFTEP) in 1906 as a cooperative state-federal effort to eliminate bovine babesiosis (or cattle fever) from the U.S. cattle population. By 1943, the U.S. was declared free of CFTs, except in the Permanent Tick Quarantine Zone (PTQZ) in the coastal counties of South Texas, which spans over 500 miles from Del Rio, Texas, to the Gulf of America (Figure 1). However, increasing trade and traffic at the southern border of potential livestock hosts of CFTs (cattle and horses), combined with rising populations of wildlife hosts of CFTs (such as white-tailed deer, red deer, and nilgai antelope), have heightened the risk of tick entry and establishment in the U.S.

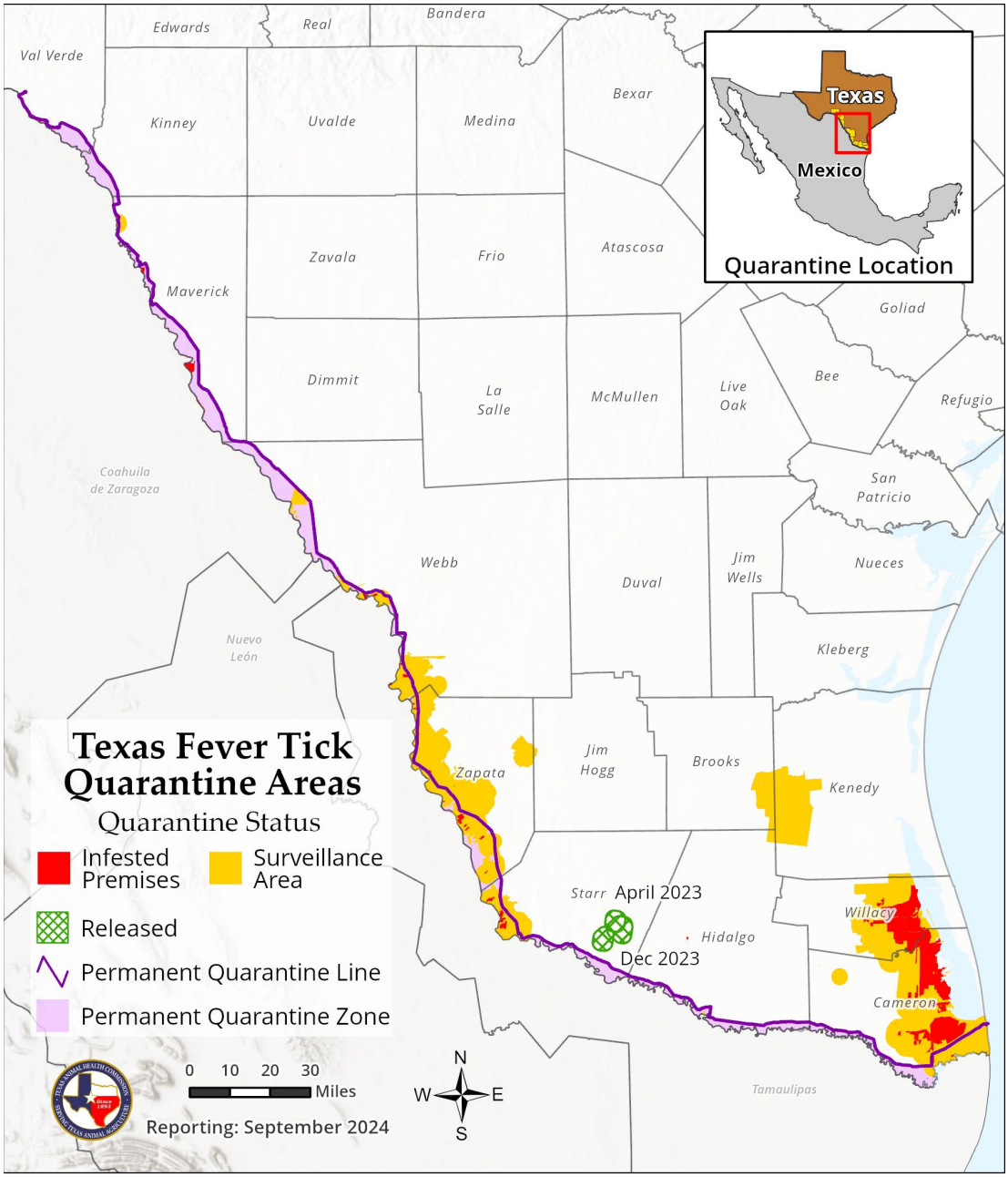

Figure 1. Texas Fever Tick Quarantine Areas

Source: (TAHC 2024)

Observations regarding CFT infestations on cattle premises within the permanent and non-permanent quarantine areas of South Texas show an upward trend from 2014 to 2017, a period of relative stabilization from 2017 to 2021, and a sporadic decline since 2021 (Figure 2).
As of February 2024, 85 premises identified in several South Texas counties (Cameron, Starr, Val Verde, Webb, Willacy, and Zapata) were infested and quarantined for CFTs (TAHC 2024). These CFT infestations impose substantial challenges, including prolonged quarantine restrictions on cattle herds, increased management efforts and related expenses for cattle producers within the tick-free zones of South Texas, and undermined ongoing eradication efforts. USDA APHIS continues to

oversee inspections and implement control measures, including surveillance and patrolling for stray or smuggled tick-infested livestock, livestock movement quarantines, treatment of tick-infested livestock with acaricides (such as coumaphos, doramectin, imidocarb, and pyrethroids), vacating of tick-infested pastures and premises, and high game fencing to impede the movements of wildlife hosts of CFTs. To enhance these efforts, CFTEP is proposing an additional control measure - the use of ivermectin-treated corn to treat white-tailed deer populations, main hosts and spreaders of CFTs in South Texas.

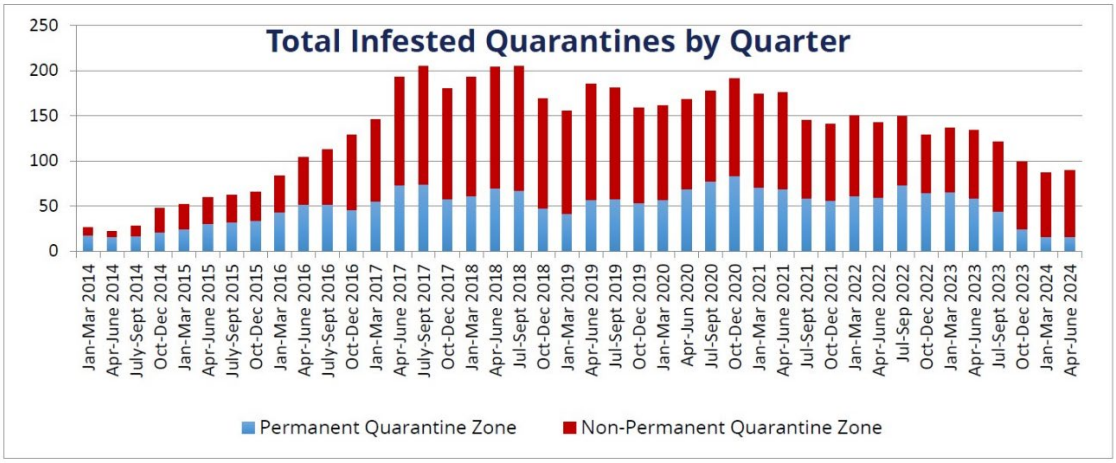

Figure 2. Total infested quarantines by quarter from Jan 2014-Jun 2024

Source: (TAHC 2024).

In 1968, cattle fever ticks were discovered on white-tailed deer in Dimmit County, and in later years, southern cattle ticks were found on deer in other areas, raising concerns about their role in tick outbreaks (USDA APHIS 2025). Since the 1970s, chronic infestations in Webb County, Texas, have demonstrated that white-tailed deer contribute to the persistence and distribution of ticks (USDA APHIS 2017a and 2025). To the above-listed control measures, treatment of white-tailed deer with ivermectin-treated corn could substantially improve the overall program results (USDA APHIS 2017a; 2017b; and 2018; Kramm et al. 2021; and Thomas and Duhaime 2022). So, on December 2, 2015, USDA APHIS and partners - the Texas Animal Health Commission (TAHC) and the Texas Parks and Wildlife Department (TPWD) - agreed to collaborate in feeding white-tailed deer ivermectin-treated corn while complying with the Food and Drug Administration (FDA) regulations outlined in a March 14, 2016, communication (USDA APHIS 2025).

Bovine Babesiosis:

Babesiosis is a severe and often fatal disease of livestock caused by protozoan parasites (*Babesia bovis* V. Babes, 1888 [Piroplasmida: Babesiidae] and *B. bigemina* Smith and Kilbourne, 1893) that typically attach themselves to the skin inside an animal's thigh, flanks, and forelegs or along the belly and brisket, and spread cattle fever (babesiosis) through their infected saliva while feeding.

These CFT-transmitted pathogens (*B. bovis* and *B. bigemina)* destroy the infected animal's red blood cells causing neurological disturbances and other symptoms such as anemia, jaundice, aggressiveness, coma, and eventually death. Babesiosis causes substantial economic losses due to reduced livestock productivity, hide damage, and increased mortality.

CFTs and babesiosis are well established in Mexico, and more information on the tick biology and the history of the CFTEP can be found in the previous environmental documentations (USDA APHIS 2017a; 2017b; and 2018). That information is incorporated in this Environmental Assessment (EA) by reference[1].

Description of the Action and Program Area:

In this EA, USDA APHIS analyzes the potential effects on the human environment[2] associated with feeding white-tailed deer ivermectin-treated corn as an additional method to control tick vectors in 41 South Texas counties, particularly where cattle fever is a concern. This proposed action is similar to that described in the 2017 EA (USDA APHIS 2017a), except the program area has increased from 10 counties (in 2017) to 41 counties (in 2025).

Ivermectin, an antiparasitic agent introduced in the early 1980s, has been proved to be highly effective against arthropods such as CFTs (Kramm et al. 2021). It was approved as a drug by the FDA and has been used with whole kernel corn as a bait system in feeding stations (Figure 3) to deliver a systematically active acaricide to white-tailed deer (USDA APHIS 2025). This treatment technology appears as a promising tool to complement existing CFTEP measures aimed at preventing the spread of CFTs and bovine babesiosis (USDA APHIS 2017a; 2017b; and 2018; Kramm et al. 2021; and Thomas and Duhaime 2022). For instance, when white-tailed deer rely on treated corn in feeders as a primary food source, it reduces the need for travel in search of nourishment, thereby decreasing the potential spread of vectors and related diseases (Kramm et al. 2021).

USDA APHIS uses the Ivomec® or Ivomax® pour-on for cattle formulation mixed with whole kernel corn. Ivomec® pour-on for cattle is sold by Merial, Inc., and Ivomax® pour-on for cattle is a generic product (FDA ANADA 200-272). The treated corn is placed in gravity flow feeding stations from February through July to control cattle fever ticks in deer populations (nilgai do not eat corn and thus, are not treated). The feeder mechanically dispenses treated feed, delivering oral medication effectively to white-tailed deer. Feeders are serviced and refilled weekly, and program records are maintained, including wildlife treatment feeding logs, bait station data sheets, service records, and maps documenting the number and location of each feeding station.

[1] Any information incorporated by reference in this document is incorporated for all contents except those rescinded by Executive Order.

[2] In the context of 40 CFR § 1502.16(b), the term "human environment" refers to the physical, social, economic, and cultural aspects of the environment that affect or are affected by human activities. (85 FR 137/43331, July 16, 2020)

For dosing, 200 milliliters (ml) of a formulation containing 5 milligrams (mg) of ivermectin per ml is mixed with 100 pounds of clean corn, resulting in 10 mg of ivermectin active ingredient per pound of corn. The daily ivermectin intake for a white-tailed deer, weighing approximately 100 pounds consuming 1 pound of corn daily, is estimated at 22 mg per kilogram (kg). Research indicates that this feeding rate achieves maximum blood serum levels of approximately 30 parts per billion (ppb). This target concentration ensures high efficacy, even for deer consuming only one-third of the dosage. Serum levels of 10 ppb - equivalent to one-third of the targeted dosage - are sufficient to provide 100% efficacy against ticks feeding on treated animals (USDA APHIS 2017a; 2017b; and 2018; Thomas and Duhaime 2022; and USDA APHIS 2025).

The number and placement of feeding stations are determined by deer population size and density, with one feeder allocated for every 20–30 deer to reduce competition and dominance behaviors. Feeders are distributed so that deer travel no more than ¼ to ½ mile to access feed, translating to one feeder per 125 to 500 acres. Stations are strategically placed in areas of high deer activity. Remote sensing data, combined with local observations, is used to identify locations with substantial evidence of deer presence, such as numerous tracks, a high volume of excrement, or vegetation displaying heavy browsing (USDA APHIS 2017a; 2017b; and 2018; Thomas and Duhaime 2022; and USDA APHIS 2025).

Feeder sites are selected to be relatively flat and level. In areas where other large animals may have access, feeders are enclosed by a perimeter barrier with a minimum 30-foot diameter to prevent non-target species from accessing the feed (USDA APHIS 2017b; and Thomas and Duhaime 2022).

Figure 3. Closed gravity feeder system

Source: (USDA APHIS, 2017b)

1.2 Purpose and Need:

Since 1968, there has been increasing concerns about the role of white-tailed deer in CFT outbreaks, and studies have shown that white-tailed deer are suitable hosts and reservoirs for CFTs (USDA APHIS 2017a; 2017b; and 2018; Currie et al. 2020; Kramm et al. 2021; Osbrink et al. 2021; Thomas and Duhaime 2022; and USDA APHIS 2025).

One approach of disinfesting ticks from wild hosts is using food baits medicated to eliminate parasites as part of an integrated program. Using this technique, wildlife managers and scientists have been able to successfully eradicate a local outbreak of fever ticks in Port Mansfield, Willacy County, Texas (Thomas and Duhaime 2022). Likewise, ivermectin-treated corn was used to treat CFT-infected white-tailed deer on the East Foundation El Sauz Ranch overlapping both Willacy and Kenedy Counties in South Texas (Kramm et al. 2021). Many other studies referenced in (USDA APHIS 2017a; 2017b; and 2018) provide similar eradication successes.

The purpose of this EA is to evaluate the potential effects of the use of ivermectin-treated corn in feeders intended for white-tailed deer by the CFTEP on the human environment. Considering the population dynamics of white-tailed deer in South Texas, which may contribute to the accelerated

spread of CFTs along the southern border, feeding white-tailed deer ivermectin-treated corn for the purpose of controlling CFTs is essential and needed. The failure to incorporate ivermectin-treated corn into an integrated pest management (IPM) approach alongside current CFT control measures, could substantially undermine efforts to eradicate these ticks, prevent the spread of babesiosis, and protect the cattle industry (USDA APHIS 2017a; 2017b; and 2018).

Although the use of ivermectin-treated corn approach would most likely apply to the 10 counties identified along the permanent quarantine line (Cameron, Hildago, Jim Wells, Kinney, Maverick, Starr, Val Verde, Webb, Willacy, and Zapata counties) where incursions of CFTs were detected or established (USDA APHIS 2017a), the CFTEP proposes to expand its action area to additional nearby counties to ensure all counties of potential concerns are covered in the event more CFT infestations occur. So, the CFTEP proposes to implement this approach in 41 counties in South Texas: Aransas, Atascosa, Bandera, Bee, Bexar, Brooks, Calhoun, Cameron, Dimmit, Duval, Edwards, Frio, Goliad, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kendall, Kenedy, Kerr, Kinney, Kleberg, La Salle, Live Oak, Maverick, McMullen, Medina, Nueces, Real, Refugio, San Patricio, Starr, Terrell, Uvalde, Val Verde, Victoria, Webb, Willacy, Wilson, Zapata, and Zavala (Figure 4).

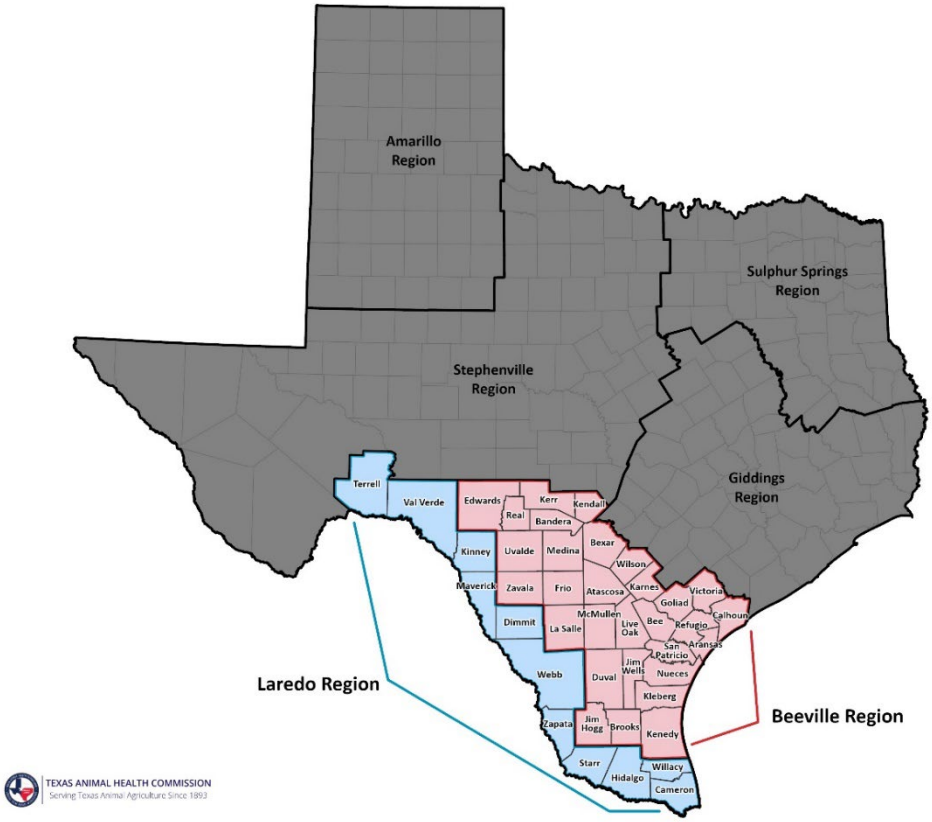

Figure 4. The 41 South Texas counties included in the proposed action

This EA complies with the National Environmental Policy Act of 1969 as amended (NEPA; 42 U.S.C. § 4321 et seq.), and USDA APHIS implementing procedures at 7 C.F.R. Part 372.

2 Alternatives

This EA evaluates two alternatives: a no action alternative and a proposed action alternative.

2.1 No Action Alternative

Under the no action alternative, USDA APHIS would not expand its ivermectin-treated corn program beyond its current action area of 10 counties (Cameron, Hidalgo, Jim Wells, Kinney, Maverick, Starr, Val Verde, Webb, Willacy, and Zapata). The program would not extend to the 31 nearby counties where new infestations of CFTs, spread by white-tailed deer, are possible. Instead, the agency would continue its existing operations, including livestock inspections, patrolling, premises vacating, quarantines, pesticide treatments, high game fencing, and maintaining the ivermectin program within the original 10-county area.

2.2 Preferred Action Alternative (Ivermectin-Treated Corn)

Under the preferred action alternative, the USDA APHIS program would strategically place ivermectin-treated corn kernel in gravity flow feeders on public and private lands as needed within the 41 counties in South Texas, particularly in areas most visited by white-tailed deer, where cattle fever ticks have been detected, and where cattle fever is a concern. White-tailed deer feed on ivermectin-treated corn from the feeder. This method, in conjunction with ongoing CFTEP measures, aims to reduce CFT infestations beyond the PTQZ.

As briefly indicated in the previous chapter (Section 1.1), a gravity flow feeder is a commercially made plastic bin device with three or four feed tubes below the bin, and a lid (Figure 3). Each feed site will include one gravity flow feeder that has a holding capacity of approximately 300-350 pounds of corn and will be serviced weekly. A minimum of 30-foot diameter fenced perimeter barrier, three feet tall, is established around gravity flow feeders, which are enclosed with welded wire panels and silt fencing at ground level to exclude non-target animals. On refuge lands, a 50-meter (164-feet) buffer is implemented around wetlands and water bodies as an additional precaution (USDA APHIS 2017a). The treated corn is placed in gravity flow feeding stations from February through July (removed 60 days before hunting season in compliance with FDA recommendations to control CFTs in deer populations (nilgai are not consistently attracted to the feeders, thus, are not treated) (USDA APHIS 2017a; 2025).

More details about the gravity flow feeder functionality are available in (USDA APHIS 2017a; 2017b; and 2018), and that information is incorporated in this EA by reference.

2.3 Other Alternatives Considered but Dismissed

Tick eradication strategies for wild deer typically rely on two practical approaches: topical application and medicated bait.

- Topical approach using four-poster roller: The CFTEP has previously employed a four-poster roller, a system widely used in the Eastern United States, to apply acaricide to the fur of deer infected with cattle fever ticks. Equipped with a corn feeder, the rollers - dusted with pyrethroid insecticide - are mounted on either side of the feeder access point, allowing deer to self-apply the insecticide when their heads approach the feeder opening (Thomas and Duhaime 2022). However, this method was deemed less favorable due to its high maintenance cost. Also, the insecticide on the rollers dries out quickly requiring frequent reapplications, and therefore, making the four-poster roller less effective.

- Topical approach using permethrin applications: Another passive topical tool involves applying permethrin (a synthetic pyrethroid acaricide) directly to deer pelage. However, the application of acaricides to disinfest wildlife is not as easy as treating managed cattle herds in pastures since wild animals cannot be gathered for treatment. In addition to this limitation, tick populations have developed resistance to pyrethroids in south Texas (Thomas and Duhaime 2022).

Due to the constraints and limitations described above, both topical approaches (four-poster-pyrethroid-dusted system and direct application) were dismissed. A medicated bait - ivermectin-treated corn - appears to be more effective.

3 Affected Environment

This chapter details the existing physical and social conditions in the proposed program area in South Texas. The resources potentially affected by this program include soil, vegetation, agriculture and livestock, wildlife, water quality, air quality, tribal and historic properties, and human health and socioeconomics. Where applicable, this EA references information from previous documents (e.g., (USDA APHIS 2017a; 2017b; and 2018)) to allow for cross-referencing.

3.1 Soil

Texas encompasses four major physical regions shaping its heterogeneous landscape: Basin and Range, North Central Plains, Great Plains, and Gulf Coastal Plains. This section focuses on Great Plains and Gulf Coastal Plains, which overlap the program area (Figures 5 and 6). Their characteristics are summarized from various literatures including Texas History Review Library (Fiveable 2024) and Texas Almanac (TSHA 2021a,b) as follows:

*Great Plains***:** This region features distinct subregions, including the Balcones Escarpment, Llano Basin, Edwards Plateau, and Stockton Plateau. Most dominant soils in this region are Mollisols, whose key characteristics are loamy, well-drained, and rich in organic matter and nutrients. Commonly cultivated for agriculture, these soils often develop a caliche layer due to leaching of carbonate minerals and salts.

Gulf Coastal Plains: This region consists of subregions such as the Rio Grande Plains, Lower Rio Grande Valley, Coastal Prairies, and Blackland. Most dominant soil types are Entisols, Inceptisols, Mollisols, and Vertisols, ranging from fine to coarse texture, generally well-drained, and varying from alkaline to slightly acidic clays and clay loams. These soils are fine- to coarse-textured, well drained, with limited soil moisture available for use by vegetation during the growing season; and they range from alkaline to slightly acidic clays and clay loams (USDA APHIS 2017a).

Soils of the Great Plains and Gulf Coastal Plains also vary depending on local geology, with the underlying bedrock and sediment deposition patterns directly effecting soil composition and land resource characteristics across each region (Figures 5 and 6). For instance, soil properties, uses, and threats in various locations of the Great Plains and Gulf Coastal Plains are further described in the Texas Almanac as follows {TSHA, 2021 #1;TSHA, 2021 #2}:

- *Edwards Plateau Soils*: Shallow, stony clays over limestone in uplands, with fertile, deep clays in valleys. Primarily used for cattle grazing, mohair, and wool production, alongside hunting leases. Major challenges include brush control and limited soil moisture.
- *Northern Rio Grande Plain Soil*s: Neutral to alkaline loams and clays on brush-covered

plains. Supports rangeland, cropland, and hunting leases, with challenges such as brush control and soil fertility.

- *Western Rio Grande Plain Soils*: Alkaline clays and loams, some saline, used for rangeland and irrigated crops. Limited soil moisture and brush control are major concerns.
- *Central Rio Grande Plain Soils*: Neutral to alkaline sandy soils, some saline. Supports beef cattle and limited cropland. Wind erosion and brush control are the main challenges.
- *Lower Rio Grande Valley Soils*: Neutral to alkaline loams and silty clays, used for irrigated agriculture. Key challenges include irrigation water management and wind erosion.
- *Blackland Prairie Soils*: Deep, dark alkaline clays, known for cracking during dry weather. Used for crops and grasslands, with concerns including water erosion and soil tilth.
- *Claypan Area Soils*: Acidic sandy loams over dense claypan subsoils. Land use includes rangeland and cropland, with challenges such as water erosion and irrigation management.
- *Coast Prairie Soils*: Neutral to slightly acidic clay loams and clays, supporting grazing and crops like rice and hay. Challenges include brush control and drainage.
- *Coast Saline Prairies Soils*: Saline clays and loams near sea level, primarily used for cattle grazing and wetland management. Key concerns include providing fresh water and managing grazing access.

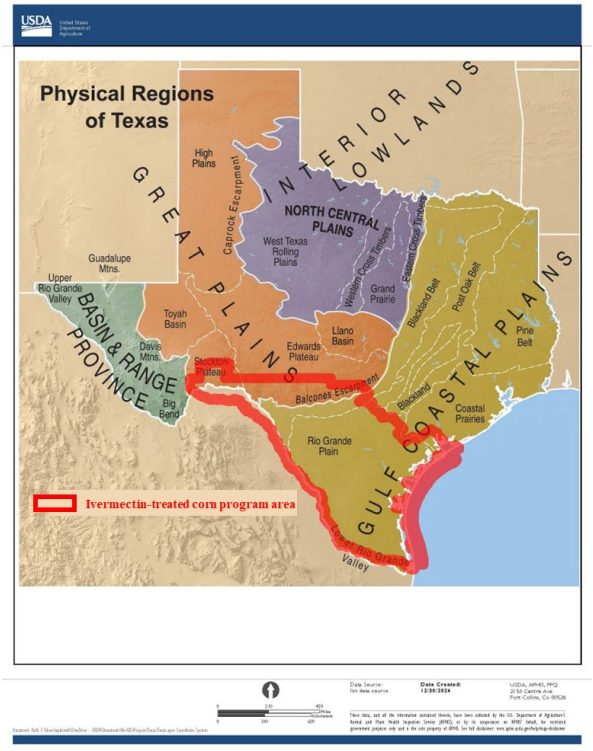

Figure 5. Physical regions of Texas

Source: modified from (TSHA 2021a)

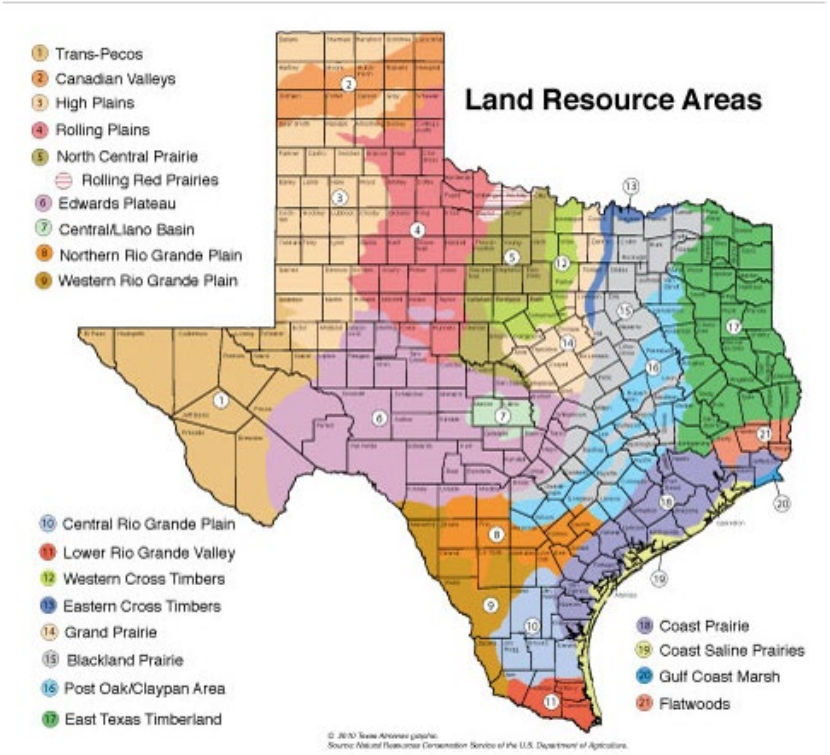

Figure 6. Land Resources Areas of Texas

Source: (TSHA 2021b)

3.2 Vegetation

The vegetation across Texas (Figure 7) reflects its varied climate and soils. According to the Texas Almanac (TSHA 2021b), the main vegetation areas within the program area include:

- *Gulf Prairies and Marshes*: Tall grass and marsh vegetation, providing excellent grazing and farming opportunities. Overgrazing has led to the spread of less desirable plant species.
- *Post Oak Savannah*: A mix of oak-dominated woodlands and grasslands, affected by overgrazing and the invasion of woody underbrush.
- *Blackland Prairies*: Historically a grassy plain, much of this fertile area has been cultivated, leaving limited native vegetation. Overgrazing has introduced invasive species like mesquite.
- *South Texas Plains*: Known as Brush Country, this area features extensive brushlands dominated by mesquite, cacti, and grasses.
- *Edwards Plateau*: A mix of woodlands, brush, and grasslands, with challenges related to invasive woody plants and maintaining rangeland productivity.

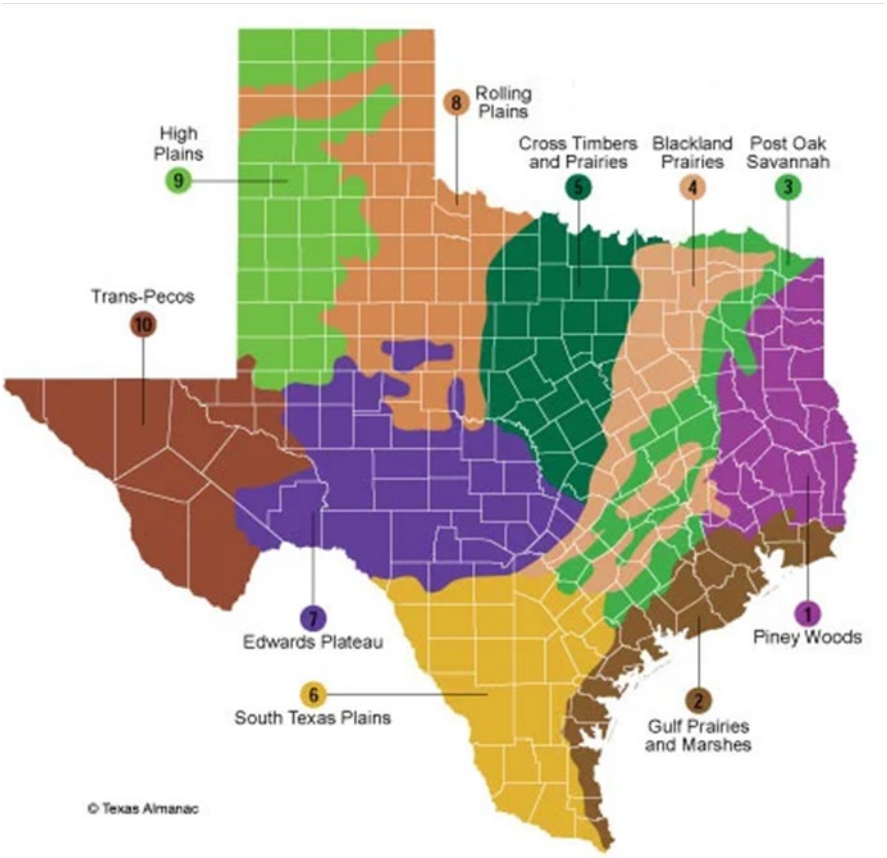

Figure 7. Vegetation Areas of Texas

Source: (TSHA 2021c)

3.3 Agriculture and Livestock

The website of the Texas Department of Agriculture (TDA 2022) provides up-to-date agricultural statistics and highlights the state's top commodities. Texas leads the nation with approximately 230,662 farms and ranches covering 125.5 million acres with an average farm size of about 544 acres. While cattle (beef) farms are the most prevalent, poultry farms have seen substantial growth since 2017.

In terms of market value, Texas' top 10 agricultural commodities in 2022 are:
Cattle: $15.5 billion
Poultry and eggs: $5 billion
Dairy: $3.5 billion
Corn: $1.6 billion
Cotton: $1.4 billion
Greenhouse products: $1.2 billion
Fruits, vegetables, and tree nuts: $846 million
Wheat: $443 million

Sorghum: $435 million
Rice: $269 million

Other important commodities produced in Texas include grapefruit, oranges, carrots, melons, peppers, cabbage, cucumbers, mushrooms, and spinach. Texas is also the fifth-largest wine-producing state in the U.S.

The agricultural profiles for the 10 counties analyzed in this EA are summarized in Appendix D.

3.4 Wildlife

The Texas coastal plains and gulf coast plains overlapping the program area are home to many game animals, including birds, fish, reptiles, and mammals. The Texas Parks and Wildlife Department (TPWD) that manages the state's wildlife resources identifies over 142 species of mammals, over 600 species of birds, and over 230 species of reptiles and amphibians (TPWD n.d.-a).

Examples of wildlife species are white-tailed deer (*Odocoileus virginianus*), nilgai antelope (*Boselaphus tragocamelus*), coypu (*Myocastor coypu*), collared peccary *(Pecari tajacu*), common raccoon (*Procyon lotor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), striped skunk (*Mephitis mephitis*), nine-banded armadillo (*Dasypus novemcinctus*), black-tailed jackrabbit (*Lepus californicus*), fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), American beaver (*Castor canadensis*), gray fox (*Urocyon cinereoargenteus*), and American badger (*Taxidea taxus*) (TPWD 2020).

The list of the most hunted (or expected to be hunted) game animals in the 2024-2025 Drawn Hunt Catalog (TPWD 2024) includes white-tailed deer (top of the list), feral hogs, bobwhite quail, Eastern gray squirrels, Bighorn sheep, mule deer, pronghorn, alligator, javelina, Mule deer, pronghorn, Spring turkey, etc.

Texas has a substantially higher deer population (approximately 5.5 million) compared to other states with large deer populations estimated around one million deer each (WPR 2024). White-tailed deer remain the most common deer in Texas with a population of about four million (TPWD n.d.-d), which poses environmental concerns (including hosting and spreading of CFTs).

3.5 Water Quality

Under Section 303(d) of the Clean Water Act (CWA), states, territories, and authorized tribes must identify impaired waters, those too polluted or degraded to meet the required water quality criteria. The Texas Commission on Environmental Quality (TCEQ)’s Surface Water Quality Monitoring (SWQM) Program assesses physical, chemical, and biological characteristics of aquatic systems to guide effective policies. According to the Texas Water Development Board (TWDB n. d.) and Guadalupe-Blanco River Authority (GBRA 2024), Texas contains 15 major river basins (Table 1 and Figure 8), four of which intersect the program area (Guadalupe, Nueces, Rio Grande, and San Antonio River Basins). The characteristics of these river basins are

described below as follows:

- *Guadalupe Basin:* This is the fourth largest basin in Texas. It spans from its North and South Forks in Kerr County to San Antonio Bay as it drains into the Gulf of America. Key water bodies include the Blanco, Comal, and San Marcos rivers, as well as Sandies and Coleto creeks. Over pumping of underlying aquifers has reduced base flows in the Guadalupe River, while other challenges include high bacteria levels, low dissolved oxygen, drought, stormwater runoff pollution, and mercury contamination in fish tissue.
- *Nueces Basin:* The Nueces River, originating in Edwards and Real counties, flows into Nueces Bay, eventually reaching the Gulf of America. Tributaries include the Leona, Frio, and Sabinal rivers, among others. Drought-induced water scarcity is a critical issue, alongside concerns like stormwater runoff pollution, high dissolved solids, low pH levels, and bacterial contamination from septic systems and wastewater plants.
- *Rio Grande Basin:* The Rio Grande Basin covers the largest area of any river basin in Texas. The Rio Grande serves as the primary waterway, forming part of the U.S.–Mexico border. Key tributaries include the Pecos and Devils rivers. Water quality challenges in this basin include high bacterial levels, salinity (chloride, sulfate, total dissolved solids), and nutrient pollution (ammonia and phosphorus).
- *San Antonio Basin*: This basin, modest in size, is characterized by the San Antonio River, which originates in Bexar County and merges with the Guadalupe River. Water quality issues include stormwater runoff pollution from feedlots, heavy metals, and nutrient loading. Over pumping has further reduced base flows, threatening species reliant on aquatic habitats.

According to the 2022 Texas Integrated Report of Surface Water Quality, 1,051 impairments are listed in the state, with roughly one-third due to excessive bacteria (Figure 9).

Table 1. Overview of Texas River Basins

River basin	Area (sq. mi)	Area in Texas (sq. mi)	River Length (mi)	River Length in Texas (mi)
Brazos	45573	42865	840	840
Canadian	47705	12865	906	213
Colorado	42318	39428	865	865
Cypress	3552	2929	90	75
Guadalupe	5953	5953	409	409
Lavaca	2309	2309	117	117
Neches	9937	9937	416	416

River basin	Area (sq. mi)	Area in Texas (sq. mi)	River Length (mi)	River Length in Texas (mi)
Nueces	16700	16700	315	315
Red	93450	24297	1360	695
Rio Grande	182215	49387	1896	889
Sabine	9756	7570	360	360
San Antonio	4180	4180	238	238
San Jacinto	3936	3936	85	85
Sulphur	3767	3580	222	200
Trinity	17913	17913	550	550

Source: (TPWD n. d.-b)

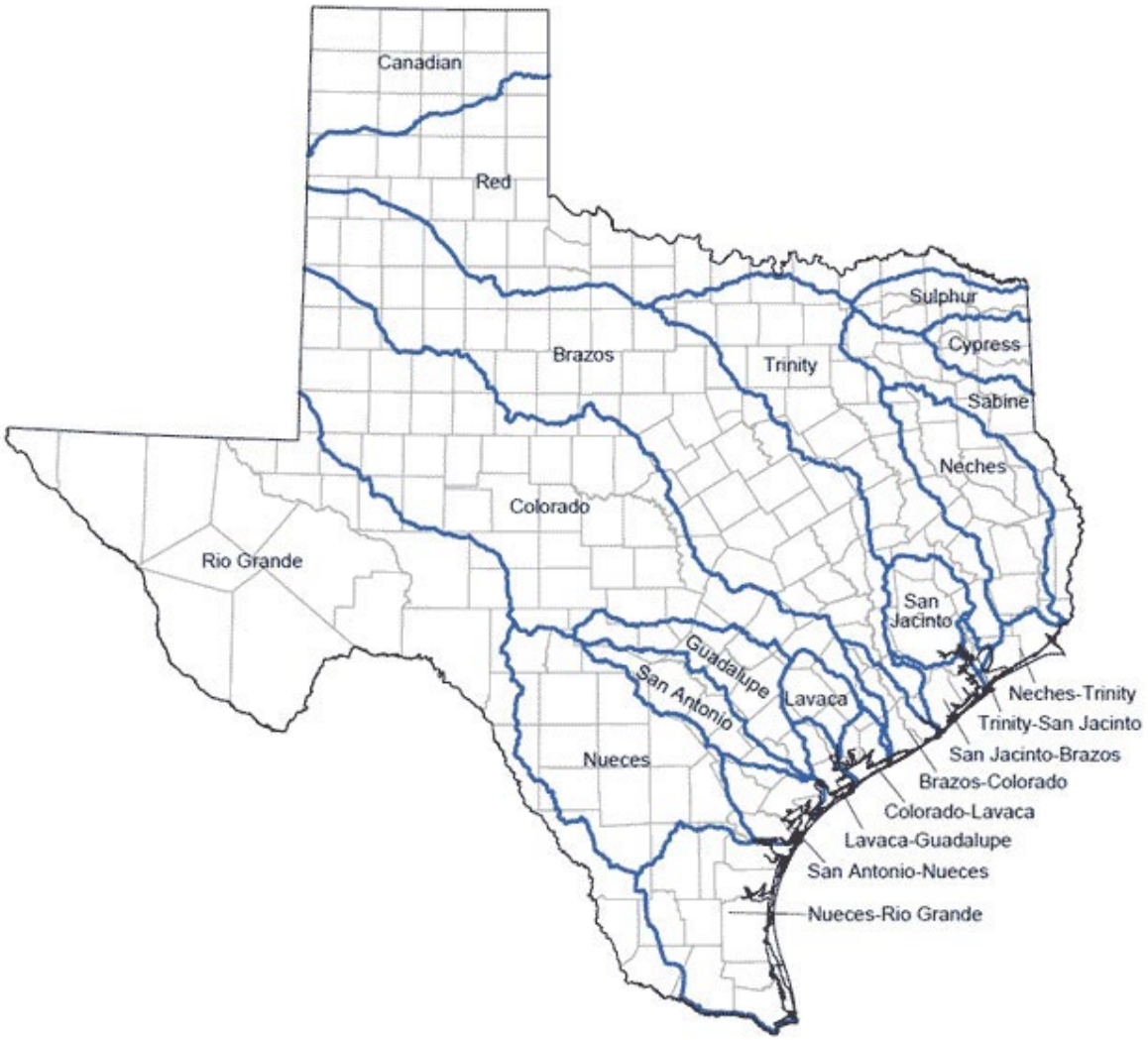

Figure 8. Texas Major Basins and Rivers

Source: (TWDB n.d.)

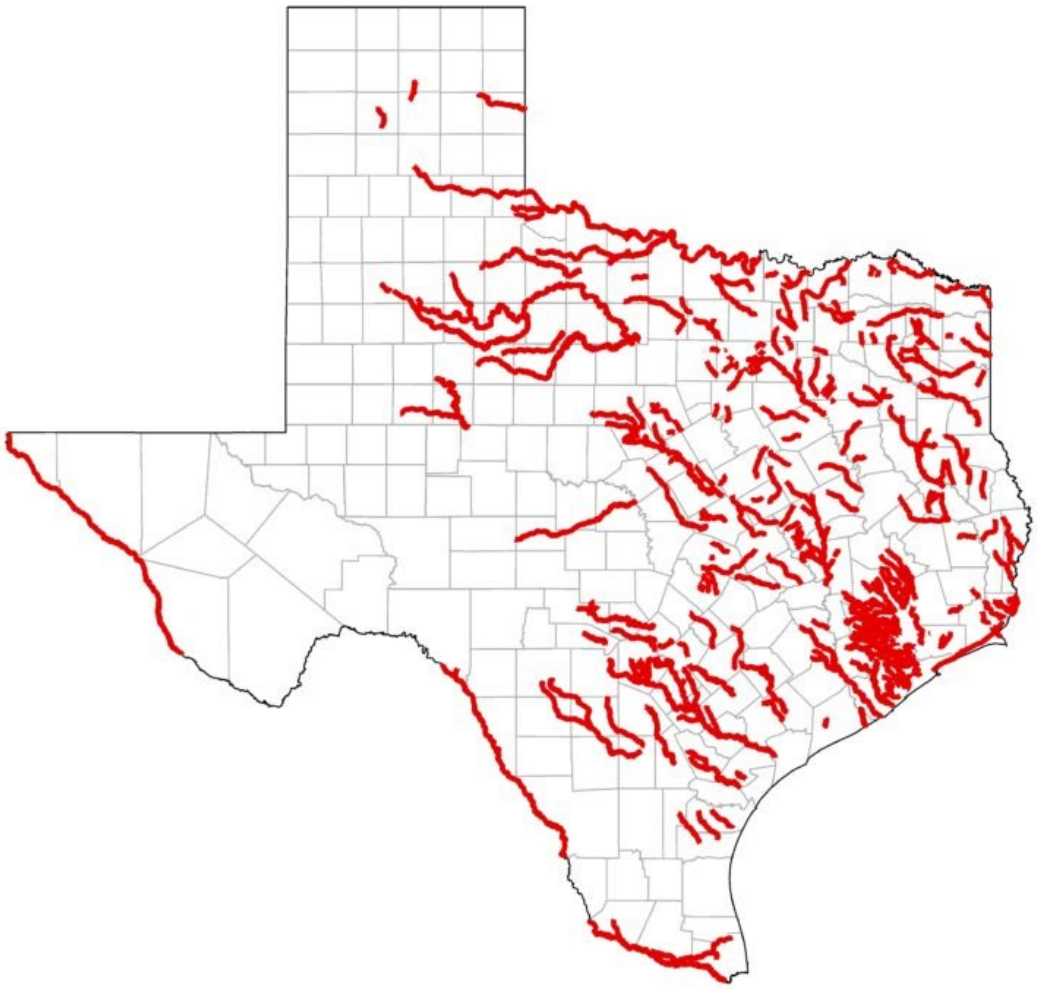

Figure 9. Bacteria impairments in Texas water bodies

Source: (TCEQ 2025)

3.6 Air Quality

Air quality substantially depends on factors (like vegetation, temperature, humidity, rainfall, and seasonal weather) that influence how pollutants are formed, dispersed, and removed from the atmosphere. Texas' annual temperatures range from approximately 52°F in the northern Panhandle to 68°F in the Lower Rio Grande Valley, and precipitation decreases inland from the Gulf of America while the influence of the El Niño Southern Oscillation affects moisture patterns (TWDB 2012).

The Clean Air Act (CAA) regulates air emissions, establishing National Ambient Air Quality Standards (NAAQS) for pollutants such as ozone and particulate matter (U.S.C. §7401 et seq. (1970)). Figure 10 shows that Bexar, Nueces, San Patricio, Victoria, and Wilson Counties are listed

by U.S. Environmental Protection Agency (EPA) among the counties in Texas "affected" by air quality issues. As of July 2024, Bexar County has been identified by EPA as a nonattainment area for ozone due to its air quality index (AQI) becoming too high (AQI >50), that is, it exceeds the required ground-level ozone amount (89 FR 51829, TCEQ 2024).

Other major sources of air pollution in South Texas, besides ozone layers, include biomass burning and cooking activities (60%), industrial emissions, diesel engine emissions, vehicular traffic emissions, agricultural activities, and long-range transboundary emissions {Pinakana, 2023 #69}. In general, places where air pollutants are released continually (such as major city roads, highways, and petroleum production fields) are often associated with poor air quality.

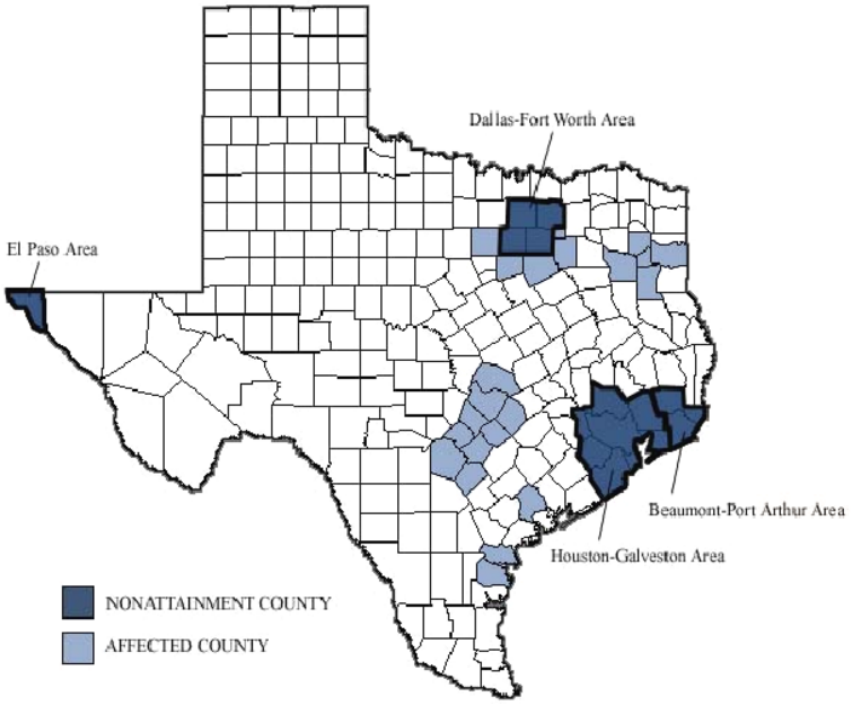

Figure 10. EPA's Nonattainment and Affected Counties in Texas

Source: (Haberl et al. 2004)

3.7 Tribal and Historical Properties

The Bureau of Indian Affairs (BIA 2016) identifies no federally recognized tribal lands in the program area (Figure 11). The program area overlaps the Kickapoo reservation and ceded lands historically belonging to the Comanche and Apache tribes (Figure 12). The following tribes may still have some historical interests in the proposed program area (HUD 2023):

Absentee-Shawnee Tribe of Indians of Oklahoma

Alabama-Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Apache Tribe of Oklahoma
Caddo Nation of Oklahoma
Cherokee Nation
Choctaw Nation of Oklahoma
Comanche Nation, Oklahoma
Coushatta Tribe of Louisiana
Delaware Nation, Oklahoma
Fort Sill Apache Tribe of Oklahoma
Jicarilla Apache Nation, New Mexico
Kickapoo Traditional Tribe of Texas
Kickapoo Tribe of Oklahoma
Mescalero Apache Tribe of the Mescalero Reservation, New Mexico
Muscogee (Creek) Nation
Osage Nation
Tonkawa Tribe of Indians of Oklahoma
White Mountain Apache Tribe of the Fort Apache Reservation, Arizona
Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie), Oklahoma
Ysleta del Sur Pueblo

In March 2025, USDA APHIS notified the representative of the Kickapoo Traditional Tribe, whose reservation may still be active in Texas, about the agency's proposed program.

USDA APHIS also identified about 379 listed historic properties for all 41 counties in the program area using the National Register of Historic Places (NRHP) database available online at https://atlas.thc.state.tx.us. These properties are essentially old buildings (such as houses, depots, churches, warehouses, lighthouses, courthouses, and jails) and green places (such as cemeteries, plantations, pastures, yards, ranches, parks, forts, and battlefields, etc.) Additional information on these properties is summarized in Appendix F.

Figure 11. Indian Lands of Federally Recognized Tribes in the U.S.

Source: (BIA 2016)

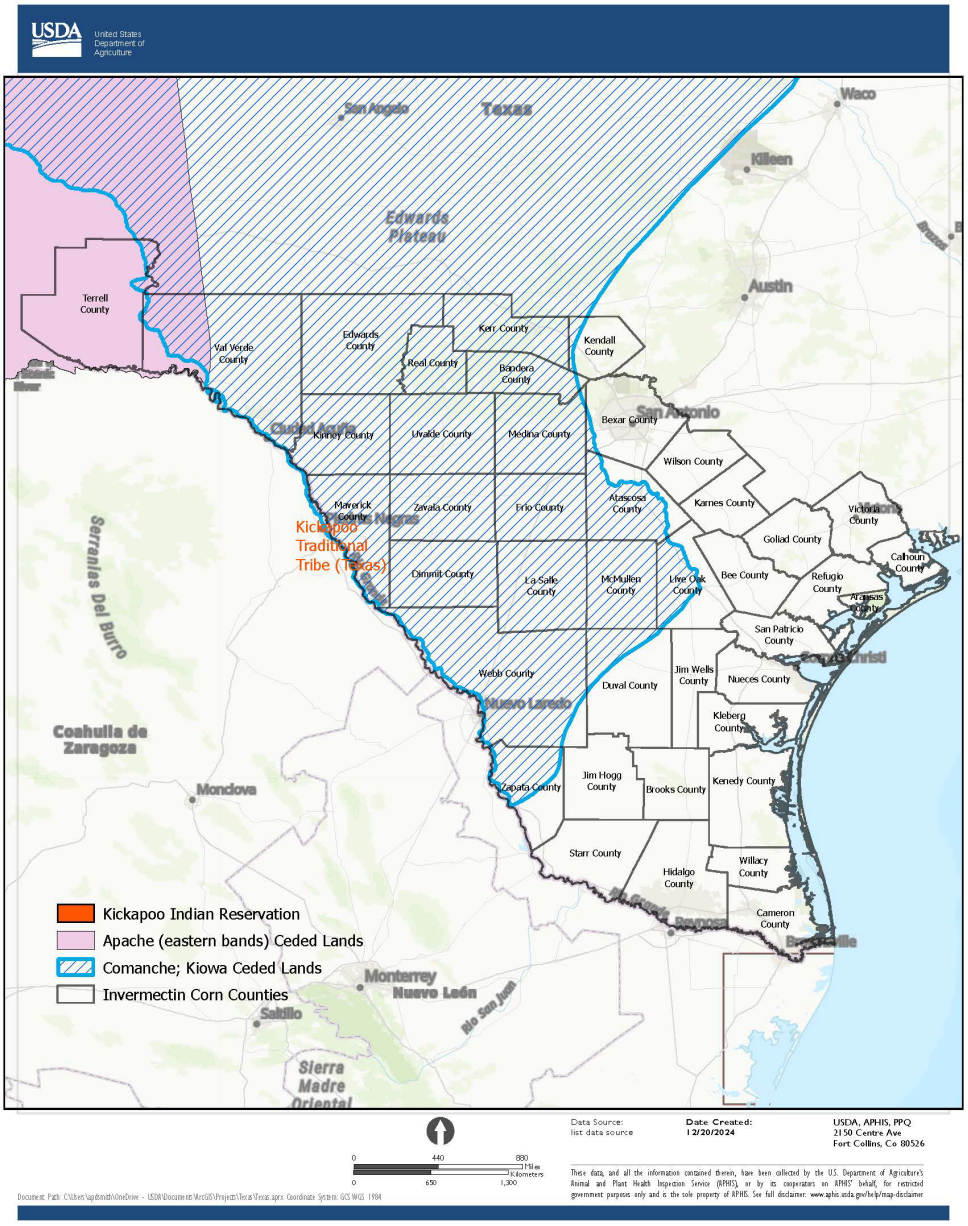

Figure 12. The Kickapoo Reservation and Ceded Lands in the Program Area

Source:(NPS 2024)

3.8 Human Health and Socioeconomics

USDA APHIS considers human health and socioeconomics in its activities to ensure compliance with environmental regulations and executive orders (EOs). This analysis evaluates environmental factors critical to the social and economic well-being of affected communities, in line with 42 USC 4331 Section 101(a)(b), ensuring “safe, healthful, productive, and esthetically and culturally pleasing surroundings” for residents.

To inform this analysis and the overall quality of life in the proposed program area, data from the U.S. Census Bureau (USCB 2024) was examined for relevant information on factors such as demographics, activities, employment, income, housing, poverty, business ownership, etc. Overall, Texas (261,267.85 square miles) is the second largest states of the U.S. after Alaska (665,384 square miles), with a varied population and a growing Hispanic majority (around 40% of the state). The median age of the population is around 35, and socioeconomic status varies substantially across the state. A summary of this information is presented in Table 2 (for Texas) and Appendix E (for the proposed counties).

Table 2. Demographics of Texas (USCB, 2024)

Parameters	Percent or Value
Land Area (square mile)	261,267.85
Population Estimate (2023)	30,503,301
Population density in 2020 (per square mile)	111.6
Race and Ethnicity	
Asian (%)	6.0
White (%)	76.8
Two or More Races (%)	2.3
Black (%)	13.6
Hawaiian/Pacific Islander (%)	0.2
Native American and Alaskan (%)	1.1
Hispanic (%)	39.8
Education	
High School Diploma or higher (%)	85.7
Bachelor's Degree or higher (%)	33.1
Foreign language speakers (%)	34.9
Business, all firms (2017)	423,488
Minority owners (%)	26.2
Housing, owner-occupied (%)	62.6
Employment, Income, and Qualify of Life	
Civilians >16 years in the Labor Force (%)	64,769
Median income (dollar)	76,292
Per capita income-(dollar)	39,446
Poverty rate (%)	13.7
Persons < 5 (%)	6.3
Person < 18 (%)	24.8
Persons < 65 with disability (%)	88.4

A study by the Texas A&M University (AFPC 2010) presents the economic effect of an expanded CFT range in Texas under a no-action alternative as follows:

- A relatively small CFT outbreak outside the quarantine zone in Texas would cost approximately $123 million in the first year, including both capital and ongoing variable annual costs.
- After initial capital costs are covered, the annual cost for similar outbreaks is estimated at around $97 million per year.
- For a representative 50-cow-calf ranch in Texas, adhering to a nine-month dipping protocol would result in costs of $250 per cow, a 47% increase in cash expenses, and an 80% reduction in net cash farm income.
- A ranch adjacent to an infested operation would face an 8% rise in cash expenses and a 13% decrease in net cash farm income.
- If the fever tick outbreak extended into its historic range, the first-year costs would be at least $1.2 billion. This estimate is conservative due to the lack of inspections and surveillance infrastructures in those states.

4 Potential Environmental Effects

This chapter evaluates the potential environmental consequences of the no action and preferred action alternatives, focusing on soil, vegetation, agriculture and livestock, wildlife, water quality, air quality, tribal and historic properties, and human health and socioeconomics.

As stated in Chapter 2 (section 2.1), under the no action alternative, USDA APHIS will not expand its ivermectin-treated corn program beyond its current action area of 10 counties but will simply continue its existing operations (livestock inspections, patrolling, premises vacation, quarantines, pesticide treatments, high game fencing, and continuation of the ivermectin program within the original 10-county area). These operations may remain insufficient to effectively address wildlife-associated tick spread and infestations of cattle premises. Therefore, white-tailed deer populations are likely to continue spreading CFTs in South Texas, and thereby, affecting the cattle industry and the economy of Texas.

Under the preferred action alternative, USDA APHIS would implement an ivermectin-treated corn program in conjunction with existing CFTEP measures (no action alternative). This targeted ivermectin-treated corn program approach directly delivers acaricides to white-tailed deer, offering a cost-effective solution to reduce CFT infestations beyond the PTQZ. Gravity flow feeders (1 per 125-500 acres for about 20-30 deer (USDA APHIS 2017a,b)) will be strategically monitored and maintained to ensure compliance with FDA regulations and minimize potential environmental effects on resources. USDA APHIS evaluated and described the potential effects on resources that are associated with ivermectin in previous environmental documentations (USDA APHIS 2017a,b; 2018; and 2025). That information is incorporated in this EA by reference.

4.1 Soil

Under the no action alternative, the above-listed ongoing control activities may contribute to soil erosion and compaction over time, causing Group D and Group C/D soil types to slow down water infiltration and water transmission rates further, as well as increasing runoff potential when thoroughly wetted (USDA APHIS 2024a). Such potential effects on soils would add to key concerns currently observed in the Great Plains and Gulf Coastal Plains, that were described in Chapter 3 - including soil tilth, water and wind erosions, brush drainage, and limited soil moisture {TSHA, 2021 #1;TSHA, 2021 #2}. However, not only these soil physical disturbances are limited in scope and time they are not associated with the action proposed in this EA.

Under the preferred action alternative, white-tailed deer will be fed ivermectin-treated corn from gravity feeders strategically placed in areas frequently used by white-tailed deer and where CFTs are a concern. The setup of feeders may require digging the ground and moving some soil

particles, but these physical effects would be minimal because they are limited in time and scope.

When administered to livestock, ivermectin is excreted unmetabolized in the dung within five days post administration, and its residue in manure eventually affects dung colonizers (beetles, earthworms, and other soil invertebrates), manure decomposition process, and nutrient cycling in temperate settings (Yeates et al. 2002; Ruhinda et al. 2025). However, such effects are not expected to be substantial for several reasons (1) ivermectin breaks down quickly through both photodegradation and microbial activity, reducing its persistence in soil; (2) dung dispersion in the environment lowers ivermectin concentration, minimizing its impact; (3) certain decomposers, resilient and less sensitive to ivermectin, often continue nutrient cycling, and (4) ivermectin does not build up significantly in invertebrates or the food chain (bioaccumulation is limited) (Lumaret and Errouissi 2002 and Wall and Strong 1987). In fact, ivermectin half-lives in soil are limited to 7- 14 days at high temperatures in summer or 91- 217 days at low temperatures in the winter (USDA APHIS 2017b). Studies on soil nematodes confirmed no (or unsubstantial) effects of ivermectin on soils (Yeates et al. 2002).

Given that ivermectin was approved by FDA since the 1980s (FDA-ANADA 200-272) and that USDA APHIS chemical application methods meet all application provisions of 21 CFR 350, its proposed program is expected to cause no substantial effects on soils.

4.2 Vegetation

Under the no action alternative, there would be no clearing of the vegetation, and the existing vegetative cover (consisting of Gulf prairies and marsh vegetation; post oak savannah of woodlands and grasslands; Blackland prairies; South Texas plains with extensive brushlands dominated by mesquite, cacti, and grasses; as well as the mix of brush, woodland and grassland of the Edwards plateau) would continue to grow as usual. The overgrazing and the land cultivation may continue to be the limiting factors of the native vegetation as they contribute to the spread of weeds and invasive plants (TSHA 2021a). Also, areas most used by livestock and the patrolling agents during the program operations may incur continued trampling of the vegetation. However, none of these effects are associated with the action proposed in this EA. In any case, the vegetation in cultivated areas, trampled vegetation, and overgrazed plants would regrow and recover naturally.

Under the preferred alternative, any necessary vegetation clearing for feeder installation would be minimal due to the low feeder density (one feeder per 125–500 acres of vegetation and for approximately 20 - 30 deer). Deer activities around feeders may cause some vegetation changes such as plant uprooting, species composition shifts, and bare patches, but these effects would be confined both in scope (around feeder stations) and duration (vegetation recovery time).

A biological assessment prepared by USDA APHIS reveals a few plant species listed as

threatened or endangered, with or without critical habitats in the proposed program area that may or may not be affected (USDA APHIS 2025). Related detailed information is provided in the ESA section of this EA.

Overall, no effects on vegetation associated with the proposed program action is expected.

4.3 Agriculture and Livestock

Under the no action alternative, untreated white-tailed deer (main CFT hosts) would continue spreading CFTs into healthy cattle ranches causing Texas cattle industry substantial economic losses. For example, one analysis estimated that a 500 cow-calf ranch in Texas could experience an 80% decline in net cash farm income if the ranch was adjacent to an infested ranch (AFPC 2010). Before the CFTEP, direct and indirect economic losses were estimated at $130.5 million, equivalent to over $3 billion today, highlighting the substantial effect of the disease on the cattle industry (USDA APHIS 2024b). If this trend continues, Texas might no longer lead the nation in cattle ranching and beef production.

Under the preferred alternative, feeding white-tailed deer ivermectin-treated corn could lead, eventually, to some deer dungs containing ivermectin residues landing in agricultural lands. While this may affect some dung decomposers and possibly soil fertility, such effects are not expected to be substantial because (1) ivermectin breaks down quickly through photodegradation and do not persist in soil; (2) dung dispersion in the soil environment lowers ivermectin concentration, minimizing its impact; (3) resilient decomposers often continue nutrient cycling, and (4) the bioaccumulation of ivermectin in soil is very limited (Lumaret and Errouissi 2002 and Wall and Strong 1987). Organisms that rely on deer dungs as essential food source may also be affected by ivermectin traces in dungs (Merola and Eubig 2012). However, most farmland animals do not rely on deer dungs as a food source nor is the ivermectin-treated corn program intended for livestock direct feeding. Moreover, the possibility of exposure to non-target animals will be by using exclusion barriers (welded wire panels precluding strayed livestock) combined with weekly monitoring of the feeders reduces this potential exposure. The low probability of exposure and administration of therapeutic doses of ivermectin suggest that risk to non-target terrestrial vertebrates who may consume some spilled treated corn will be low.

So, overall, the program expects no to negligible ivermectin risks to most animals and fish (USDA APHIS 2017b; and 2025).

4.4 Wildlife

As indicated in Chapter 3, Texas is home to hundreds of species of mammals, birds, reptiles, and amphibians. The state hosts approximately 5.5 million deer, more than many other deer-populated-states in the country (WPR, 2024). White-tailed deer alone represents over four million heads

{TPWD, n.d. #71}, which poses environmental concerns (including hosting and spreading of CFTs) and economic challenges to the cattle industry in South Texas, as described in the previous sections.

Under the no action alternative, where the CFTEP would continue its ongoing control activities without incorporating the ivermectin-treated corn use approach, the program's effective eradication goal may not be reached any sooner because white-tailed deer population would continue to increase, host, and spread CFTs among other animal hosts.

Under the preferred alternative, white-tailed deer will be fed ivermectin-treated corn. When deer ingest food (ivermectin-treated corn), the drug is absorbed into blood, distributed throughout the mammal's body, and deposited in the body fat and liver (USDA APHIS 2017b). The absorption rate varies with the route of administration, formulation, and animal species. Ruminant species appear to have a slower absorption process than monogastric animals. The ingested drug then blocks the transmission of neural signals of the parasites (ticks) by binding selectively and with high affinity to the glutamate-gated chloride channels in nerve and muscle cells of the animals and acting as an agonist of the gamma-aminobutyric acid (GABA) neurotransmitter in the peripheral nervous system of invertebrates. However, ivermectin has low toxicity in mammals because GABA is found only in the central nervous system of mammals and is protected by the blood-brain barrier.

More information about ivermectin functions and uses in treating deer in South Texas, as well as its potential risks to non-targets wildlife is available in (USDA APHIS 2017a; 2017b; 2018) and associated Biological Assessment (USDA APHIS 2025); that information is being incorporated in this EA by reference.

4.4.1 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. There are 49 federally listed species and species proposed for listing and 16 areas of designated or proposed critical habitat in the 41-county program area. USDA APHIS has considered the effects of the program activities on listed species and critical habitat in the two proposed treatment areas.

Potential effects of the proposed action to listed species and critical habitat include toxicity of ivermectin to non-target species, removal of brush that serves as species habitat from areas where feeders are placed, runoff of ivermectin into aquatic areas, trampling of listed plants, and species disturbance by feeder set up and weekly servicing. USDA APHIS will avoid adverse effects by surveying potential feeder sites for presence of listed plants and nesting birds, placing feeders in

areas already dominated by non-native vegetation, avoiding creation or widening of trails to access feeders, implementing buffers for feeder placement from aquatic areas, avoiding removal of native vegetation and brush, avoiding placement of feeders within designated critical habitat, and using feeders that prevent access to treated corn by non-target species.

USDA APHIS prepared a biological assessment for listed and proposed species and critical habitat in Cameron, Hidalgo, Jim Wells, Kinney, Maverick, Starr, Val Verde, Webb, Willacy, and Zapata Counties and submitted it to USFWS (U.S. Fish and Wildlife Service), Texas Coastal Ecological Services Field Office, and received a biological opinion dated January 24, 2017. The biological assessment (BA) (prepared by T. Willard, USDA-APHIS, October 17, 2016) is included in the administrative record for this EA. USDA APHIS then prepared a revised BA for the expanded 41-county program area and submitted it to the USFWS on January 6, 2025 (prepared by T. Willard, USDA-APHIS), requesting reinitiation of consultation for the program. This BA is also included in the administrative record for this EA.

In the 2016/2017 consultation for this program in Cameron, Hidalgo, Jim Wells, Kenedy, Kinney, Kleberg, Live Oak, Maverick, Starr, Val Verde, Webb, Willacy, and Zapata Counties on October 17, 2016 (Consultation No. 02ETTXX0-2016-F-0590), USDA APHIS determined that use of ivermectin-treated corn may affect but is not likely to adversely affect the black-capped vireo (*Vireo atricapilla*), golden-cheeked warbler (*Dendroica chrysoparia*), Devils River minnow (*Dionda diaboli*), and its critical habitat, ashy dogweed (*Thymophylla tephroleuca*), black lace cactus (*Echinocereus reichenbachii var. albertii*), least tern (*Sternula antillarum*), South Texas ambrosia (*Ambrosia cheiranthifolia*), star cactus (*Astrophytum* (*=Echinocactus*) *asterias*), Texas ayenia (*Ayenia limitaris*), Texas snowbells (*Styrax texanus*), Tobusch fishhook cactus (*Sclerocactus brevihamatus ssp. tobuschii*), Walker's manioc (*Manihot walkerae*), and Zapata bladderpod (*Lesquerella thamnophila*) and its critical habitat, and USFWS concurred with those determinations. USDA APHIS also determined that the use of ivermectin com would not jeopardize the continued existence of the golden orb (*Quadrula aurea*) which was a candidate for listing, or the Texas hornshell (*Popenaias popeii*) which was proposed for listing as endangered. In addition, USDA APHIS determined that the program may affect and is likely to adversely affect the endangered northern aplomado falcon (*Falco femoralis septentrionalis*), ocelot (*Leopardus pardalis*), Gulf Coast jaguarundi (*Felis yagouaroundi cacomitli*), and whooping crane (*Grus americana*), and their critical habitat, and the USFWS issued a biological opinion on January 24, 2017. USDA APHIS also determined that the program would have no effect on the West Indian manatee (*Trichechus manatus*) and its critical habitat, piping plover (*Charadrius melodus*) and its critical habitat, rufa red knot (*Calidris canutus rufa*), yellow-billed cuckoo (*Coccyzus americanus*) and its proposed critical habitat, critical habitat of the whooping crane (*Grus americana*), hawksbill sea turtle (*Eretmochelys imbricata*) and its critical habitat, Kemp's Ridley sea turtle (*Lepidochelys oliveacea*), leatherback sea turtle (*Dermochelys coriacea*) and its critical habitat, loggerhead sea turtle (*Dermochelys coriacea*), and critical habitat of Zapata bladderpod (*Lesquerella thamnophila*).

USDA APHIS reinitiated this consultation to update it to include additional species that have been listed or proposed and critical habitat that has been designated or proposed in the program area since 2017, and to add 28 counties to the action area. USDA APHIS requested an official species list for this area from IPaC on December 3, 2024 (Project Code: 2025-002640) and submitted the BA to the USFWS on January 6, 2025.

USDA APHIS determined that use of ivermectin-treated corn may affect, but is not likely to adversely affect the Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*); cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*); Mexican spotted owl (*Strix occidentalis lucida*) and will have no effect on its critical habitat; southwestern willow flycatcher (*Empidonax traillii extimus*) and will have no effect on its critical habitat; fountain darter (*Etheostoma fonticola*) and its critical habitat; Mexican blindcat (catfish) (*Prietella phreatophila*); false spike (*Fusconaia mitchelli*) and its critical habitat; Balcones spike (*Fusconaia iheringi*) and will have no effect on its critical habitat; Mexican fawnsfoot (*Truncilla cognata*) and its proposed critical habitat; Salina mucket (*Potamilus metnecktayi*) and its proposed critical habitat; Texas fatmucket (*Lampsilis bracteata*) and no effect on its critical habitat; Texas hornshell (*Popenaias popeii*) and its proposed critical habitat; Texas pimpleback (*Cyclonaias petrina*) and its critical habitat; [No Common Name] beetle (*Rhadine exilis*) and its critical habitat; [No Common Name] beetle (*Rhadine infernalis*) and its critical habitat; Helotes mold beetle (*Batrisodes venyivi*) and its critical habitat; Cokendolpher Cave harvestman (*Texella cokendolpheri*) and its critical habitat; Government Canyon Bat Cave meshweaver (*Cicurina vespera*) and its critical habitat; Government Canyon Bat Cave spider (*Tayshaneta microps*) and its critical habitat; Madla Cave meshweaver (*Cicurina madla*) and its critical habitat; Robber Baron Cave meshweaver (*Cicurina baronia*) and its critical habitat; bracted twistflower (*Streptanthus bracteatus*) and its critical habitat; bushy whitlow-wort (*Paronychia congesta*) and its critical habitat; and prostrate milkweed (*Asclepias prostrata*) and will have no effect on its critical habitat; and slender rush-pea (*Hoffmannseggia tenella*).

Use of ivermectin corn will not jeopardize the continued existence of the monarch (*Danaus plexxipus*) and will have no effect on its proposed critical habitat because proposed critical habitat does not occur in the program area.

USDA APHIS has also determined that use of ivermectin-treated corn will have no effect on the tricolored bat (*Perimyotis subflavus*); eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*); piping plover [Atlantic Coast and Northern Great Plains DPS] (*Charadrius melodus*) and its critical habitat; rufa red knot (*Calidris canutus rufa*) and its proposed critical habitat; yellow-billed cuckoo (western Distinct Population Segment (DPS)) (*Coccyzus americanus*) and its critical habitat; green sea turtle (North Atlantic DPS) (*Chelonia mydas*); San Marcos salamander (*Eurycea nana*) and its critical habitat; Texas blind salamander (*Eurycea* (=*Typhlomolge*) *rathbuni*); Austin blind

salamander (*Eurycea waterlooensis*) and its critical habitat; Houston toad (*Bufo houstonensis*) and its critical habitat; fountain darter (*Etheostoma fonticola*) and its critical habitat; Comal Springs dryopid beetle (*Stygoparnus comalensis*) and its critical habitat; Comal Springs riffle beetle (*Heterelmis comalensis*) and its critical habitat; Peck's cave amphipod (*Stygobromus* (=*Stygonectes*) *pecki*) and its critical habitat; bunched cory cactus (*Coryphantha ramillosa*); and Texas wild-rice (*Zizania texana*) and its critical habitat.

USDA APHIS received a letter from the USFWS dated February 26, 2025, concurring with these determinations (Project Number 2025-002640).

4.4.2 Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c)

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. § 668) prohibits the take of bald or golden eagles unless permitted by the USFWS. BGEPA defines the term "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb" (50 CFR § 22.3). Disturb means to agitate or bother to a degree that causes injury, a decrease in its productivity, or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Golden eagles (*Aquila chrysaetos*) are rare to locally uncommon in the 41-county area, and very rare to casual throughout the remainder of Texas (Lockwood and Freeman, 2004). For bald eagles, breeding populations occur mainly in the eastern half of the state and along coastal counties from Rockport to Houston {TPWD, n.d. #70}. Nonbreeding populations of bald eagles are found mainly in the Panhandle, Central and East Texas, and in other suitable habitats throughout Texas {TPWD, n.d. #21}. Because bald and golden eagles are unlikely to be in the program area, activities associated with ivermectin-treated corn are not expected to cause disturbance to eagles.

Bald eagles in Texas commonly eat coots, catfish, rough fish, and soft-shell turtles; and carrion is also common in the diet of bald eagles, especially in younger birds {TPWD, n.d. #21}. Golden eagles eat a variety of foods, mainly mammals ranging in size from ground squirrels up to prairie-dogs, marmots, and jackrabbits (NAS 2016b). They may also prey on smaller rodents, birds, snakes, lizards, large insects, and carrion (NAS 2016b). Should bald or golden eagles occur in an area where ivermectin-treated corn feeders are placed, direct risk to them from feeding on prey that has fed on ivermectin-treated corn is expected to be low because of the method of application for ivermectin-treated corn and low toxicity of ivermectin to birds (see the Migratory Bird Treaty Act section for additional toxicity information). The use of the closed gravity feeder will reduce exposure to most non-target birds and other animal species that could serve as prey to eagles. In addition, eagles would have other food sources that would not contain ivermectin residues, further reducing risk to them. Ivermectin is used therapeutically to treat raptors, including bald and golden eagles, for helminth parasites (parasitic worms, such as tapeworms and roundworms) (USDA

APHIS 2017b).

4.4.3 Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–712)

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) makes it unlawful without a waiver to pursue, hunt, take, capture, kill, or sell nearly 1,100 species of birds listed therein as migratory birds. Upon thorough evaluation by USDA APHIS, it has been determined that implementing the ivermectin-treated corn poses minimal risk of contravening the stipulations set forth by the MBTA. Texas occurs within the Central Flyway, a bird migration route that is composed of the States of Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota, and the Canadian provinces of Alberta, Saskatchewan, and the Northwest Territories. Many of the migratory bird species of the Central Flyway winter in Central and South America. Some migrate across the Western Hemisphere to the Arctic Circle, and others migrate to South America (NAS 2016a). Birds in this flyway include the American oystercatcher (*Haematopus palliatus*), black skimmer (*Rynchops niger*), brown pelican (*Pelecanus occidentalis*), greater sage-grouse (*Centrocercus urophasianus*), least tern, lesser prairie chicken (*Tympanuchus pallidicinctus*), piping plover, reddish egret (*Egretta rufescens*), redhead (*Aythya americana*), red knot, ruddy turnstone (*Arenaria interpres*), sanderling (*Calidris alba*), sandhill crane (*Grus canadensis*), whooping crane, and Wilson's plover (*Charadrius wilsonia*) (NAS 2016a). Birds that migrate along this route depend on stopover habitat, such as native prairie and wetland areas.

Disturbance of nesting migratory birds is not expected because USDA APHIS will not remove brush or native vegetation that migratory birds would use as nesting substrate; as much as possible, feeders will be placed in areas dominated by invasive brush, or other not native vegetation. USDA APHIS will place feeders away from aquatic areas to avoid disturbance of nesting shorebirds from placement and servicing of feeders.

Exposure and toxicity of ivermectin is another potential effect to migratory birds. USDA APHIS prepared an environmental risk assessment for ivermectin-treated corn that was appended to the BA (USDA APHIS 2025). The risk assessment concluded that direct risk to non-target birds is expected to be low based on the method of application for ivermectin-treated corn and low toxicity of ivermectin to birds. The use of the closed gravity feeder will reduce risk to most terrestrial non-target birds and other animal species. USDA APHIS will place feeders a minimum of 50 feet from aquatic areas to prevent ivermectin runoff that could affect fish and invertebrate prey. Insectivorous birds would not likely ingest ivermectin-treated corn. Small insects that would serve as prey for these birds are also not expected to ingest ivermectin-treated corn. If birds were to ingest the treated corn or prey that has ingested ivermectin-treated corn, acute toxicity of ivermectin to birds is low to moderate depending on the species. The oral median lethal dose (LD_{50}) for ivermectin to bobwhite quail (*Colinus virginianus*) is 2,000 milligrams (mg)/kilogram (kg) and 88 mg/kg for the mallard duck (*Anas platyrhynchos*). Similar sensitivities are seen in dietary studies, with median lethal

concentration (LC_{50}) values of 3,102 and 383 mg/kg, for the bobwhite quail and mallard, respectively {Bloom, 1993 #72}.

4.5 Water Quality

Under the no action alternative, the water quality in the water basins overlapping the program area would remain as described in Chapter 3 (Affected Environment), that is, characterized by high bacterial levels, salinity, nutrient pollution, stormwater runoff pollution, high dissolved solids, low pH levels, over-pumping, low dissolved oxygen, drought, mercury contamination in fish tissue, etc. (GBRA 2024). Any water quality change may result from natural events or ongoing CFTEP operations listed above, and not from the ivermectin-treated corn program. Some acaricide products may leak through runoff during wash-off or from improper disposal of dip wash from dipping vats (FDEP 2023), but the likelihood of such leaks is low when the acaricide application and the disposal of dip wash are done properly and according to the manufacturer's instructions.

Under the preferred alternative, there are no expected threats to ground and surface water that could be used as drinking water or serving as aquatic habitat due to the proposed treatment method (feeding white-tailed deer with corn treated with ivermectin). The environmental fate of ivermectin supports this approach (USDA APHIS 2017a,b; and 2025). In general, feeding stations are placed a minimum of 50 feet from any aquatic areas and it is unlikely that any treated corn would be transported during a rain event to any surface water source used for drinking water; the potential for exposure to aquatic organisms from ivermectin-treated corn is expected to be negligible (USDA APHIS 2017a,b; and 2025). Ivermectin is mixed with whole kernel corn and dispensed from a closed gravity feeder system to deer (Figure 3), and drift to aquatic areas is not anticipated based on this use pattern. Runoff would also not be anticipated because the corn is contained within feeders. Although corn spillage from deer feeding at the feeders is possible the spilled amount of corn would be minor (<5%) because that corn would likely be consumed by deer (USDA APHIS 2017a,b; and 2025). Ivermectin has low water solubility and partitions strongly to soil and organic matter and would not be expected to be in solution in detectable levels if there was a rain event that could result in transport of treated corn into aquatic habitats. Deer droppings containing ivermectin may be transported as runoff or deposited directly into aquatic habitats, but this is not expected to be a major pathway of exposure for most aquatic organisms because ivermectin in deer droppings would be bound to organic matter and not available to most aquatic organisms (USDA APHIS 2017b). Sediment-dwelling invertebrates may be exposed to ivermectin due to its affinity for organic matter. However, the likelihood of substantial quantities of deer droppings entering aquatic habitats is low, and the degradation of ivermectin further reduces the potential risk to benthic aquatic invertebrate populations (USDA APHIS 2017b). While ivermectin can be toxic to certain aquatic species, the use of feeder barriers, fencing, buffer zones, and the drug's environmental fate help minimize its presence in aquatic environments. Nonetheless, these measures do not eliminate entirely the risk, as treated deer may still excrete the drug into their surroundings. Additionally, ivermectin binds tightly to soil particles, making it unlikely to leach into groundwater or runoff into surface water in a dissolved state (USDA APHIS 2017a,b; and 2025). The drug degrades into less bioactive compounds through photodegradation and aerobic breakdown, with a photolysis rate in

water of less than 0.5 days in summer and approximately 39 hours in winter (USDA APHIS 2017a,b; and 2025).

4.6 Air Quality

Under the no action alternative, there would be no effects on air quality associated with ivermectin-treated corn use by white-tailed deer since this program would not be applicable. Any such effects would likely result from other causes including the ongoing CFTEP operations that usually require the use of service vehicles. The release of air pollutants resulting from these activities could affect air quality in the program area. However, these effects would be negligible because they are limited in scope and time. USDA APHIS usually minimizes the number of trips by service vehicles to limit air emissions.

Under the preferred alternative, gas emissions from the running service vehicle could contribute to air pollution, but such a contribution would be short-term (minutes to hours). Ivermectin is not considered a substantial contributor to air pollution because of its low volatility meaning it is unlikely to evaporate into the air and become airborne pollution (USDA APHIS 2017b; Chacca et al. 2022; de Souza and Guimarães 2022).

4.7 Tribal and Historical Properties

The proposed ivermectin program activities will have no effect on federally recognized Tribal or ceded lands in the proposed program area because there are none in South Texas according to the Bureau of Indian Affairs (BIA 2016). On March 21, 2025, USDA APHIS notified the Chairman of the Board of the Kickapoo Traditional Tribe of Texas regarding the agency's proposed program action. The Kickapoo Tribe has indicated no concerns regarding USDA APHIS' proposed program.

In accordance with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations, USDA APHIS assessed the historic properties in the program area (Appendix F) and analyzed the agency's action's potential effects on those properties. USDA APHIS found that the proposed action would have no effect on the listed properties because feeders will not be set in historical buildings (houses, depots, churches, warehouses, lighthouses, courthouses, and jails). Some listed historic places (such as cemeteries, plantations, pastures, yards, ranches, parks, forts, and battlefields) may provide habitat corridors for deer and ticks, nevertheless, it is unlikely that feeders would be placed on these properties. If feeders are eventually set on these grounds, they will be enclosed with welded wire panels, fenced, and protected to keep non-targets out (Figure 3), as described in the previous chapters.

USDA APHIS' proposed action would not alter, change (restore or rehabilitate), modify, relocate, abandon, or destroy any historic buildings, edifices, or nearby infrastructure. The agency's program's activities would not directly or indirectly alter the characteristics of any listed historic property that makes it eligible for listing in the National Register of Historic Properties. USDA APHIS activities would not use heavy equipment that could create noise levels requiring auditory protection. Any visual, atmospheric, or auditory effects during the ivermectin-treated corn program

activities would be limited in duration, intensity, and area. The proposed action will not disturb the ground for building, and does not include mowing, herbicidal treatments, or removal of plant material from any historic site.

4.8 Human Health and Socioeconomics

Human Health:

Humans are not hosts of CFTs, which are not considered a direct threat to human health in the United States and do not pose a risk to the general public if their populations become uncontrolled (USDA APHIS 2018; and 2023). However, wildlife such as white-tailed deer may be hosts to other ticks that can transmit human diseases - most notably the transmission of Lyme disease (caused by the bacteria *Borrelia burgdorferi*) which is vectored by deer ticks (*Ixodes scapularis*). For these reasons, tick control in animals is important for human health. Human health risks associated with the ivermectin program are determined based on the toxicity of ivermectin, and the potential for exposure, which in turn also depends on the ivermectin application method and the environmental fate profile for ivermectin (USDA APHIS 2017b and 2025).

As indicated in the Ecological Risk Assessment and the BA (USDA APHIS 2025), ivermectin has low toxicity in mammals because GABA is found only in the central nervous system of mammals and is protected by the blood-brain barrier. In the United States, ivermectin tablets are approved by the FDA to treat people with intestinal strongyloidiasis and onchocerciasis, two conditions caused by parasitic worms. Some topical forms of ivermectin are approved to treat external parasites like head lice and for skin conditions such as rosacea (USDA APHIS 2025). The FDA-approved ivermectin human drugs currently include Stromectol® (3 milligram (mg) oral tablet), Sklice® (0.5% topical lotion), and Soolantra® (1% topical cream) (USDA APHIS 2017b; 2025).

Ivermectin can be toxic to humans if an accidental overdose or excessive exposure to veterinary formulation occurs. The reported adverse human health effects include rash, edema, headache, dizziness, asthenia, nausea, vomiting, and diarrhea (USDA APHIS 2017b; and 2025). Exposure to the Ivomax® pour-on formulation may cause the following adverse effects: 1) eye irritation (direct eye contact); 2) irritation and/or drying and cracking of the skin (prolonged or repeated contact); 3) mild irritation of the nose and throat (vapor exposure of isopropyl alcohol in the formulation) and nausea, headache, and mild drowsiness; 4) decreased activity, slow rate of breathing, dilation of the pupils, muscle tremors, and in-coordination (overexposure to ivermectin); and 5) burning of the gastrointestinal tract, nausea, vomiting and central nervous system depression (ingesting a large amount of isopropyl alcohol) (USDA APHIS 2017b; and 2025). Aggregate effects to human health from the proposed use of ivermectin-treated corn are not anticipated because of the proposed use pattern (USDA APHIS 2025). The probability of human exposure is greatest for workers who mix and fill the feeders although this risk is

negligible overall when workers use the appropriate personal protective equipment (PPE) (USDA APHIS 2025).

For the public, potential direct exposure to ivermectin-treated corn is low or unlikely based on the method of application and program requirements that restrict access to feeders. A sign in both English and Spanish will be posted if feeders are placed on public lands indicating access restrictions.

Potential exposure of the public from dietary consumption of meat from ivermectin-treated deer is unlikely because the program discontinues feeding deer ivermectin-treated corn 60 days prior to the deer hunting season. The proposed treatment period is annually from February through July. The withdrawal time of 60 days allows ivermectin residues to decrease to below the tolerance levels in white-tailed deer (USDA APHIS 2017a,b; and 2025). Consequently, risks to the public from dietary consumption of ivermectin in harvested deer meat are expected to be negligible.

Potential exposure of the public from dietary consumption of meat from feral swine that have ingested ivermectin-treated corn is unlikely because of the installation of exclusion fencing, the design of feed ports, and the time of year associated with hunting swine for food. In fact, feeders will be enclosed with welded wire panels to exclude hogs and other non-target animals, such as hogs, and serviced weekly. The exclusion fencing surrounding each deer feeder, 34 inches high, is optimum to keep feral swine out of corn feeders (USDA APHIS 2017a,b; and 2025). While breach of fencing by feral swine could occur, although uncommon, the program personnel would repair the feeder fence and engage the landowners of the breached sites in implementing lethal feral swine population control measures, which usually occur during warm to hot months of the year (USDA APHIS 2017a,b; and 2025).

Occupational workers exposed to ivermectin in feeding stations may experience some symptoms (such as eye irritation if direct eye contact and irritation of the nose and throat if exposed to vapor isopropyl alcohol), but these physical symptoms would be mild or minimal in scope and time. Also, workers will adhere to safety instructions and other precautionary measures, including wearing PPE (such as gloves, masks, and goggles) during program activities in accordance with applicable safety and health regulations (29 CFR §§ 1910 et seq.) (USDA APHIS 2017b and 2018; Merck 2024).

Overall, the use of ivermectin-treated corn in feeding stations to treat white-tailed deer for the purpose of controlling the spread of CFTs in South Texas is expected to pose no or minimal risks to human health under the USDA APHIS preferred alternative.

More information on ivermectin formulation, uses, and potential human health risks is discussed in detail in the 2017 *CFTEP Use of Ivermectin Corn Final EA* (USDA APHIS 2017a), the 2017 *CFTEP on Laguna Atascosa and Lower Rio Grande Valley National Wildlife Refuges* (USDA

APHIS, 2017b), and *Human Health and Ecological Risk Assessment for the Use of Ivermectin-treated Whole Kernel Corn to Control Cattle Fever Ticks in White-Tailed Deer Populations*, appended to the BA (USDA APHIS 2025). That information is incorporated in this EA by reference.

Socioeconomics

Table 2 (chapter 3) and Appendix E show demographics and socioeconomic information including the population composition (education, youth, adults, etc.) and the overall quality of life (senior health, employment, income, housing, poverty, etc.) in Texas and the program area (41 counties), respectively. USDA APHIS complies with Executive Orders (EO) 13045, "Protection of Children from Environmental Health Risks and Safety Risks", by considering the likelihood and consequences of exposure to the agency's proposed action. In Texas, about 25% of the population is under 18 years old and about 6.3% are under five (USCB 2024). Under both alternatives, children are highly unlikely to live anywhere near or use the proposed ivermectin-treated corn feeding stations. The program personnel will not set feeders at places or near facilities children and youth typically use (such as parks, playgrounds, schools, or outdoor community centers). As stated in the previous sections, feeders will be enclosed with welded wire panels to exclude non-target animals.

USDA APHIS will ensure that its ivermectin program and activities are accessible to persons with limited English proficiency as directed by EO 13166, "Improving Access to Services for Persons with Limited English Proficiency" by conducting outreach, when necessary, to both English-speaking and Spanish-speaking communities through a variety of public notices and informational brochures about CFTEP program activities. A sign in both English and Spanish will be posted if feeders are placed on public lands. This way, the 34.9% of Texas residents speaking languages other than English at home, as well as representatives of colonia, would be able to access relevant CFTEP information.

USDA APHIS would invite all stakeholders, including Colonia ombudspersons and residents of Colonias, to any public meetings. The Texas Department of Health and Community Affairs (TDHCA 2019) defines "Colonia" (meaning neighborhood or community, in Spanish) as a geographic area located within 150 miles of the Texas-Mexico border that has a majority population composed of individuals and families of low and very low income. These families lack safe, sanitary, and sound housing and are without basic services such as potable water, adequate sewage systems, drainage, utilities, and paved roads. Colonia residents tend to be young, predominately Hispanic, low to very low income, and employed in low-paying sectors. According to the 1990 Census, 36.6 percent of colonia residents in Texas are children (under 30 percent statewide). Nearly all are Hispanic, and over 27 percent speak Spanish as their primary language, over 75 percent of colonia residents are U.S-born, and 85 percent are U.S. citizens (TDHCA 2019). The workforce tends to be young and unskilled; consequently, wages are low.

Family incomes in the counties along the border tend to be much lower than the state average of $16,717. Primary occupations of colonia residents are seasonal in nature and agriculture-related, accounting for more than 50 percent of the workforce. Unemployment levels in five Rio Grande Valley colonias ranged from 20-70 percent, compared with the overall state unemployment rate of only seven percent.

The status of colonias relative to CFTEP is discussed extensively in the 2018 Environmental Impact Statement (USDA APHIS, 2018), and the information is being incorporated in this assessment by reference.

Under the no action alternative, the unchecked spread of CFTs and related disease (babesiosis) may lead to a substantial economic downturn in the livestock sector in the 41 counties in South Texas examined in this EA. Knowing that the cattle population's mortality rate in South Texas due to CFT is estimated between 70 and 90 percent (TFB 2019) and that this rate may increase if effective CFT containment measures including white-tailed deer tick control using ivermectin-treated corn are not implemented, the cattle industry in South Texas risks losing millions of dollars annually, thereby exacerbating unemployment and poverty rates, especially among communities that depend on ranching for their livelihoods. One analysis estimated that a 500 cow-calf ranch in Texas could experience an 80% decline in net cash farm income if the ranch was adjacent to an infested ranch (AFPC 2010). Before the eradication program began, direct and indirect economic losses were estimated to be $130.5 million, which is equivalent to over $3 billion today, highlighting the substantial effects of the disease on the cattle industry (USDA APHIS 2024b). This trend, if no action is taken, could affect the entire socioeconomic situation of the southern region and Texas might no longer lead the nation in cattle ranching and beef production.

Under the preferred action alternative, the spread of cattle fever ticks from white-tailed deer to cattle in South Texas would be minimized, leading to improved cattle health and greater socioeconomic benefits for ranchers. A healthier and more productive cattle population would result in lower production costs, which could translate into reduced consumer prices, increased employment opportunities, improved nutritional options, market share gains, and overall better physical and mental health. These indirect positive effects are expected to be more pronounced under the preferred action alternative.

4.9 Reasonably Foreseeable Effects

NEPA 42 U.S.C. § 4321 et seq. requires that agencies consider reasonably foreseeable environmental effects of the proposed agency action. Such reasonably foreseeable effects may include effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Such effects can also result from actions with individually minor but collectively substantial effects taking place over a period.

USDA APHIS has past and ongoing programs in South Texas including the 41 counties examined in this EA, primarily related to plant health and animal pest controls. Examples of such programs include, but are not limited to citrus greening and Asian citrus psyllid, imported fire ants, Mediterranean fruit fly, Oriental fruit fly, Mexican fruit fly, European cherry fly, European grapevine moth, flighted spongy moth complex, spotted lanternfly, giant African snail, Asian longhorn beetle, coconut rhinoceros beetle, Emerald ash borer, boll weevil and cattle fever tick eradication programs, and vertebrate pest control (Table 3, Figure 13).

Table 3. Examples of USDA APHIS Programs in Texas

Program Title	Document	Scope	Year
Oral Vaccination to Control Specific Rabies Virus Variants with Human Adenovirus Type 5 Vector in Maine, New Hampshire, New York, Ohio, Pennsylvania, Tennessee, Texas, Vermont, Virginia, and West Virginia [Docket #: APHIS-2019-0034]	SEA and FONSI	National	**2021**
Predator Damage Management in the Canyon District of Texas	EA and FONSI	Texas	2024
Field Evaluation of HOGGONE® Sodium Nitrite Toxicant Bait for Feral Swine	SEA and FONSI	Texas	2022
Bird Damage Management in Texas, [Docket #APHIS- 2021-0067]	EA and FONSI	Texas	2021
Field Evaluation of HOGGONE® Sodium Nitrite Toxicant Bait for Feral Swine	SEA and FONSI	Texas	2021
A Small-Scale Field Evaluation of HOGGONE® 2 Sodium Nitrite Toxicant Bait for Feral Swine in Texas	EA and FONSI	Texas	2019
Field Evaluation of HOGGONE® Sodium Nitrite Toxicant Bait for Feral Swine	EA	Texas	2017
Feral Swine Damage Management in Texas	EA and FONSI	Texas	2014
Aquatic Mammal Damage Management in Texas, [Docket #: APHIS-2016-0075]	EA and FONSI	Texas	2016
Predator Damage Management in Corpus Christi District	EA and FONSI	Texas	2017
Predator Damage Management in Fort Worth District	EA and FONSI	Texas	2015
Predator Damage Management in Kerrville District	EA and FONSI	Texas	2016
Predator Damage Management in Canyon District	EA and FONSI	Texas	2014
Predator Damage Management in College Station District	EA and FONSI	Texas	2015

Predator Damage Management in Fort Stockton District	EA and FONSI	Texas	2014
Predator Damage Management in San Angelo District	EA and FONSI	Texas	2015
Predator Damage Management in Uvalde District	EA and FONSI	Texas	2014
Oral Vaccination to Control Specific Rabies Virus Variants with Human Adenovirus Type 5 Vector, APHIS-2019-0034	EA and FONSI	National	2019,
Predator Damage Management in the Canyon District of Texas	EA and FONSI	Texas	2023,
Field Evaluation of HOGGONE; Sodium Nitrite Toxicant Bait for Feral Swine in Texas	SEA and FONSI	Texas	2022
Bird Damage Management in Texas, APHIS-2021-0067	EA and FONSI	Texas	2021
Field Evaluation of HOGGONE; Sodium Nitrite Toxicant Bait for Feral Swine in Texas	SEA and FONSI	Texas	2021
Small-Scale Field Evaluation of HOGGONE; Sodium Nitrite Toxicant Bait for Feral Swine	EA and FONSI	Texas	2019
Field Evaluation of HOGGONE; Sodium Nitrite Toxicant Bait for Feral Swine in Texas	EA and FONSI	Texas	2017
Feral Swine Damage Management in Texas	EA and FONSI	Texas	2014
Aquatic Mammal Damage Management in Texas, APHIS-2016-0075	EA and FONSI	Texas	2016
Predator Damage Management in Corpus Christi District in Texas	EA and FONSI	Texas	2016
Predator Damage Management in Fort Worth District in Texas	EA and FONSI	Texas	2015
Predator Damage Management in Kerrville District in Texas	EA and FONSI	Texas	2015
Predator Damage Management in Uvalde District in Texas	EA and FONSI	Texas	2014

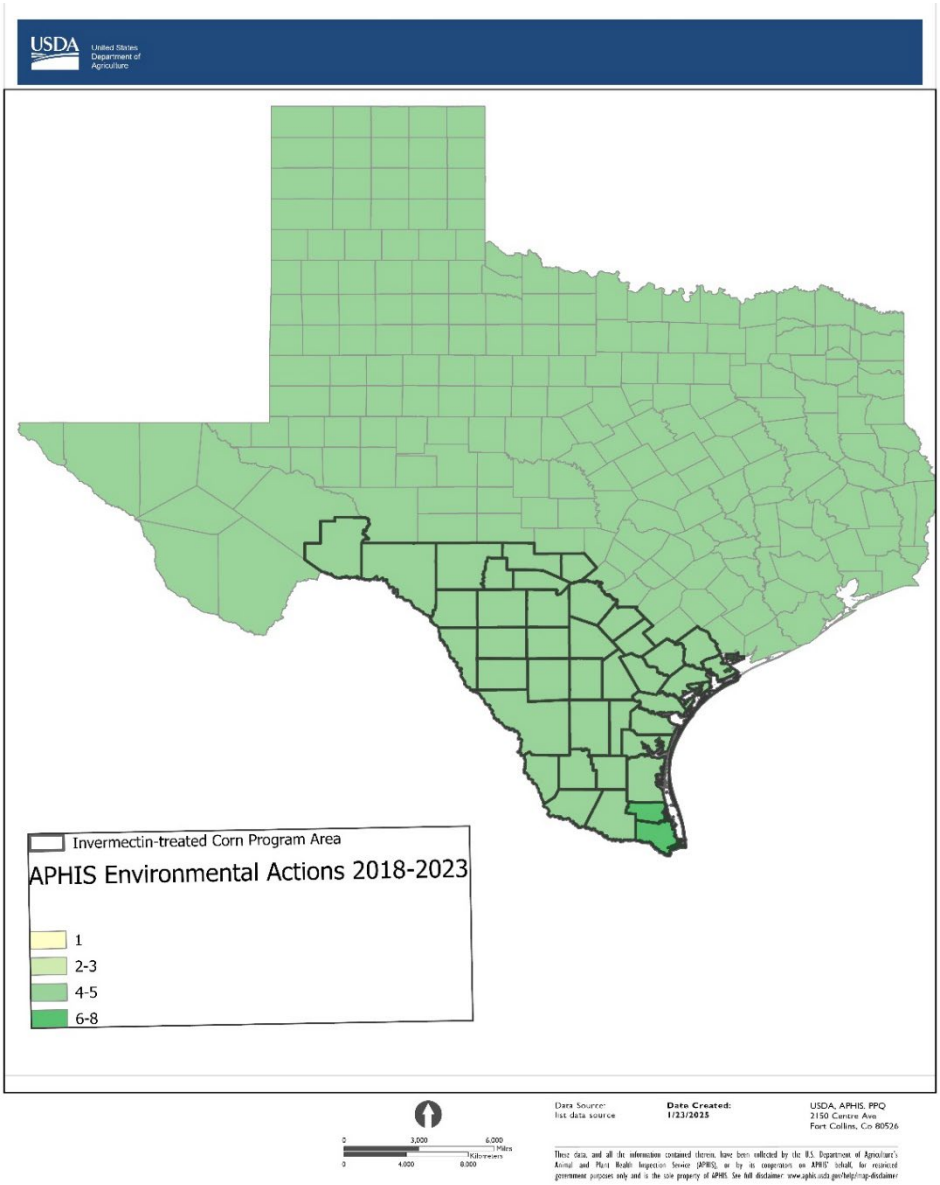

Figure 13. APHIS Environmental Actions in South Texas from 2018 to 2023

In general, when the detection of a pest (e.g., boll weevil, imported fire ant, or Mexican fruit fly) triggers an action, a chemical treatment is applied to the specific affected sites or to an extended quarantined area. Targeted treatments are infrequent and made in crop fields or in nurseries using products that are registered by the EPA for a wide variety of agricultural and non-agricultural uses.

USDA APHIS works with other Federal agencies to minimize aggregate effects to the environment. For instance, effects on vegetation and soil occur to a limited degree because of activity coordination between APHIS CFTEP (conducting trail maintenance to survey for cattle coming from Mexico), U.S. Department of Homeland Security (using sites associated with

potential illegal border crossings), and USFWS (using trail to monitor wildlife).

Given that ivermectin is widely used as an anti-parasitic drug in humans, livestock, and pets (USDA APHIS 2017a,b; 2018; and 2025), there may be increased environmental loading from the use of ivermectin-treated corn for white-tailed deer where there are also ivermectin uses for domestic animals, cattle, and other livestock animals. However, the effects to white-tailed deer are expected to be incrementally negligible when put in context with other stressors because the dose of ivermectin is considered therapeutic and not intended to result in adverse effects. So, livestock and domestic animals receiving ivermectin for other purposes are also not expected to have aggregate effects resulting from the proposed use of ivermectin-treated corn in white-tailed deer because those animals will not be able to access the deer feeders. Aggregate effects to aquatic organisms will also be negligible because there is a low probability of exposure to aquatic habitats from the proposed use of ivermectin-treated corn (USDA APHIS 2017a,b; and 2025).

Aggregate effects to human health from the proposed use of ivermectin-treated corn are not anticipated because of the proposed use pattern. In fact, human exposure and risk are very low for the public. The probability of exposure may be greatest for workers who mix and fill the feeders, but the risk to this group of the population would be negligible based on the low risk of ivermectin when using the appropriate PPE. There is the potential for worker exposure to ivermectin and other chemicals that may be used in the CFTEP (such as coumaphos, for example, is an organophosphate insecticide used to treat cattle for ticks that may vector cattle fever), but the potential for aggregate effects related to exposure to both pesticides (coumaphos and ivermectin) by workers will also be reduced using PPE. Aggregate risks to the public from exposure to mixtures of both chemicals are also not anticipated because of the method of application, program controls, and restriction of public access to treatment areas.

In South Texas, various federal chemical programs (e.g., Boll Weevil Cooperative Eradication Program and the Fruit Fly Cooperative Program) along with the use of spinosad - a common agricultural insecticide applied by individual farmers to their orchards or groves - can contribute alongside the proposed ivermectin program to aggregate effects. However, aggregate runoff from both spinosad and the pesticide programs into livestock production areas are unlikely due to their specific use patterns and intended targets (USDA APHIS 2017b). Consequently, the likelihood of public and worker exposure to multiple programs simultaneously is low.

Research shows synergistic effects between ivermectin and antibiotics (doxycycline, erythromycin, rifampicin, and azithromycin) in controlling body lice. These interactions are not expected with the proposed use of ivermectin because treatments will be directed at animals not receiving antibiotic treatment. These types of mixture exposures would not be anticipated for humans either because of the method of application and other measures to prevent exposure to the public and workers who mix ivermectin with corn and load the feeders (USDA APHIS 2017b; 2025).

In summary, the aggregate effects associated with the proposed preferred action alternative, when assessed in relation to the current baseline and past, present, and future activities, constitute a small incremental change to the human environment. Some of these aggregate changes may be positive such as the reduction in CFTs and the associated economic benefits from having tick-free and healthier cattle. To preserve environmental quality for the human population and ecological resources, the CFTEP would minimize potentially negative aggregate effects by following the best management practices. USDA APHIS does not find that any reasonably foreseeable effects caused by the program activities will occur later in time or be farther removed in time.

5 Agencies and Persons Consulted

CFTEP operates as a collaborative initiative involving the Federal government, the State of Texas, local governments, and individual livestock producers, all of whom share the program's costs. To compile, share, and review information for this Environmental Assessment, USDA APHIS consulted several individuals and agencies, including:

Kickapoo Traditional Tribe of Texas
2212 Rosita Valley Road
Eagle Pass, TX 78852

Texas Animal Health Commission, Field Operations Office
25833 Zinnia County Road
Raymondville, Texas 78580

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Policy and Program Development, Environmental Risk and Analysis Services
4700 River Road, Unit 149
Riverdale, MD 20737

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services Strategy and Policy, National Cattle Fever Tick Eradication Program, Natural Resources Research Center, Bldg. B, 3E89
2150 Centre Avenue
Fort Collins, CO 80526-8117

U.S. Fish and Wildlife Service Ecological Services, Alamo Sub-Office
3325 Green Jay Rd
Alamo, Texas 78516

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Appendix B. Soil Types

County	Area (mi^2)	Elevation (ft)	Soil Types (details in draft EA)
Aransas	252.1	0-55	Coast Saline Prairies
Atascosa	1219.5	350-700	Post Oak/Claypan Area; North Rio Grande Plain (NRGP)
Bandera	791	1200-2300	Edwards plateau
Bee	880.2	200-300	North Rio Grande Plain
Bexar	1240.3	400-1896	Edwards plateau; Blackland Prairies, Post Oak/Claypan Area; NRGP
Brooks	943.3	100-400	Coastal Rio Grande Prairies (CRGP)
Calhoun	506.9	0-50	Coast Saline Prairies; Brownish to reddish soils, with loamy to clayey surface layers, and clayed subsoils; Lower Rio Grande Valley (LRGV); Coastal prairies
Cameron	891.7	0-60	Coast Saline Prairies; Brownish to reddish soils, with loamy to clayey surface layers, and clayed subsoils
Dimmit	1328.9	500-800	NRGP; CRGP
Duval	1793.5	250-800	CRGP
Edwards	2117.9	1500-2410	Edwards plateau
Frio	1133.5	400-600	North Rio Grande Plain
Goliad	852	100-250	North Rio Grande Plain; Coastal prairies
Hidalgo	1,571	40-200	LRGV; Sandy and light loamy soils over deep reddish or mottled clayey subsoils.
Jim Hogg	1,136	200-800	CRGP; deep loamy surfaces over clayey subsoils, or brown to red clays
Karnes	748	180-400	CRGP; Light to dark, with loamy surfaces over reddish, clayey subsoils over limestone
Kendall	662.5	1000-2000	CRGP; Light to dark, with loamy surfaces over reddish, clayey subsoils over limestone
Kenedy	1458.6	0-100	Post Oak/Claypan Area; North Rio Grande Plain
Kerr	1103.3	0-100	CRGP; Coast Saline Prairies; Brownish to reddish soils, with loamy, to clayey surface layers, and clayed subsoils
Kinney	1,360.1	1500-2000	Edwards plateau
Kleberg	881.3	0-150	Edwards plateau. Rocky and hilly with some loamy soils; or gray to black, cracking, clayey soils over limestone
La Salle	1,486.7	400-600	NRGP; CRGP; Coast Saline Prairies; Brownish to reddish soils, with loamy to clayey soils.
Live Oak	1039.7	70-400	North Rio Grande Plain; CRGP
Maverick	1,279.3	540-960	Edwards Plateau and Rio Grande Plain, with mostly gray to black, cracking, clayey soils

McMullen	1,139.8	150-450	North Rio Grande Plain, CRGP
Medina	1,334.5	635-1995	Edwards plateau; North Rio Grande Plain
Nueces	839.2	0-180	Coast Saline Prairies
Real	699.2	1400-2400	Edwards plateau
Refugio	770.5	0-100	North Rio Grande Plain; Coastal prairies
San Patricio	693.3	0-200	Coast Prairies
Starr	1,223.2	125-580	LRGP; Sandy or light-colored loamy soils over very deep, reddish, or mottled
Terrell	2,358	1300-4000	Edwards plateau
Uvalde	1,551.9	700-2000	Edwards plateau; NRGP; CRGP
Val Verde	3,145	2248-2925	CRGP; Dark, calcareous stony clays and clay loams, Edwards plateau
Victoria	882.1	0-230	North Rio Grande Plain
Webb	3,362	310-940	Clayey and loamy, CRGP
Willacy	590.6	450-550	LRGV; Coast Saline Prairies; Dark brown to red loam over deep clayey subsoils; or sandy and saline (cracking) along the Gulf Coast
Wilson	803.7	300-600	Edwards plateau; Post Oak/Claypan Area, NRGP
Zapata	998.4	300-860	CRGP; Light-colored, loamy soils over reddish or mottled clayey subsoils
Zavala	1,297.4	580-964	NRGP; CRGP

Appendix C. Vegetation Types

County	Area (mi^2)	Vegetation
Aransas	252.1	Gulf Coast Plains
Atascosa	1219.5	Great Plains
Bandera	791	Great Plains
Bee	880.2	Gulf Coast Plains
Bexar	1240.3	Great Plains/Blackland Prairie
Brooks	943.3	Gulf Coast Plains
Calhoun	506.9	Gulf Coast Plains
Cameron	891.7	Gulf Prairie and Marsh
Dimmit	1328.9	Gulf Coast Plains
Duval	1793.5	Gulf Coast Plains
Edwards	2117.9	Great Plains
Frio	1133.5	Great Plains
Goliad	852	Gulf Coast Plains
Hidalgo	1,571	South Texas Plains
Jim Hogg	1,136	Gulf Coast Plains
Jim Wells	868.5	South Texas Plains
Karnes	747.8	Gulf Coast Plains
Kendall	662.5	Great Plains
Kenedy	1458.6	Gulf Coast Plains
Kerr	1103.3	Great Plains
Kinney	1360.5	Edwards Plateau or South Texas Gulf Coast Plains; and Great Plains
Kleberg	881.3	Gulf Coast Plains
La Salle	1486.7	Great Plains
Live Oak	1039.7	Gulf Coast Plains
Maverick	1279.5	Mesquite, live oak, cat's claw, huajilla, cenizo, and prickly pear
McMullen	1139.8	Great Plains
Medina	1334.5	Great Plains
Nueces	839.2	Gulf Coast Plains
Real	699.2	Great Plains
Refugio	770.5	Gulf Coast Plains
San Patricio	693.3	Gulf Coast Plains
Starr	1,223	South Texas Plains
Terrell	2,358	Great Plains
Uvalde	1551.9	Great Plains
Val Verde	3144.8	Desert shrub; or juniper, oak, and mesquite savanna; Gulf Coast Plains
Victoria	882.1	Gulf Coast Plains

County	Area (mi^2)	Vegetation
Webb	3,362	Mesquite, grasses, thorny shrubs, and cacti
Willacy	590.6	Mesquite, grasses, thorny shrubs, and cacti
Wilson	803.7	Great Plains/Post Oak Savannah (TX Almanach)
Zapata	998.4	Mesquite, grasses, thorny shrubs, and cacti
Zavala	1297.4	Great Plains

Appendix D. Agricultural Profiles of the 41 Texas Counties

County	Area (mi^2)	# farms	cropland, acre	pasture, acre	wood, acre	other land use, acre	crop market value ($1000)	livestock & poultry market value ($1000)
Aransas	252.1	79	1,767	40,660	213	246	688	1502
Atascosa	1219.5	1673	81,698	519,046	63638	24000	16004	49102
Bandera	791	723	7,984	137,268	39,260	6,983	777	3852
Bee	880.2	443	63,092	315,540	52700	5906	19,930	16392
Bexar	1240.3	2107	76669	144918	18267	8691	48,093	25057
Brooks	943.3	317	11328	333912	20102	7033	3,485	20721
Calhoun	506.9	257	31143	93703	2322	2803	11,172	20801
Cameron	891.7	1248	168839	32815	3025	4022	125,443	3347
Dimmit	1328.9	211	41629	285275	16155	1320	6,920	3693
Duval	1793.5	1044	42027	974218	84388	15154	1,947	13073
Edwards	2117.9	456	12310	948464	41729	8676	395	10997
Frio	1133.5	592	121521	373174	61457	10565	86,663	81184
Goliad	852	1092	48073	320285	37865	10068	3,855	18129
Hidalgo	1,571	2045	310143	180493	19122	25830	362,855	23187
Jim Hogg	1,136	208	16041	564012	4735	2686	174	8399
Jim Wells	868.5	960	116011	219873	55897	7015	39,927	32690
Karnes	747.8	958	68844	266395	43262	11353	6,299	33392
Kendall	662.5	1142	19708	212812	24623	11912	858	13271
Kenedy	1458.6	30	D	D	D	380	D	D
Kerr	1103.3	987	14558	316767	45311	13558	1,079	10072
Kinney	1360.5	190	9525	510297	90133	5969	38	3749
Kleberg	881.3	380	58989	406290	3016	2702	16,377	35428
La Salle	1486.7	344	11484	424507	105025	11462	1,122	6544
Live Oak	1039.7	793	43806	255289	106612	8322	1,553	13412
Maverick	1279.5	234	13233	258975	50506	6929	2,939	41358
McMullen	1139.8	171	8243	475897	89218	7414	868	8598
Medina	1334.5	2204	160275	354275	96672	22618	37,111	45533
Nueces	839.2	549	383446	110652	21984	14581	134,256	5694
Real	699.2	212	2629	247998	36722	4068	250	2396
Refugio	770.5	315	73951	285959	6499	2904	28,330	10378
San Patricio	693.3	620	244431	82730	5687	3220	86,457	14752

County	Area (mi^2)	# farms	cropland, acre	pasture, acre	wood, acre	other land use, acre	crop market value ($1000)	livestock & poultry market value ($1000)
Starr	1,223	1126	85536	311240	58804	12677	21,506	51509
Terrell	2,358	60	8551	781949	D	10858	354	5813
Uvalde	1551.9	580	115702	804850	59976	12551	45,851	44793
Val Verde	3144.8	333	4197	1404446	1375	7368	289	15192
Victoria	882.1	1412	106033	380741	30316	8916	46,235	25799
Webb	3,362	659	53047	1963620	87299	24541	477	31041
Willacy	590.6	345	170402	118996	1519	2944	90,337	5054
Wilson	803.7	2503	85199	228154	63844	15951	12,872	133755
Zapata	998.4	305	5980	264004	11899	5441	253	4941
Zavala	1297.4	212	48593	562851	106079	23235	49,135	37703

Appendix E. Socioeconomic Profile of the 41 Texas Counties

County	Area (mi^2)	Population (2023)	White	Other	Hispanic or Latino	Poverty	Median house Income ($)	Foreign language speakers	Minority Bus. Owners	Housing Ownership	Civil >16 in Labor Force
Aransas	252.1	19,696	88.9	1.1	49.7	14.6	71,870	30.0	76	76.4	64.3
Atascosa	1219.5	51,784	94.1	5.9	66	18.4	69,413	40.7	...	77.4	57.4
Bandera	791	22,637	94.1	5.9	21.6	12.9	69,7.3	13.3	...	86.2	51.7
Bee	880.2	30,850	87.6	2.4	61.7	24.9	56,075	34.6	...	72.1	45.7
Bexar	1240.3	2,087,679	82.6	17.4	59.8	14.7	70,571	37.1	10,756	59.1	64.6
Brooks	943.3	6,848	93.2	6.8	86.9	29.7	31,310	69.2	...	53.2	60.3
Calhoun	506.9	426,710	96.6	3.4	89.2	23.5	51,334	70.9	2,432	65.2	58.0
Cameron	891.7	8,257	94.1	5.9	87.4	27.3	33,409	56.5	...	60.8	41.9
Dimmit	1328.9	9,604	94.3	5.7	82.0	29.1	50,081	52.7	...	71.0	50.1
Duval	1793.5	9,604	94.3	5.7	82.0	29.1	50,081	52.7	61	71.0	42.5
Edwards	2117.9	1,393	91.2	8.8	49.7	19.7	38,500	38.4	...	94.5	65.9
Frio	1133.5	17,987	89.4	9.6	77.7	25.6	60,098	52.2	...	63.0	49.7
Goliad	852	7,144	91.0	9.0	31.5	13.8	59,556	17.2	...	82.8	52.4
Hidalgo	1,571	898,471	96.6	3.4	91.9	26.9	52,281	80.4	6,845	67.6	58.5
Jim Hogg	1,136	4,720	96.0	4.0	88.6	24.6	42,230	59.4	...	61.5	59.2
Jim Wells	868.5	38,662	95.6	4.4	79.6	21.2	47,492	48.8	291	67.5	50.1
Karnes	747.8	15,018	85.7	14.3	53.6	23.6	59,103	28.4	...	65.3	43.8
Kendall	662.5	50,537	93.1	6.9	24.8	6.9	110,498	13.6	156	77.9	60.6
Kenedy	1458.6	343	88.9	11.1	73.2	14.9	31,183	90.4	...	35.3	51.0
Kerr	1103.3	53,915	93.3	6.7	27.1	12.0	67,927	13.7	152	70.4	54.4
Kinney	1360.5	3,148	90.1	9.9	53.1	21.0	66,341	42.4	...	76.6	51.7
Kleberg	881.3	30,069	90.1	9.9	71.9	22.1	57,612	34.5	179	53.9	59.7
La Salle	1486.7	6,537	93.6	6.4	77.5	27.1	55,469	58.7	...	78.8	38.8

County	Area (mi²)	Population (2023)	White	Other	Hispanic or Latino	Poverty	Median house Income ($)	Foreign language speakers	Minority Bus. Owners	Housing Ownership	Civil >16 in Labor Force
Live Oak	1039.7	11,584	88.2	11.8	42.2	17.0	53,869	28.4	24	72.9	43.4
Maverick	1279.5	57,762	95.7	4.3	94.7	22.8	51,270	89.0	429	68.7	58.3
McMullen	1139.8	568	91.4	8.6	39.4	12.4	45,833	12.1	...	76.8	65.5
Medina	1334.5	54,797	91.7	8.3	52.1	13.1	73,462	25.4	...	82.7	54.3
Nueces	838.5	352,289	90.2	9.8	62.9	17.3	66,021	32.8	1,895	59.9	60.9
Real	699.2	2,854	91.9	8.1	27.7	15.7	45,417	15.1	...	75.6	33.3
Refugio	770.5	6,666	88.7	11.3	51.0	16.8	58,016	25.3	...	78.0	52.2
San Patricio	693.3	70,660	93.4	6.6	56.6	17.2	67,512	30.2	...	66.3	57.9
Starr	1,223	65,934	98.4	1.6	97.0	28.8	38,182	92.5	269	71.6	57.7
Terrell	2,358	687	89.4	9.6	49.9	18.6	46,989	38.0	...	88.7	44.0
Uvalde	1551.9	24,960	94.5	5.5	71.1	21.0	57,849	48.7	...	66.5	56.9
Val Verde	3144.8	47,720	94.1	5.9	81.2	20.2	59,673	63.0	...	66.9	56.9
Victoria	882.1	91,664	89.1	0.9	48.4	14.1	70,101	24.2	1,464	67.6	61.7
Webb	3,362	269,148	97.4	2.6	94.9	22.5	62,506	88.1	3,334	63.9	62.2
Willacy	590.6	20,037	94.6	5.4	87.2	27.8	45,645	61.0	...	72.4	55.8
Wilson	803.7	54,183	93.7	6.3	40.7	9.9	92,461	22.8	139	85.7	60.8
Zapata	998.4	13,736	97.9	2.1	94.2	30.4	36,527	84.9	...	74.6	51.8
Zavala	1297.4	9,312	95.2	4.8	92.7	28.9	41,887	72.5	...	71.0	54.6

Appendix F. National Register of Historic Properties in Texas

County	Count	Property types
Aransas	7	station, houses, school, and midden
Atascosa	3	courthouse, farmstead, and houses
Bandera	4	houses, courthouse, Jail, and court
Bee	13	NAS Chase field-buildings, theaters, courthouse, post office, school, bridge, etc.
Bexar	169	Tours, quadrangles, military district, schools and universities, churches, hotels, battlefield and archeological site, clubs and casinos, cemeteries, drug companies, historic parks, courthouses, post offices, water pump, houses, stations, palaces, U.S arsenals, administration buildings, ranches, missions, railroad stations, municipal buildings, farms, house complexes, fort, motor companies, etc.
Brooks	1	courthouse
Calhoun	2	lighthouse and monument
Cameron	36	Buildings, depots, cemeteries, market houses, warehouses, courthouses and jails, hotels, churches, statues, battlefields, monuments, lighthouses, forts, railroad depots, etc.
Dimmit	3	courthouse, ranch, and houses
Edwards	1	courthouse jail
Frio	1	jail
Goliad	13	ranches, houses, historic districts, museums, etc.
Guadalupe	15	Plantations, houses, farmsteads, hotels, farms, commercial districts, archeological districts, agricultural schools, etc.
Harris	303	waterworks, cotton buildings, churches, bridges, schools, astrodomes, zoos, archeological buildings, post offices, courthouses, boys school sites, boulevard esplanades, clubhouses, golf courses, Hollyfield Laundry and Cleaners, street and boulevard houses, cemeteries, Houston Post-Dispatch Building, libraries, oil buildings, parks, hospitals, synagogues, apartment buildings, archeological sites, bridges, manufacture buildings, banks, textile mills, chapels, warehouses, San Southwestern Bell Capitol Main Office, space environment simulation lab, etc.
Hidalgo	23	county jail, theaters, hotels, archeological districts, irrigation systems, canal pumphouses, citrus sheds, courthouses, schools, ranchos, etc.
Karnes	3	courthouse, houses, and historic district
Kendall	12	houses, historic districts, farm buildings, farms, bat roost, monuments, etc.
Kerr	6	buildings, houses, etc.

County	Count	Property types
Kinney	2	historic districts and courthouse
Kleberg	6	ranch, schools, historic districts, courthouses, buildings, etc.
La Salle	4	historic district, ranch, courthouse, school and plaza
Live Oak	3	fort, jail, and Pagan site
Maverick	2	Fort Duncan and courthouse
Medina	8	historic districts, market and saloons,
Nueces	18	buildings, houses, courthouses, cemeteries, churches, theaters, schools, etc.
Refugio	5	monuments, courthouse, houses, homesteads, etc.
San Patricio	6	homesteads, monuments, and Taft Public Housing Development
Starr	9	drugstore, post office, historic districts, house and hotel buildings, courthouse, bridges, etc.
Uvalde	11	banks, archeologic sites, houses, schools, historic districts, bridges, etc.
Val Verde	12	Cassinelli Gin House, courthouse, railroad camp districts, cemeteries, archeologic districts, Canyon sites, etc.
Victoria	117	buildings, waterworks, bakeries, farm warehouses, schools, municipal halls, churches, filling stations, etc.
Willacy	2	courthouse and high school
Zapata	6	ranches, houses, and historic districts