

Environmental Assessment

Proposed Hike-and-Bike Trail

Palo Alto Battlefield National Historical Park

Brownsville, Texas



June 2019

This page intentionally left blank

TABLE OF CONTENTS

Section 1.0	PURPOSE AND NEED	1
1.1	Proposal	1
1.2	Purpose and Need for the Proposal	3
1.3	Issues and Impact Topics Considered	3
1.4	Issues and Impact Topics Dismissed	3
1.4.1	Archeology	3
1.4.2	Cultural Landscapes	4
1.4.3	Soundscape Management	4
1.4.4	Historic Structures	5
1.4.5	Indian Trust Resources and Sacred Sites	5
1.4.6	Wetlands and Floodplains	6
1.4.7	Soil	7
1.4.8	Vegetation	9
1.4.9	Wildlife.....	11
1.4.10	Special Status Species.....	12
1.4.11	Public Health and Safety.....	15
1.4.12	Environmental Justice.....	15
Section 2.0	ALTERNATIVES	17
2.1	Alternative 1: No Action.....	17
2.2	Alternative 2: Paved Trail with Boardwalk and Highway Right-of-Way Access (Proposed Action/Preferred Alternative)	17
2.3	Alternative 3: Trail on Highway Shoulder	22
2.4	Alternatives Considered but Dismissed	25
2.5	Mitigation Measures	27
Section 3.0	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	31
3.1	Visitor Use and Experience.....	31
3.1.1	Affected Environment.....	31
3.1.2	Impacts of Alternative 1	31
3.1.3	Impacts of Alternative 2 (Proposed Action/Preferred Alternative).....	31
3.1.4	Impacts of Alternative 3	33
Section 4.0	CONSULTATION AND COORDINATION	35
Section 5.0	REFERENCES	36
Section 6.0	ACRONYMS.....	40

FIGURES

Figure 1	Area Map.....	2
Figure 2	Site Map (with Alternative 2)	18
Figure 3	Alternative 2	19
Figure 4	Alternative 3	23

APPENDICES

Appendix A	Site Photographs
Appendix B	Impacts on Special Status Species

Section 1.0 PURPOSE AND NEED

1.1 Proposal

The National Park Service (NPS), in partnership with the City of Brownsville, Texas (“City”), proposes to construct a multi-use trail along the western boundary of Palo Alto Battlefield National Historical Park (park) for recreational users (e.g., hikers, runners and cyclists) that would connect to the City’s existing Historic Battlefield Trail system to the south and provide a link to future City-funded trails to the north and east of the park.

An agreement for the proposed project is provided under a 2017 Memorandum of Understanding (MOU) between the U.S. Department of Interior, Palo Alto Battlefield National Historical Park, City of Brownsville, Texas, and City of Los Fresnos, Texas. As stated in the MOU, the multi-use trail is intended to “increase the public’s enjoyment and understanding of the unique natural and cultural history of the park.”

The Palo Alto Battlefield is located approximately eight miles north of downtown Brownsville, and was established as a National Historic Site in 1992 with an area of approximately 3,400 acres.

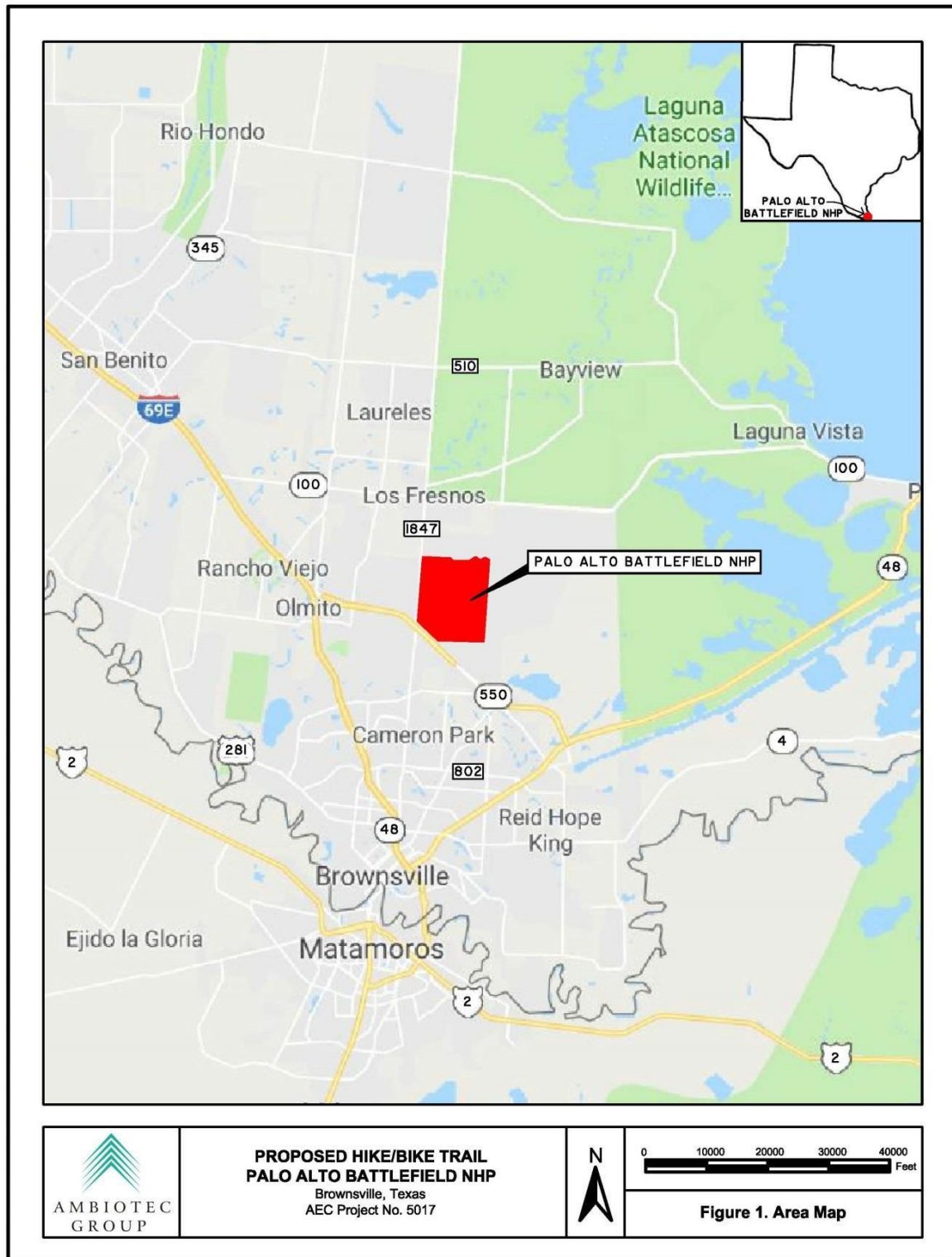


Figure 1 Area Map

1.2 Purpose and Need for the Proposal

A multi-use trail along the western boundary of the park is needed to connect the community to the park and local history. The trail would offer an alternative means of transportation to the park while promoting a healthy lifestyle through hiking, running and cycling opportunities, and would increase awareness of the cultural and natural values of the park and the broader concepts and offerings of the National Park Service. The trail would be part of Brownsville's existing Historic Battlefield Trail system that connects the park to area attractions such as the Resaca de la Palma Battlefield Unit of the park and the Mitte Cultural District near downtown Brownsville, and would provide a link for future expansion of the trail system toward the City of Los Fresnos to the north and the Bahia Grande to the east.

Additionally, the trail is needed to provide the public with safe, non-motorized travel along FM 1847, a State of Texas highway that connects the cities of Brownsville and Los Fresnos. Currently, non-motorized users are forced to use highway shoulders (approximately 10 feet wide) thereby posing considerable risks to public safety. The proposed trail would provide hikers, runners and cyclists with an alternative route that would increase travel safety.

1.3 Issues and Impact Topics Considered

The following topics were carried forward for further analysis in this EA:

- Visitor Use and Experience

1.4 Issues and Impact Topics Dismissed

The following topics were dismissed from further analysis in this EA for the reasons provided.

1.4.1 Archeology

The proposed trail would be located either along the western edge of the park (Alternative 2) or entirely within the right-of-way of Paredes Line Road, (State highway FM 1847), (Alternative 3). In either case, past archeological surveys performed at the park suggest that battle-related artifacts are not likely to be encountered in the proposed project area (Cornelison et al., 2015). In addition, the Texas Historical Commission (THC) reviewed the proposed project area and indicated that there would be "no adverse effects on historic properties" relating to archaeology resources (THC, 2018). Monitoring of the proposed action by the park's Archeologist would be performed to protect any unknown archeological resources that may be inadvertently discovered during ground disturbing activities. If archaeological resources are discovered, construction in the area would be stopped immediately and the THC would be notified immediately to determine appropriate steps for ensuring that the identified resources are properly handled and preserved (see **Section**

2.5 – Mitigation Measures).

1.4.2 Cultural Landscapes

According to NPS' Director's Order DO-28 (*Cultural Resource Management Guideline*), a cultural landscape is "a geographic area, including both natural and cultural resources, associated with a historic event, activity, or person". The "Palo Alto Battlefield landscape" is an NPS-designated cultural landscape that encompasses the approximate 3,400 acres of the park (NPS, 2010). Cultural landscapes within the NPS are maintained and/or stabilized to preserve the existing integrity and character of the landscape against deterioration caused by natural forces (e.g., erosion, vegetation overgrowth, etc.) and normal wear (NPS 1998). As such, the park is maintained to preserve the historical integrity and character of the landscape as it was at the time of the Battle of Palo Alto.

For either Alternative 2 or Alternative 3, there would be large stands of dense brush to screen the trail from the cultural landscape of the core battlefield. In addition, Alternative 2 would include low-profile lighting structures that would direct the light downward to avoid any potential adverse impacts to the cultural landscape (no lighting would be included in Alternative 3). Noise from the construction of the trail may impact the setting of the cultural landscape in the core battlefield, but would only last during the six months of construction of the project. For that reason, the presence of the trail would not affect the historical integrity or character of the cultural landscape. Therefore, the cultural landscapes impact topic was dismissed from this EA.

1.4.3 Soundscape Management

In accordance with NPS *Management Policies (2006)* and Director's Order-47 *Sound Preservation and Noise Management*, an important component of the NPS mission is the preservation of natural soundscapes associated with NPS units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in NPS units, together with the physical capacity for transmitting natural sounds. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among NPS units as well as potentially within each NPS unit, being generally greater in developed areas and less in undeveloped areas.

For both action alternatives, the proposed project area would be located along the western boundary of the park and Paredes Line Road where vehicle noise can be heard. Trail construction activities would generate short-term human-caused sound over the anticipated 6-month construction period, but would only occur during weekday hours between 8 a.m. and 5 p.m. In addition, if the trail were to be constructed, it would potentially increase human sounds associated with trail use. However, because the area is already subject to highway noise from Paredes Line Road and noise from park operations, the noise generated from temporary trail construction activities and future trail use would not substantially contribute to the aggregate of human-caused sounds in the area, and effects would be negligible. Therefore, soundscape management has been dismissed as an impact topic in this EA.

1.4.4 Historic Structures

According to NPS, there are two historic structures at the park that are eligible for listing on the National Register of Historic Places (NRHP): Cameron County Drainage District Main Ditch No. 2 and the 1916 cannon memorial (NPS, 2016). Neither of the structures is located within the proposed project area.

Other man-made above-ground resources *not* associated with the Battle of Palo Alto are known to have been present at the park in the past, including:

- A section of drainage ditch constructed between 1950 and 1962 that intersects the northern portion of the proposed trail under Alternative 2 and Alternative 3. The ditch was designed to divert stormwater runoff to a livestock tank excavated within the Palo Alto Resaca bed (Caran et al., 2005); and,
- A cluster of four buildings associated with a late 19th to early 20th century ranch and dairy farm located near the proposed trail under Alternative 2 and Alternative 3. No standing structures remain (Caran et al., 2005). The structures were located approximately 200-300 feet east of the proposed project area; therefore, this area would not be impacted by the proposed action.

The Texas Historical Commission (THC) reviewed the proposed project area for both Alternative 2 and 3 and determined that there would be “no adverse effects on historic properties” relating to above-ground resources (THC, 2018). In addition, representatives of NPS and THC verified that the drainage ditch described above had no historic value based on an inspection performed in October 2018 (NPS, 2018c). For these reasons, the historic structures impact topic has been dismissed from this EA.

1.4.5 Indian Trust Resources and Sacred Sites

Indian trust resources are “natural resources reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, which are protected by a fiduciary obligation on the part of the United States,” while sacred sites are defined as “places containing certain natural and cultural resources” regarded by American Indian tribes “as sacred places having established religious meaning and as locales of private ceremonial activities” (NPS, 2006).

The NPS solicited comments about this project from five affiliated Native American tribes: Alabama-Coushatta Tribe of Texas; Comanche Nation; Mescalero Apache Tribal Council; San Carlos Apache Tribal Council; and Tonkawa Tribe of Oklahoma. Comments received from the Comanche Nation and San Carlos Apache Tribal Council indicate that no properties of religious or cultural significance are located at the park relating to these two tribes. No comments have been received to-date from the remaining tribes. Through these and other consultation efforts

in the past, the park has not been made aware of any Indian sacred sites at or near the project site, regardless of trail location; therefore, the park does not believe there are any sacred sites within the park boundary. Should new information regarding sacred sites be identified during public comment or tribal consultation, the NPS will reconsider this determination. Since no known Indian trust resources or sacred sites are located at the park, potential impacts to these resources would not occur and, therefore, have been dismissed from further evaluation in this EA.

1.4.6 Wetlands and Floodplains

Field inspections and a review of aerial imagery identified three wetland areas along the western boundary of the park, including two segments of the Resaca de Palo Alto (an abandoned meander channel of the Rio Grande Deltaic System), and a portion of an abandoned drainage ditch (see *Historic Structures* discussion above). These wetland areas are ephemeral and mostly dry during the year, filling only after heavy rain events. No wetland areas would be impacted by the trail under Alternative 3. Impacts to wetlands under Alternative 2 are described below.

Under Alternative 2, the abandoned drainage ditch would be avoided and would not be impacted. Approximately 300 linear feet of the proposed trail under this alternative would be constructed within the southern segment of the Resaca de Palo Alto wetland near the trail's southern terminus; however, a boardwalk would be constructed in this area to minimize impacts to the wetland environment. The boardwalk would be constructed with rows of two 6"x6" treated square timber pilings spaced approximately 6 feet apart to a depth of approximately 3-6 feet below ground surface (until refusal). Boardwalk treads would be comprised of composite material (plastic and wood fiber) with anti-slip surfaces. To preserve the ecological value and function of the wetland, the boardwalk design would incorporate gaps between treads which would allow sunlight to reach the substrate.

The northern segment of the Resaca de Palo Alto is approximately 1,000 feet north of the proposed boardwalk. The proposed trail would extend approximately 850 feet along the western edge of this wetland; however, there would be no impacts since the proposed trail would be located outside the boundary of the wetland and within the right-of-way of Paredes Line Road.

The boardwalk would be constructed using "top-down" construction methods to minimize disturbances to the wetland environment and avoid temporary impacts from construction workers. The top-down construction method involves installing 6-ft sections of the boardwalk from equipment on top of the previously installed sections. As each new section of boardwalk is completed, equipment is moved to the new section to begin construction of the next section. This method is repeated until the boardwalk construction is complete. The total volume of wetland sediments to be impacted by boardwalk pilings is anticipated to range between approximately 75 cu ft and 150 cu ft (i.e. 6"x6" piling x 2 per row x 51 rows (6 ft spacing) x 3-6 ft depth).

Adverse impacts to the wetland functionality or ecological value would not occur due to the following reasons: the highly ephemeral nature of these wetlands; the functionality of these two segments of the Resaca de Palo Alto has already been severely disrupted by the construction of Paredes Line Road and subsequent expansions that have truncated these segments of the Resaca; and the proposed boardwalk is designed to have minimal impact on the wetland. Therefore, further evaluations of potential impacts to wetlands under Alternatives 2 and 3 have been dismissed from this EA.

Floodplain information was obtained from FEMA Flood Insurance Rate Maps (FEMA, 2018). The study area consists of two areas that are within the 100-year floodplain as identified by the U.S. Federal Emergency Management Agency (FEMA). One area is associated with a wetland on the west boundary of the park, and the remaining area is on private property to the north of the park boundary in an area proposed for future trails. The construction of the existing 4-lane highway (Paredes Line Road), has already altered the floodplain and there would be no additional effect because of the close proximity of the trail to the highway. Under both Alternative 2 and 3, the proposed trail also would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. Therefore, further evaluations concerning potential impacts to floodplains have been dismissed from this EA.

1.4.7 Soil

According to the USDA's *Soil Survey of Cameron County (1977)*, the proposed project area consists of (in order of precedence) Benito clay, Chargo silty clay, Lomalta clay, and Laredo silty clay loam. Typical characteristics of these soil units include calcareous composition, moderate to high salinity, plane to concave surfaces, slow runoff, and slow to moderate permeability.

Under Alternative 2, the trail would extend approximately 8,000 feet along the western boundary of the park, including approximately 7,700 feet of paved trail and approximately 300 feet of wetland boardwalk. Potential soil impacts relating to the proposed boardwalk are discussed in the ***Wetlands and Floodplains*** section above.

For the paved portion of the proposed trail under Alternative 2, soils would be impacted by excavation activities within the 10-ft wide paved trail corridor. Initially, vegetation within the trail corridor would be cleared (see ***Vegetation*** discussion below) followed by the removal of approximately five inches of top soil from the 10-ft trail tread using a small dozer. A 2-inch sand bed and 4-inch rebar-enforced concrete pavement would be installed in the excavation area to complete the paved trail construction.

Approximately 1,200 cubic yards of soil would be excavated from the 10-ft trail tread (i.e. 5 inches x 10 ft x 7,700 ft) during the trail construction activity. These soils would be permanently removed from the project area and transported off-site by the contractor for future use. Trail shoulder soils and other soils within the construction area would not be removed but may be compacted during the trail's construction (e.g., trampling by construction workers). In addition, soils exposed during the construction period could potentially experience effects of erosion during heavy storm events. However, soil impacts due to construction activities would be

temporary and limited in duration to the construction period (i.e. 6 months). Trail shoulder soils exposed due to removal of vegetation during the trail clearing activity would be re-vegetated with native coastal plant species and would stabilize within 6-12 months. Soil compaction and/or erosion may occur on the trail shoulders as a result of normal wear by trail users; however, these impacts would be minor and temporary. Impacted areas would be restored to pre-existing conditions during routine periodic maintenance activities.

Under Alternative 3, impacts to soils would be less than described for Alternative 2 because the trail would be constructed entirely within an area in which soils have been disturbed and compacted relating to the construction of Paredes Line Road and ongoing maintenance of the highway's right-of-way. Under Alternative 3, construction activities would include removal of vegetation adjoining the existing shoulder followed by the removal of approximately five inches of top soil using a small dozer. Low areas would be filled to raise surface elevations so that the final trail surface would be level with the existing shoulder. Fill material would be obtained from the excavation of the trail corridor and from the excavation of a roadway drainage ditch that would be constructed adjacent to the trail within highway ROW. Any additional fill material needed for construction would be imported from an off-site source. Following completion of the filling activity, ground surfaces along the trail corridor would be treated and tilled with lime followed by the installation of a geosynthetic liner. Limestone would be placed over the liner and treated with an asphalt preparation layer (i.e. prime coat) before applying the asphalt pavement and compacting the surface with a roller compactor. The completed trail would be level with the existing asphalt pavement.

Approximately 740 cubic yards of soil (i.e. 5 inches x 6 ft x 8,000 ft) would be excavated during the trail construction activity under Alternative 3. These soils would be either permanently removed from the project area by the contractor or used to fill low areas of the proposed trail corridor so that the final trail surface would be level with the existing highway shoulder. Any additional soil needed for the trail's construction would be obtained from the excavation and shaping of a roadway drainage ditch that would be constructed adjacent to the trail. Other soils within the construction area may be compacted during the trail's construction (e.g., trampling by construction workers) during the construction period and could potentially experience effects of erosion during heavy storm events. However, soil impacts due to construction activities would be temporary and limited in duration to the construction period (i.e. 6 months). Any soils adjacent to the trail that would be exposed due to the trail clearing activity would be re-vegetated with native coastal plant species and would stabilize within 6-12 months. Soil compaction and/or erosion may occur adjacent to the trail as a result of normal wear by trail users; however, these impacts would be minor and temporary. Impacted areas would be restored to pre-existing conditions during routine periodic maintenance activities.

Based on these considerations, the topic of impacts to soils under the proposed trail alternatives was dismissed from further analysis in this EA.

1.4.8 Vegetation

Alternative 2

Under Alternative 2, vegetation communities within the proposed construction area are characterized as: salty prairie and thornscrub (approximately 0.3 acres); salty prairie and wooded upland prairie (approximately 1.3 acres); salt marsh and vegetated salt flats (approximately 0.3 acres); salty prairie and vegetated salt flats (approximately 0.8 acres); and non-native grasses within the highway ROW (approximately 0.6 acres).

Species common throughout these communities vary in richness and distribution as a result of gradual changes in soil characteristics, elevation, and seasonality. Woody canopy producing species within the project area generally consist of: **honey mesquite** (*Prosopis glandulosa*), **spanish dagger** (*Yucca treculeana*), **spiny hackberry** (*Celtis pallida*), and **huisache** (*Acacia farnesiana*). Understory vegetation includes: **goat bush** (*Castela erecta texana*), **prickly pear cactus** (*Opuntia engelmanni* var. *lindheimeri*), **screwbean mesquite** (*Prosopis pubescens*), and a number of coastal species such as **gulf cordgrass** (*Spartina spartinae*) and **sea ox-eye daisy** (*Borrchia frutescens*). All of these species are common in the park.

Vegetation within the Paredes Line Road right-of-way consists primarily of non-native grasses, including **King Ranch bluestem** (*Bothriochloa ischaemum* var. *songarica*) and **johnson grass** (*Sorghum halepense*).

Three (3) special status plants are historically known to occur in Cameron County and may be encountered in the park. These plants are discussed in the **Threatened and Endangered Species** section below and include the **South Texas ambrosia** (*Ambrosia cheiranthifolia*), **Star cactus** (*Astrophytum asterias*), and the **Texas ayenia** (*Ayenia limitaris*).

Potential impacts relating to the proposed 300-ft boardwalk are discussed above in the **Wetlands and Floodplains** section. For the paved portion of the proposed trail, a 15-20-ft wide construction area would be impacted by construction activities including vegetation removal, trampling/compaction by construction workers, and dusting of foliage.

Within the construction area, the trail corridor would be limited to a maximum width of 14 feet (i.e. 10-ft paved trail and 2-ft shoulders) resulting in the removal of a maximum of 2.5 acres of vegetation (i.e. 14 ft x 7,700 ft), including native coastal grasses and forbs, small shrubs, several canopy trees, and non-native grasses in the Paredes Line Road right-of-way. However, trail shoulder areas would *not* be cleared of mature trees or shrubs. Trees and shrubs within the 10-ft trail tread would be removed using hand-held power tools, and grasses and forbs would be removed using a small dozer. No vegetation would be removed outside the 14-foot corridor, and the trail would be routed so as to minimize removal of canopy trees to the greatest extent possible.

Since the paved trail would be 10 feet wide, approximately 1.8 acres (i.e. 10 ft x 7,700 ft) of vegetation would be *permanently* removed. A temporary loss in vegetation would occur in the trail shoulder area (i.e. 4 ft x 7,700 ft; 0.7 acres) where native coastal plant species would be planted following completion of the paved portion of the trail. Native coastal species planted in

the trail shoulder area would emerge within 3-4 months of planting, and vegetation would become fully established within 6-12 months.

Also, under Alternative 2, approximately 2,200 feet of the trail would be located within the Paredes Line Road right-of-way where non-native grasses are present. Therefore, approximately 0.5 acres (i.e. 10 ft x 2,200 ft) of non-native grasses would be permanently removed from the proposed trail corridor. The removal of non-native grasses associated with the right-of-way would benefit native vegetation near the trail corridor by reducing competition for spatial and nutrient resources.

The clearing of vegetation from the trail tread would result in the loss of several mature trees and would affect understory vegetative communities adjoining the trail corridor that rely on shade from mature trees. With the exception of the one wetland crossing, the current canopy cover along the park's fence line is considered to be dense; therefore, the removal of mature trees would locally impact densely vegetated areas but would not affect the overall character of the area. Nevertheless, every effort would be made to minimize the removal of mature trees along the proposed trail corridor. As stated above, the trail would be routed to avoid mature trees to the greatest extent possible, and much of the trail would be within the Paredes Line Road right-of-way where no mature trees are present. If feasible, mature trees that would be unavoidably removed from the trail corridor would be transplanted outside of the trail corridor on park property.

Construction-related impacts (e.g., dusting of foliage, trampling) to vegetative communities adjoining the proposed trail would affect individual plants, but any impacted vegetation would return to current conditions within one year. Therefore, there would be no permanent change to vegetation communities in these areas.

Impacts from trail usage (e.g. hiking, biking, jogging) may include litter and off-trail soil compaction and associated vegetation loss where users deviate from the trail; however, these incidents are anticipated to be localized and infrequent. Any impacted vegetation would return to current conditions within one year and, therefore, no permanent change to vegetation communities would occur in these areas.

Alternative 3

Under Alternative 3, direct impacts to native vegetation would not occur because the trail would be located entirely within the already disturbed highway right-of-way where the existing vegetation (i.e. grasses and forbs) is non-native and regularly mowed. Approximately 1.1 acres (i.e. 6 ft x 8,000 ft) of non-native vegetation would be permanently removed from the proposed trail corridor. Indirect impacts to vegetation from construction and trail usage would be the same as described under Alternative 2.

Given the above level of impacts under Alternatives 2 and 3, the topic of vegetation has been dismissed from further evaluation in this EA.

1.4.9 Wildlife

Approximately 212 terrestrial species are listed as “present” or “probably present” within the park or its surrounding lands (Cooper, 2004; Caran et. al, 2005; Duran, 2004; NPS, 2019). Of these, avian species account for the majority of the park’s terrestrial diversity, with 158 total species documented in or thought to inhabit the park (NPS, 2019).

Under both Alternative 2 and 3, the proposed trail corridor has historically been characterized by high levels of disturbance as a result of its proximity to Paredes Line Road. Past highway construction, vehicular traffic, maintenance activities, and encroachment of non-native grasses planted within the right-of-way have altered preferential habitat for local wildlife; therefore, wildlife density is considered to be lower in the proposed trail corridor than in other areas of the park. Nevertheless, the proposed trail would affect wildlife that continues to frequent the proposed trail corridor and vicinity. Impacts may occur as a result of: 1) noise generated from construction activities (refer to **Section 1.4.3** for discussion of noise impacts); 2) construction activities (vegetation removal, pavement/boardwalk installation); and 3) the future use and maintenance of the trail.

Alternative 2 would result in the permanent removal of approximately 1.8 acres (i.e. 10 ft x 7,700 ft) of vegetation along the proposed trail corridor. In addition, 3,000 sq ft (i.e. 10 ft x 300 ft) of wetland environment would be permanently altered by the installation of the boardwalk. As a result, these areas would no longer be available as wildlife habitat, though the type habitat lost would be common to the area. Construction activities and noise would displace wildlife from the area during the estimated 6-month construction period, with a higher risk of displacement occurring during the 30-day vegetation clearing activity. However, given the moderate to highly mobile nature of the majority of species (birds, mammals, reptiles), it is anticipated that wildlife would disperse to nearby unaffected areas within the park as a result of these activities since a sufficiently wide coverage of preferential habitat is available.

Over the lifespan of the trail, wildlife which may come into contact with recreational trail users or maintenance workers would also be expected to disperse into more protected areas within the park.

Construction best management practices (BMPs) would be implemented by the contractor to avoid or minimize direct impacts to avifaunal, amphibian, and reptilian populations which may be encountered during construction. BMPs would include, but are not limited to: preservation of mature trees where feasible; use of flagging to define the limits of the construction area; adoption of a “top-down” approach to boardwalk construction (as described in **Section 1.4.6**); and installation of a permanent exclusion fence that would prevent Texas tortoises and other wildlife from entering the corridor during and after construction. A detailed list of construction BMPs is presented in **Section 2.5**.

Under Alternative 3, impacts to wildlife would be the same as or less than under Alternative 2, because the trail would be located in the existing road right-of-way, which is regularly mowed and which provides low-quality wildlife habitat. Consequently, density and diversity of wildlife is

anticipated to be lower in these areas of the trail corridor and potential minor impacts would be largely relegated to transient individuals capable of moving into more protected areas in the park during the construction activity and subsequent use of the proposed trail.

Based on the above, the risk of impacts to wildlife as a result of both trail alternatives is considered to be low; therefore, impacts to wildlife have been dismissed from further evaluation in this EA.

1.4.10 Special Status Species

Under the Endangered Species Act of 1973 (ESA), the NPS has responsibility to address impacts to federally listed threatened, endangered, candidate, and species proposed for listing. Also, NPS policy requires that state listed species, and others identified as species of management concern by the park, are to be managed in parks in a manner similar to those that are federally listed. The Texas Tortoise is a state listed species that has been identified as a special status species of management concern at the park (NPS, 2016).

A summary of potential impacts on special status species is provided below. A detailed analysis of the potential impacts to these species under the preferred action alternative (Alternative 2) was provided to USFWS and is presented in **Appendix B**.

Federal Threatened and Endangered Species

The proposed project area under Alternative 2 was evaluated for potential risks to federally-listed threatened and endangered species using the USFWS' Information for Planning and Conservation (IPaC) (USFWS, 2019b) website to obtain a list of federally endangered, threatened, proposed and candidate species that may occur in the project area. In addition, the USFWS Environmental Conservation Online System (ECOS) (USFWS, 2019a) was used to obtain information regarding designated areas of critical habitat for Cameron County, Texas.

For Cameron County, IPaC currently lists 14 federally listed species, including five sea turtles, four birds, three mammals and two flowering plants. The ECOS database indicated no designated critical habitat for Cameron County.

As discussed in **Appendix B**, habitat for 10 of the listed species does not exist in the proposed action area. The remaining four species are listed as endangered, and may potentially occur at the park: **northern Aplomado falcon** (*Falco femoralis*), **Gulf Coast jaguarundi** (*Puma yagouaroundi cacomitli*), **Ocelot** (*Leopardus parodalis*), and **South Texas ambrosia** (*Ambrosia cheiranthifolia*).

Impacts to these species would occur as a result of the trail's construction (e.g., noise, dust) over the 6-month construction period, and the permanent removal of approximately 1.8 acres of vegetation along the proposed trail corridor. However, the falcon, jaguarundi and ocelot are highly mobile and therefore would be expected to disperse to other suitable habitat within the park or vicinity as a result of these impacts since a sufficiently wide coverage of preferred

habitat is available. The **South Texas ambrosia** has not been observed in the Rio Grande Valley since 1941 (USFWS, 2010); therefore, it is not anticipated to be encountered in the proposed trail corridor. However, BMPs discussed in **Section 2.5** would be implemented to protect this federally listed plant species, which would include performing a walking survey prior to the initiation of construction activity and, if federally-listed plant species were observed, the USFWS and TPWD would be notified to determine the next appropriate step for relocating the plants.

Based on the above information, the proposed action under Alternative 2 “may effect” but is “not likely to adversely affect” the federally listed species.

Impacts to federal threatened and endangered species would be less under Alternative 3 than Alternative 2 because the trail would be located entirely within the already disturbed highway right-of-way characterized mainly by mowed, non-native grasses. Consequently, this area provides poor quality habitat for special status species. The South Texas ambrosia is not anticipated to be located in the Paredes Line Road right-of-way; regardless, as under Alternative 2, a walking survey would be performed prior to the initiation of construction activity and, if federally-listed plant species were observed, the USFWS and TPWD would be notified to determine the next appropriate step for relocating the plants. The remaining federally listed species would be expected to generally avoid the area given the presence of suitable, higher quality habitat located in the park. Additionally, the wildlife species are highly mobile and capable of unrestricted movement into and out of the impacted area. Therefore, impacts relating to Alternative 3 “may effect” but are “not likely to adversely affect” the above-mentioned species.

Based on this information, a further evaluation of potential impacts to federally listed threatened and endangered species has been dismissed in this EA.

State Threatened and Endangered Species

A review of the Texas Parks and Wildlife Department’s (TPWD) Rare, Threatened, and Endangered Species of Texas by County webpage identified 52 state listed threatened, endangered, and species of greatest conservation need for Cameron County.

Under Alternative 2, of the 52 state-listed species, 22 were identified which could potentially be impacted by the proposed action. These include 5 amphibians: the **Black-spotted newt**, **South Texas siren**, **Mexican treefrog**, **White-lipped frog**, **Sheep frog**; 4 reptiles: the **Black-striped snake**, **Texas indigo snake**, **Texas horned lizard**, and **Texas tortoise**; 10 birds: the **White-faced ibis**, **Wood stork**, **Sprague’s pipit**, **Northern beardless-tyrannulet**, **Tropical parula**, **Golden-cheeked warbler**, **Texas Botteri’s sparrow**, **White-tailed hawk**, **Zone-tailed hawk**, and the **Northern Aplomado Falcon**; 2 mammals: the **Ocelot** and **Coues’ rice rat**; and 1 plant: the **South Texas Ambrosia**. Three of these species (the **Ocelot**, **Northern Aplomado Falcon**, and **South Texas Ambrosia**) were simultaneously identified on federally listed species records and are discussed above.

A desktop review and site observations indicated that these species may occur within the proposed trail corridor based on the presence of suitable habitat and the apparent geographic distributions of these species.

Potential direct impacts to these species would primarily be associated with construction activities related to noise and removal of vegetation along the proposed trail corridor during the 6-month construction period. These impacts may arise from possible contact with heavy machinery, trampling or compaction by heavy machinery, and the removal of native vegetation. Boardwalk pilings would similarly affect an estimated 75-150 cubic feet of sediments, resulting in potential mortality or injury to amphibians. Indirect impacts related to the completion of the project would include modification of behavior patterns in response to the alterations of vegetative structure and the anticipated increase in disturbance related to recreational use of the trail.

The proposed trail corridor under Alternative 2 would be located adjacent to the Paredes Line Road ROW. Despite the diversity of habitat represented within the 8,000 linear foot corridor, the presence of this roadway presents considerable dangers to wildlife, including vehicle mortality, runoff, and noise-related disturbances. Consequently, areas within the proposed trail corridor do not constitute optimal habitat for endemic, transient, or protected wildlife.

Removal of vegetation and excavation activities would pose the greatest risk of direct impacts (injury or death) to amphibians and the **Texas tortoise**, which are less capable of dispersing from the impacted area during construction activities. Given the measures outlined in **Section 2.5** that would be implemented to mitigate against such risks, the probability that these species would be adversely impacted by the proposed action is low. The remaining species identified in this evaluation are highly mobile and capable of unrestricted movement out of the impacted area; therefore, the risk of direct impacts to these species is anticipated to be low.

Indirect impacts related to the trail's construction and subsequent use are not anticipated to cause detrimental harm to special status species. These potential impacts (noise, dust, encounters with trail users) are expected to result in avoidance of the general project area during and after construction.

Given these considerations, the proposed action under Alternative 2 would be considered not likely to adversely affect the state-listed species identified in this evaluation.

Impacts to state threatened and endangered species would be less under Alternative 3 than Alternative 2 because the trail would be located entirely within the already disturbed road right-of-way, which provides poor quality habitat. Wetland areas would not be impacted by the proposed trail under Alternative 3; therefore state-listed amphibians would not likely be adversely affected by the trail. The remaining state-listed species are considered highly mobile and capable of freely dispersing into protected areas within the park and, thus, are not likely to be adversely affected by the proposed trail.

Based on these considerations, impacts to state-listed special status species under the proposed trail alternatives have been dismissed from further evaluation in this EA.

1.4.11 Public Health and Safety

Road cyclists currently use the shoulder of the adjacent highway (Paredes Line Road) as an extension of the Historic Battlefield Trail south of the park, thereby presenting a hazardous situation for both cyclists and motorists. Under Alternative 2, the proposed project is anticipated to increase public health and safety by providing an alternative to using the highway shoulder for recreational purposes. The centerline of the proposed trail would be located approximately 20- 25 feet from the highway, allowing for safer passage for recreational cyclists, joggers and hikers. In addition, signage would be installed to warn trail users of safety hazards, and other safety measures (e.g., boardwalk handrails) would be incorporated into the design of the trail. Consequently, the trail would provide substantial improvements to the current state of public health and safety for the recreational enthusiasts who currently use the shoulder of Paredes Line Road as a recreational path.

Under Alternative 3, the existing highway shoulder would be extended six feet to the east to accommodate a 10-ft trail. Alternative 3 would incorporate safety hazard signage and safety design measures including the installation of a guard fence along the entire length of the trail. Alternative 2 is considered to provide a higher level of public safety than Alternative 3 since it would be 15-20 feet further from the highway; however, the guard fence included in Alternative 3 would also provide an improvement over current conditions of public health and safety for those who use the shoulder of Paredes Line Road as a recreational path.

As a result of these considerations, further evaluations regarding potential impacts to public health and safety have been dismissed from this EA.

1.4.12 Environmental Justice

Executive Order 12898, entitled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs on minority and low-income populations. A minority population is defined as a group of people and/or community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Census Bureau as: African-American; Asian or Pacific Islander; American Indian, Eskimo, or Aleut; other non-white persons, or persons of Hispanic origin.

In accordance with EO 12898 and 13166, areas surrounding the proposed project area under both Alternative 2 and 3 were evaluated and found to contain low-income, minority, and limited English proficiency populations. However, this environmental assessment demonstrates that the impacts that could result from implementation of the alternatives would be few and would not be disproportionately high with regard to human health or environmental impacts on minorities or low-income populations. Additionally, the proposed trail would be publicly available for use by anyone, regardless of race, income, or English language proficiency thereby providing equal

recreational and health benefits to the entire community. As a result, under both Alternative 2 and 3, the proposed project is anticipated to have a beneficial effect for all who use the trail. Therefore, further considerations into potential impacts relating to environmental justice concerns have been dismissed as a topic for this EA.

Section 2.0 ALTERNATIVES

The alternatives discussed below were developed based on the outcome of meetings with project team members (NPS and City of Brownsville) and consultation with relevant Federal, State and local agencies. In addition, alternatives that were initially considered but eventually dismissed from further evaluation are discussed below.

2.1 Alternative 1: No Action

The No Action Alternative means that a multi-use trail would not be constructed. Under the No Action Alternative, no changes would occur to the environment or to park operations.

2.2 Alternative 2: Paved Trail with Boardwalk and Highway Right-of-Way Access

General Description (Proposed Action/Preferred Alternative)

The proposed trail (Figures 2 and 3), would extend approximately 8,000 feet along the west boundary of the park and Paredes Line Road (Farm-to-Market Road 1847), a highway maintained by the Texas Department of Transportation (TxDOT). The finished trail would be 10 feet wide and constructed primarily of concrete pavement, which is preferred over other materials due to its durability and lower maintenance cost. In addition to the paved portion of the trail, approximately 300 feet of the trail would consist of a composite (plastic/wood) boardwalk across a wetland. The trail design would include low-profile lighting structures that would direct the light downward.

During construction activities, vegetation along the proposed trail corridor would be cleared using hand-held power equipment within a construction area approximately 15-20 feet wide. Soil disturbances would be less than six inches below ground surface in paved areas, and 3-6 feet below ground surface at boardwalk pilings.

The trail and boardwalk would be inspected and maintained by the City of Brownsville on a regular basis to prevent deterioration/damage of trail materials or overgrowth of vegetation adjoining the trail. Repairs to any deteriorated or damaged trail materials would be performed as soon as practicable following discovery.

The southern terminus of the proposed trail would be located at the public entrance to the park and would connect to the existing Historic Battlefield Trail via approximately 500 linear feet of existing park entrance road. The existing park entrance gate would be removed to allow public access to the trail after park hours; however, two new gates on the entrance and exit roads would be installed to prevent public access to the park after hours. In addition, a split-rail or other fence would be installed between the battlefield road gate and the new trail fence to further prevent public access to the park after hours. The park's west and east parking lots would be available to trail users during normal park hours.

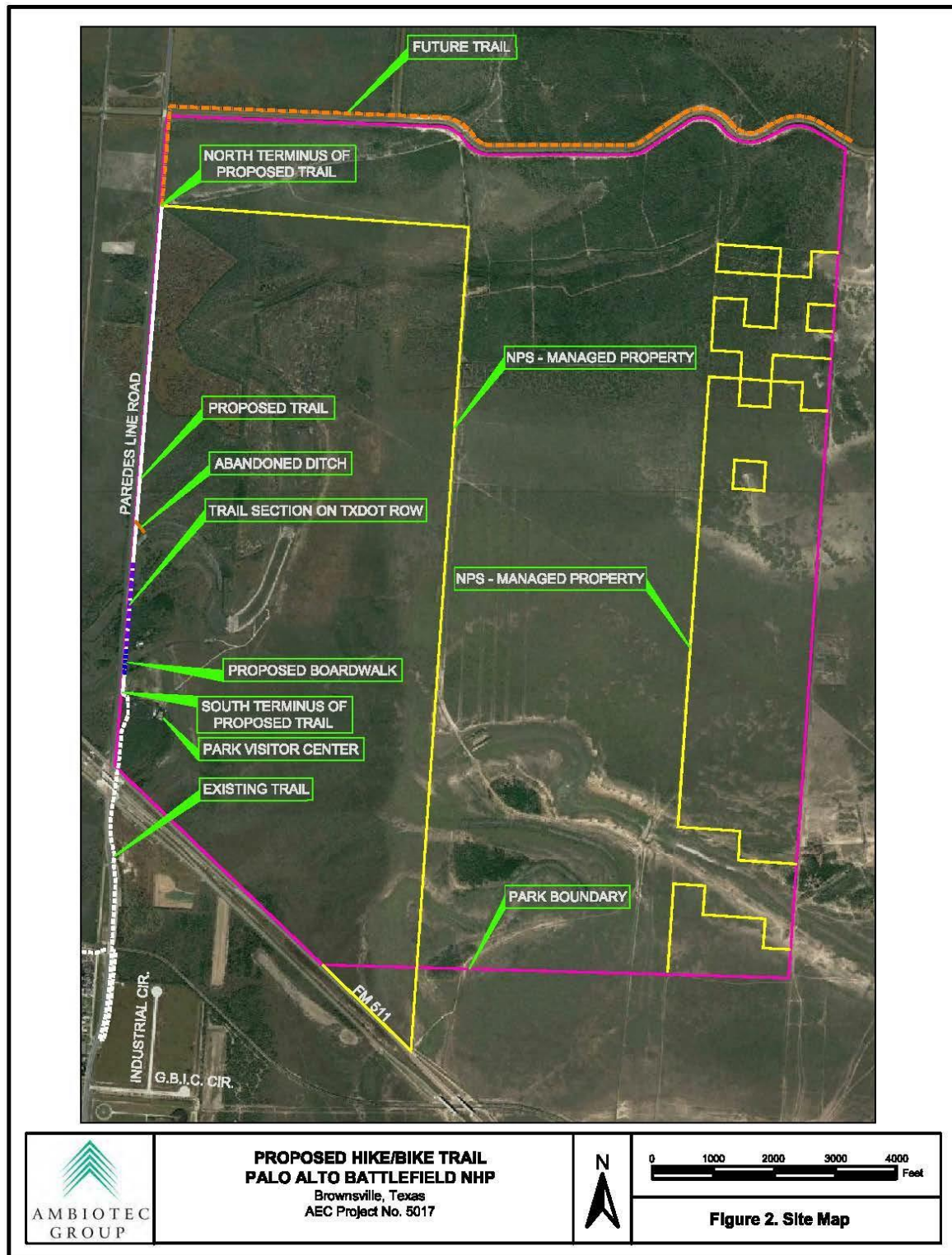


Figure 2 Site Map (with Alternative 2)

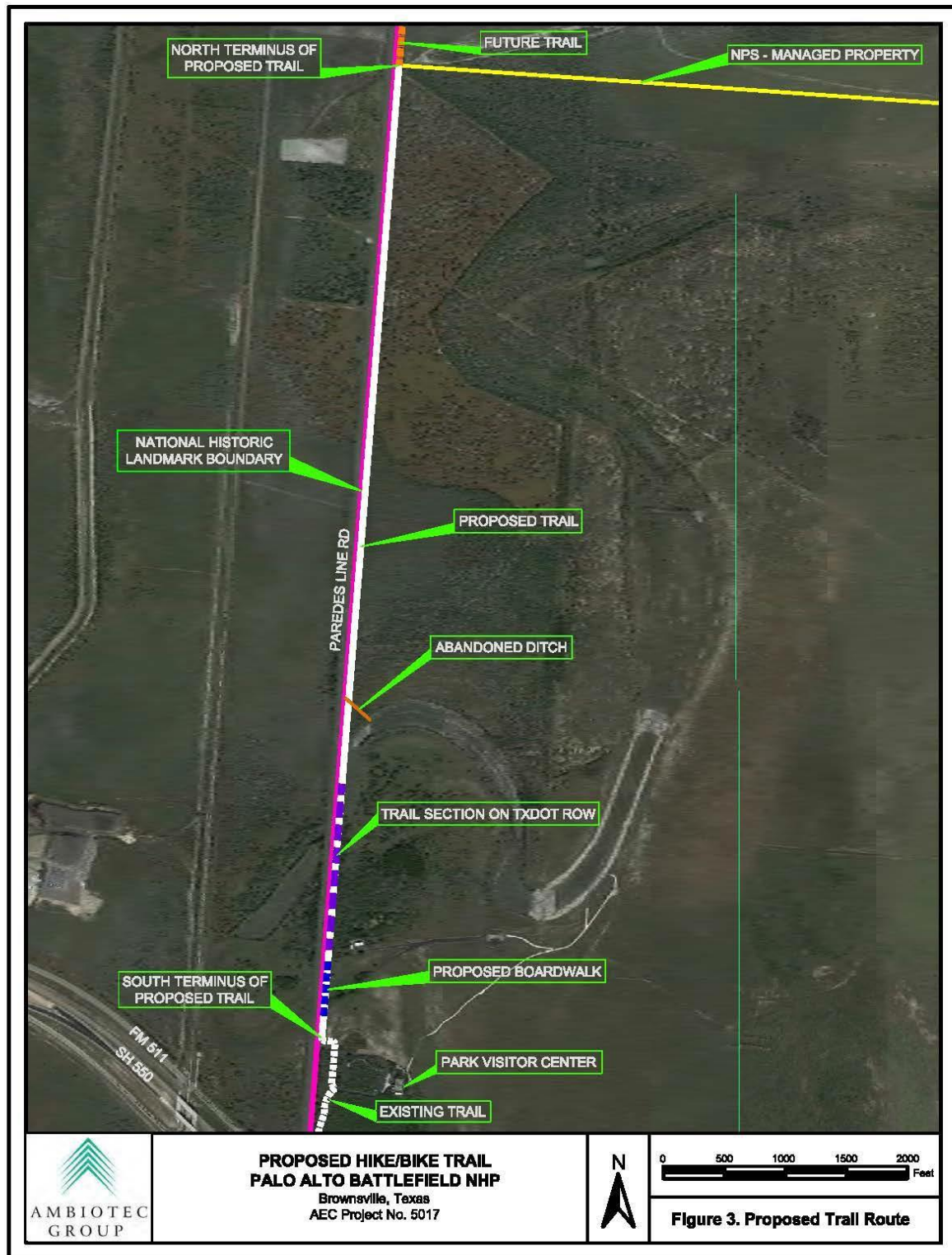


Figure 3 Alternative 2

The northern terminus of the proposed trail would be located at the northern boundary of NPS-managed lands within the park.

Construction of this trail would be completed within a timeframe of 6 months. Vegetation clearing activities are anticipated to be completed within 30 days of initiation and, if at all possible, would be performed outside of the migratory bird nesting period (Mar 15 – Sept 15). If vegetation clearing is performed during the nesting period, then bird BMPs would be implemented as listed in **Section 2.5**.

Sequence of Construction

In general, the sequence of construction activities would consist of: first, removing the fence, clearing vegetation along the trail corridor, and installing new park entrance gates and associated fencing; second, constructing the paved and boardwalk sections of the trail and removing the existing park entrance gate; and finally, installing a new fence along the eastern boundary of the trail corridor. The portion of the trail located along 500 feet of park access road would be equipped with signage to warn drivers and trail users of the shared use of the trail, and to notify drivers that the parking lot gates would be closed and locked after park hours.

Paved Trail Design and Construction

Construction activities would occur within a 15-20-ft wide construction corridor along the entire length of the proposed trail. Paved sections of the trail would be constructed of concrete over the natural topography of the corridor. The trail design would include a tread width of 10 feet, a clearing width of 2 feet on both sides of the tread and, if needed, a clearing height of 10 feet for sections of the trail adjacent to wooded areas. Soil within the 10-ft wide trail tread would be excavated to approximately five inches below ground surface, followed by the installation of a 2-inch sand bed and 4-inch rebar-enforced concrete pavement. The pavement surface would extend approximately one inch above ground surface level to facilitate drainage. In addition, the designs would comply with Architectural Barriers Act (ABA) standards, where applicable. Post-construction activities designed to minimize soil stabilization time would involve re-vegetating or sodding the trail shoulders with native coastal plant species.

Overall, construction activities would be performed in a manner to protect wildlife using best management practices (BMPs) outlined in Section 2.5 (Mitigation Measures). Site preparation activities would include removal of vegetation along the trail corridor using hand-held power equipment (e.g., chainsaws) to remove trees and shrubs, and a small dozer to remove grasses and forbs. Removal of any remaining tree and/or brush stumps would be performed using a backhoe or excavator. Following completion of vegetation removal, ground surfaces along the trail tread would be levelled with a small dozer and compacted using a roller compactor. Construction areas would be clearly delineated with the use of silt fencing, tape and/or flags to ensure that, to the extent possible, construction activities are confined to the proposed 15-20-foot construction area.

TxDOT Right-of-Way Access

Approximately 2,200 linear feet of the proposed trail would encroach upon the vegetated portion of highway right-of-way (Paredes Line Road) to avoid impacts to wetlands and dense vegetation on park property. A Multiple Use Agreement (MUA) between the City of Brownsville and the Texas Department of Transportation (TxDOT) would be established to allow the use of the ROW for trail purposes in accordance with Title 43, Texas Administrative Code, Chapter 11.21.

Construction activities relating to the entire trail would be coordinated with TxDOT since Paredes Line Road ROW access would be needed to transport construction equipment to and from the proposed project area. A traffic safety plan would be prepared according to TxDOT requirements by the contractor and implemented during the construction activity if necessary.

Boardwalk Design and Construction

Approximately 300 linear feet of the proposed trail would cross a wetland area. This area is a remnant stream channel that is dry for most of the year but is periodically inundated after significant storm events. For this area, a composite (plastic and wood fiber) boardwalk with anti-slip surfaces and protective railings would be installed. The boardwalk foundation would be constructed with rows of two 6"x6" treated square timber pilings (102 pilings total; 25.5 sq ft) spaced 6 feet apart that would be set approximately 3-6 feet below ground (until refusal). The elevation of the boardwalk would be as close as possible to the ground level of the surrounding upland environment while providing adequate clearance over ponded water after significant storm events.

The boardwalk would be installed using a "top-down" construction method to avoid disturbing the wetland environment. The top-down method involves installing 6-ft sections of the boardwalk from equipment on top of the previously installed sections. An excavator equipped with a hydraulic vibratory hammer would be used to install the pilings and, as each new section of boardwalk is completed, equipment would be moved to the new section to begin construction of the next section. This method would be repeated until the boardwalk construction is complete. Openings between deck boards would be a maximum of one-half inch to allow users to safely use the boardwalk while allowing sunlight to filter between boards to the wetland environment below.

Utilities

Existing utilities along the proposed trail corridor include an underground natural gas pipeline that crosses beneath the corridor, and an overhead telephone line situated along approximately one mile of the corridor. In addition, the section of trail that would encroach upon TxDOT right-of-way would be situated above an underground fiber optic communication cable that is parallel to Paredes Line Road. The selected contractor would be responsible for coordinating with the owners of the utilities at least 10 days prior to initiating construction and for performing the construction activities in a manner that would prevent unnecessary interference with any existing utility system. The utilities would not be impacted by the trail construction; however, contractors or City employees performing future maintenance of the trail would be responsible for coordinating with and notifying

the utilities at least 10 days in advance of any maintenance activity that may interfere with utility service.

Construction Material Staging

Construction materials and heavy machinery would be staged off-site in an effort to protect park resources and minimize disruptions to visitor use and experience. Staging of construction materials in the west parking lot would be allowed by park staff on a case-by-case basis, and only if necessary, provided that materials are staged no longer than 3 consecutive days. The staging area would be limited to the northern portion of the lot in the northern space provided for bus or recreational vehicle parking (50 ft x 8 ft) and would cause a temporary reduction in parking space for buses or recreational vehicles (from 3 spaces to 2 spaces). Notifications of limited parking may be made through the NPS website and social network, park signage and/or email to interested parties.

Temporary Closures

Potential temporary closure of the park entrance may occur during construction of the southern terminus of the trail and the removal of the existing entrance gate; however, park visitors would be notified in advance of the anticipated date(s) of closure. The need for temporary closures at the park entrance has not yet been determined, but closures could last anywhere from a few minutes to 1-2 hours. Notifications may be made through the NPS website and social network, park signage and/or email to interested parties.

2.3 Alternative 3: Trail on Highway Shoulder

General Description

Under Alternative 3, the proposed trail (Figure 4), would be situated entirely upon an extension of the asphalt shoulder of Paredes Line Road which is already in use as a TxDOT-approved bicycle lane. The proposed trail would involve extending the current edge of the existing asphalt shoulder 6 feet to the east to accommodate a 10-ft trail and 6-ft buffer space (with guard fence) between the highway (i.e. traveled way) and the edge of the trail. Unlike the concrete trail proposed under Alternative 2, asphalt material would be used under Alternative 3 since the trail would be integrated into the highway surface which is also asphalt-paved. A Multiple Use Agreement (MUA) between the City of Brownsville and the Texas Department of Transportation (TxDOT) would be established to allow the use and maintenance of the ROW for bicycling and pedestrian purposes in accordance with Title 43, Texas Administrative Code, Chapter 11.21. Under Alternative 3, no trail lighting would be allowed by the Texas Department of Transportation due to potential electrical hazards that may occur during any vehicle accidents involving the guard fence (TxDOT, 2019).

As in Alternative 2, the southern terminus of the proposed trail would be located at the public entrance to the park and would connect the proposed trail to the existing Historic Battlefield Trail via approximately 500 linear feet of existing park entrance road. The existing park entrance gate would be removed to allow public access to the trail after park hours; however, two new gates on the entrance and exit roads would be installed to prevent public access to the park after hours.

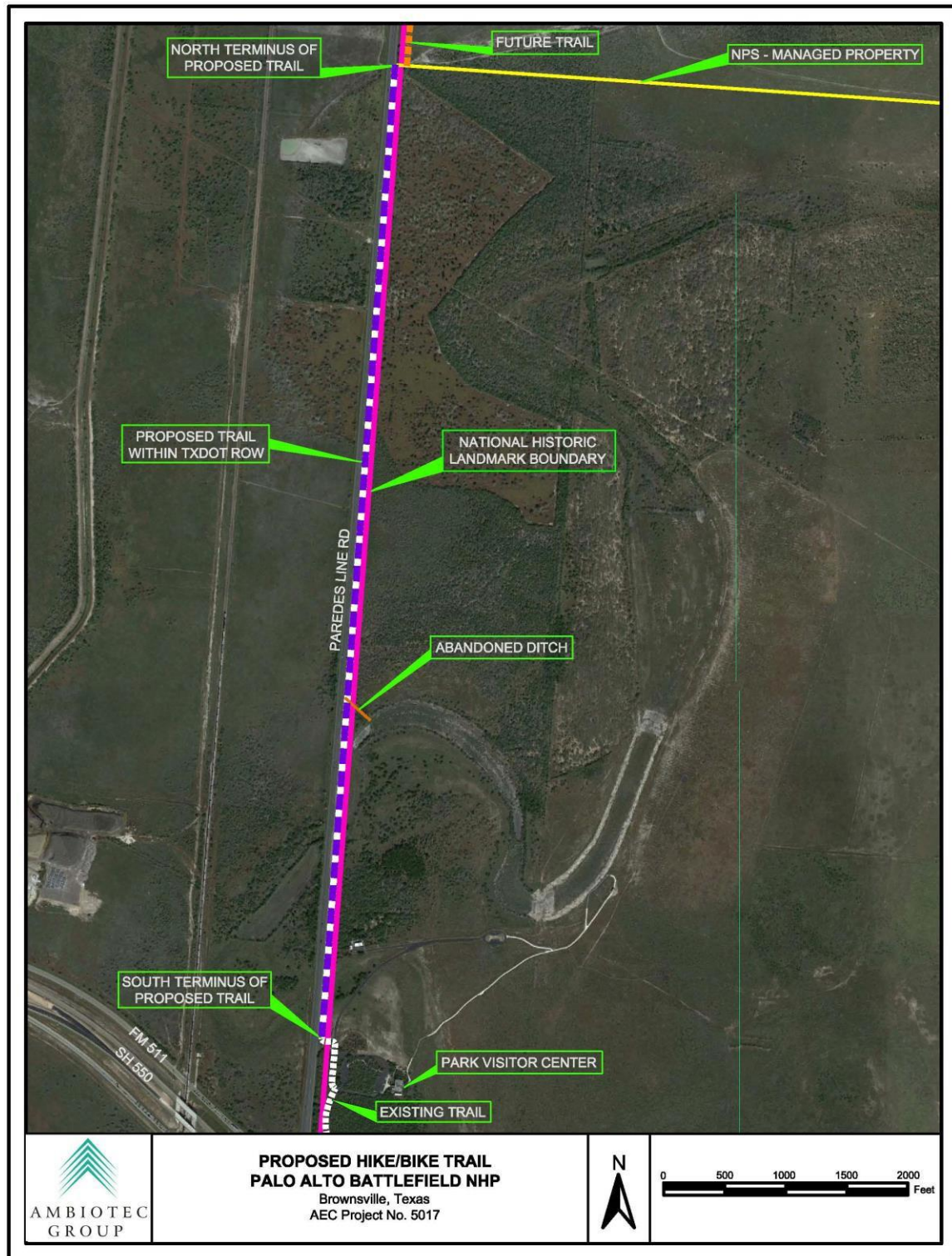


Figure 4 Alternative 3

In addition, a split-rail or other fence would be installed between the battlefield road gate and the new trail fence to further prevent public access to the park after hours. The park's west and east parking lots would be available to trail users during normal park hours. The northern terminus of Alternative 3 would be located at the northern boundary of NPS-managed lands.

Alternative 3 would be completed within a timeframe of 6 months. Vegetation clearing activities are anticipated to be completed within 30 days of initiation. Since the construction area for Alternative 3 is within vegetated areas of highway right-of-way that are mowed on a regular basis, it would not be necessary to perform vegetation clearing outside of the migratory bird nesting period (Mar 15 – Sept 15).

Sequence of Construction

In general, the sequence of construction activities would consist of: first, clearing vegetation along the trail corridor and installing new park entrance gates and associated fencing; and second, constructing the trail (i.e. highway shoulder extension and guard fence) and removing the existing park entrance gate. The portion of the trail located along 500 feet of park access road would be equipped with signage to warn drivers and trail users of the shared use of the trail, and to notify drivers that the parking lot gates would be closed and locked after park hours.

Trail Design and Construction

Construction activities would occur within TxDOT right-of-way along the entire length of the proposed trail. The proposed activity would involve extending the asphalt highway shoulder 6 feet to the east resulting in a 16-ft wide shoulder that would accommodate a 10-ft wide trail and provide a 6-ft buffer space between the highway and the edge of the trail. The buffer space would include a guard fence offset two feet from the edge of the outside highway lane. The design would comply with Architectural Barriers Act (ABA) standards, where applicable. Post-construction activities designed to minimize soil stabilization time would involve re-vegetating the trail shoulders with non-invasive native grasses.

Overall, construction activities would be performed in a manner to protect the environment using best management practices (BMPs) outlined in Section 2.5 (Mitigation Measures). Initially, a traffic safety plan would be prepared according to TxDOT requirements by the contractor and implemented during the construction activity. Site preparation activities would include removal of vegetation adjoining the existing shoulder followed by the removal of approximately five inches of top soil using a small dozer. Low areas would be filled to raise surface elevations so that the final trail surface would be level with the existing shoulder. Fill material would be obtained from the excavation of the trail corridor and from the excavation of a roadway drainage ditch that would be constructed adjacent to the trail within highway ROW. Any additional fill material needed for construction would be imported from an off-site source. Following completion of the filling activity, ground surfaces along the trail corridor would be treated and tilled with lime followed by the installation of a geosynthetic liner. Limestone would be placed over the liner and treated with an

asphalt preparation layer (i.e. prime coat) before applying the asphalt pavement and compacting the surface with a roller compactor. The completed trail would be level with the existing asphalt pavement. Construction areas would be clearly delineated with the use of silt fencing, tape and/or flags to ensure that, to the extent possible, construction activities are confined to the highway ROW.

Utilities

Existing utilities along the proposed trail corridor include an underground natural gas pipeline that crosses beneath the corridor, and an overhead telephone line situated along approximately one mile of the corridor. In addition, the trail would be situated above an underground fiber optic communication cable that is parallel to Paredes Line Road. The selected contractor would be responsible for coordinating with the owners of the utilities at least 10 days prior to initiating construction and for performing the construction activities in a manner that would prevent unnecessary interference with any existing utility system. The utilities would not be impacted by the trail construction; however, contractors or City employees performing future maintenance of the trail would be responsible for coordinating with and notifying the utilities at least 10 days in advance of any maintenance activity that may interfere with utility service.

Construction Material Staging

Construction materials and heavy machinery would be staged off-site in an effort to protect park resources and minimize disruptions to visitor use and experience. Staging of construction materials in the west parking lot would be allowed by park staff on a case-by-case basis, and only if necessary, provided that materials are staged no longer than 3 consecutive days. The staging area would be limited to the northern portion of the lot in the northern space provided for bus or recreational vehicle parking (50 ft x 8 ft) and would cause a temporary reduction in parking space for buses or recreational vehicles (from 3 spaces to 2 spaces). Notifications of limited parking may be made through the NPS website and social network, park signage and/or email to interested parties.

2.4 Alternatives Considered but Dismissed

The following action alternatives were initially considered for the trail but were dismissed due to the reasons listed below.

Alternative Locations Dismissed	Reason for Dismissal
Install paved trail through wetlands instead of boardwalks	This alternative would involve constructing a paved trail along natural contours of the wetland areas instead of installing boardwalks to avoid wetland impacts. The alternative may require a minor amount of fill for the foundation of the trail. Since the wetland areas are periodically inundated, this alternative would likely not be feasible since standing water may deteriorate the trail over time, and the trail would not be accessible to users until water has drained or evaporated from the wetland. This alternative also would not conform to NPS policy to avoid adverse wetland impacts to the extent practicable as per the NPS Procedural Manual #77-1: Wetland
Install trail to the east to minimize wetland impacts	This alternative would minimize impacts to wetlands by directing the trail to the east from the park's west boundary and constructing a boardwalk to cross the northern wetland at its narrowest point (approximately 150 feet). From the boardwalk the trail would be directed back to the west where it would continue along the western boundary of the park. Although this alternative would result in fewer wetland impacts, it would intrude into an area of the park that is currently less impacted by human activity. Therefore, this alternative was dismissed since it duplicates the less environmentally damaging alternative of constructing the trail within the highway right-of-way (ROW) (Alternative 3) and the alternative of constructing the trail along the park's western boundary (Alternative 2).
Install trail along west boundary of park and avoid highway right-of-way	This alternative would avoid the highway ROW and involve construction of the proposed trail only on park land along the western boundary of the park. This alternative would require construction of approximately 850 linear feet of additional boardwalk across a wetland area. The cost of construction for the additional boardwalk would be approximately \$264,000 (@\$311/lf) versus a cost of approximately \$43,000 (@\$50/lf) for a paved trail under the Preferred Alternative. This alternative was dismissed since it duplicates the less environmentally damaging and less expensive alternative of constructing the trail within the highway ROW.

2.5 Mitigation Measures

The mitigation measures described below would be implemented to minimize adverse environmental impacts at the park as a result of the proposed action. Mitigation measures marked with an asterisk (*) apply to Alternative 2 only. All other measures apply to both Alternative 2 and 3.

Archeological Resources

- Contractors and subcontractors would be appropriately informed of protocols in the event of archeological resource discoveries, as well as penalties for illegally collecting artifacts, or causing intentional damage to archaeological sites or historic properties.
- During excavation activities, park staff would monitor the construction areas to confirm the presence or absence of archaeological resources.
- Should construction unearth archaeological materials, construction in the area would be stopped and the park Resource Manager and Texas Historical Commission would be immediately notified.

Cultural Landscapes

- *Low-profile lighting with fixtures that direct light downward would be used along the trail to prevent impacts to cultural landscapes.

Soundscape

- Hours of operation of motorized equipment would be limited to 8:00 a.m. to 5:00 p.m. to protect dawn, dusk and nighttime quiet.
- Motorized equipment would not be allowed to idle longer than 2 minutes when not in use.
- All motor vehicles and equipment would have mufflers conforming to original manufacturers' specifications that are in good working order and are in constant operation to prevent excessive or unusual noise.

Vegetation and Soils

- A Construction Stormwater Pollution Prevention Plan (SWP3) would be developed, and erosion control and sediment runoff best management practices (BMPs) would be implemented prior to and during construction.
- Prior to clearing activities, the project corridor would be surveyed by a qualified botanist retained by the City of Brownsville. The survey would include an inspection of the proposed trail corridor for the presence of federally-listed plants following protocols established by the USFWS. If federally-listed plant species are observed, the USFWS and TPWD would be notified to determine the next appropriate step for relocating the plants.
- *The clearing of vegetation, including native herbaceous communities, thornscrub and other woody vegetation, would be minimized to the extent possible and not go beyond the 14-foot width of the proposed trail.

- *No-till drilling, hydromulching, and/hydroseeding techniques would be used to prevent undue risks to wildlife.
- Erosion and native seed/mulch stabilization materials would be used that would avoid entanglement hazards to snakes and other wildlife species.
- Any erosion control blankets or mats would contain no netting or contain loosely woven, natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting would not be used.
- Construction equipment entering the park area would be cleaned to remove the presence of any foreign soils, vegetation, or material potentially containing non-native seeds or vegetation. Any non-native vegetation removed from TxDOT right-of-way during the construction activity would be disposed or relocated off-site.
- Following completion of the construction activity, a mixture of native grasses and forbs would be used to re-vegetate the disturbed areas.

Wetlands and Water Resources

- *Boardwalk construction activities across the wetland area would be performed in accordance with Section 404 of the Clean Water Act. Compliance with Section 404 would be verified by the U.S. Army Corps of Engineers (USACE) prior to construction.
- *The destruction of inert microhabitats in wetlands such as snags, brush piles, fallen logs, banks, and pools would be avoided to protect wildlife species and their food sources.
- Natural buffers contiguous to wetlands would remain undisturbed to the extent practicable to preserve wildlife cover, food sources and travel corridors.
- As stated above, a Construction SWP3 would be developed, and erosion control and sediment runoff BMPs would be implemented prior to and during construction to protect water resources.

Wildlife

General

- Construction activities would begin after sunrise and conclude before sunset.
- A temporary sediment control fence (i.e. silt fencing) would be used to control erosion and protect water quality during construction. In addition, the fence would be buried at least six inches and be at least 24 inches high to prevent wildlife from accessing the construction zone.
- Construction personnel would examine the construction area daily to determine if any wildlife species have been trapped and provide safe egress opportunities prior to initiation of construction activities. Any open trenches or excavation areas would be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated areas, escape ramps made from soil or boards would be installed at an angle of less than 45 degrees (1:1) in excavated areas that would allow trapped wildlife to climb out on their own.
- Clearing of dense areas of brush would be minimized to the extent practicable to preserve habitat and travel corridors for endangered felids (e.g., ocelot, jaguarundi). Should any felid

be observed during construction, work would be stopped immediately until the cat has left the area, and appropriate agencies would be notified (USFWS, TPWD).

Texas Tortoise BMPs

- Contractors would be advised of potential occurrence of tortoises within the project area, and to avoid harming the species if encountered. If encountered, the contractor would notify park staff to remove the tortoises from the area for relocation within the park to an appropriate tortoise habitat.
- During clearing activities, the project area would be monitored for occurrence of the tortoises by a qualified biologist and if any tortoise was found it would be translocated to a safe place inside the park.
- *A permanent exclusion fence would be incorporated into the design of the new park fence to prevent tortoises and other reptiles from entering the trail corridor. The permanent exclusion fence would be constructed and maintained in accordance with Texas Parks and Wildlife Department (TPWD) specifications as follows:
 1. The exclusion fence would be constructed with metal flashing or drift fence material.
 2. Rolled erosion control mesh material would not be used.
 3. The exclusion fence would be buried at least 6 inches deep and be at least 24 inches high.

Birds BMPs

- Should construction occur during the migratory bird nesting period (March 15-September 15), areas to be impacted would be surveyed for active nests of special status and migratory species no more than 5 days prior to clearing, and daily during the construction period. If active nests are identified, a 150-foot buffer of vegetation would remain around the nests until the young have fledged or the nest is abandoned.
- Contractors would be made aware of potentially encountering special status and/or migratory birds, and informed upon how to avoid negatively impacting them.
- Avoid removal of unoccupied, inactive nests where practicable.

Amphibian and Aquatic Reptiles BMPs

- Contractors would be advised of potential occurrence of amphibian and aquatic reptile species within the project area, and instructing contractors how to avoid harming the species if encountered.
- Use of barrier fencing to direct animal movements away from the construction activities.
- Where possible, minimization or avoidance of disturbing basking sites or areas which may be refugia for terrestrial amphibians.

Terrestrial Reptiles BMPs

- Contractors would be advised on potential occurrence of reptiles in the area, and to avoid harming the species if encountered.
- Inform contractors that if reptiles are found on the site, allow species to leave the area on their own.
- Where possible, disturbing or removing downed trees, rotten stumps, or leaf litter would be avoided.

Section 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Visitor Use and Experience

3.1.1 Affected Environment

According to public data compiled by NPS, the park has averaged nearly 45,000 visitors per year over the past 10 years. In 2017, 84,361 persons visited the park, which was an increase of nearly 30% over the previous year (NPS, 2018a). The park is open year-round to the public from 8:00 am to 5:00 pm daily with the exception of some holidays. A park entrance road (0.26 miles in length) and two parking lots (42 total spaces for cars and 3 spaces for buses or recreational vehicles) are available for visitor vehicles.

Visitors have access to the park's Visitor Center which provides museum exhibits, interactive displays, historical videos and picnic facilities. Several special events and living history programs are held throughout the year (NPS, 2016). Three paved trails provide visitors with hiking, road cycling and disabled access to the core battlefield zone and battlefield lookout: Battlefield Trail (one-mile round trip), Mexican Line Trail (0.35 miles round trip) and U.S. Line Trail (0.4 miles round trip).

3.1.2 Impacts of Alternative 1

Direct/Indirect Impacts

Under Alternative 1, the proposed trail would not be constructed. No adverse or beneficial impacts would occur relating to visitor use and experience at the park.

Cumulative Impacts

Since there would be no direct or indirect impacts as a result of Alternative 1, there would also be no cumulative impacts to visitor use and experience.

3.1.3 Impacts of Alternative 2 (Proposed Action/Preferred Alternative)

Direct/Indirect Impacts

Under Alternative 2, visitor use and experience would be impacted as a result of the proposed trail's construction and future maintenance activities. Adverse impacts associated with the trail construction activity would include: temporary traffic diversions or closures on the park entrance road; possible reduction in parking space in the west parking lot; and noise over the 6-month construction period. Impacts associated with future maintenance activities would include temporary closure of trail sections.

Traffic diversions on the park entrance road would be associated with the following construction activities: connecting the proposed trail to the park entrance road; removing the park entrance gate; and installing new gates on the entrance and exit roads. Each activity could cause traffic diversions lasting from several hours to a week depending on the degree of construction required. However, the diversions would be temporary and similar in nature to other diversions involving maintenance activities (e.g., pavement repair) that may be routinely performed at the park; therefore, traffic diversions associated with construction activities would not degrade the overall visitor experience. The contractor would prepare and implement a traffic control plan to minimize impacts to visitor traffic and reduce safety risks to both visitors and construction personnel.

In addition, potential temporary closures of the park entrance may occur during construction of the southern terminus of the trail and the removal of the existing entrance gate; however, park visitors would be notified in advance of the anticipated date(s) of closure. The need for temporary closures at the park entrance has not yet been determined, but any closures would be of short duration (i.e. anywhere from a few minutes to 1-2 hours) and therefore would not contribute to the degradation of the overall visitor experience. Notifications of temporary closures may be made through the NPS website and social network, park signage and/or email to interested parties.

Periodic maintenance activities (e.g., repair of trail pavement) may cause temporary closures of certain sections of the trail, but since maintenance activities would be temporary, they would not substantially degrade the overall visitor experience. Closures could last from several hours to several days depending on the degree of maintenance required.

Staging of construction materials in the west parking lot would be allowed by park staff on a case-by-case basis, and only if necessary, provided that materials are staged no longer than 3 consecutive days. The staging area would be limited to the northern portion of the lot in the northern space provided for bus or recreational vehicle parking (50 ft x 8 ft). The availability of dedicated parking spaces for these vehicles would be reduced from 3 spaces to 2 spaces during times in which the staging area is occupied by construction materials (the 42 car parking spaces would not be affected). However, the decreased parking space would not degrade the overall visitor experience because the park can accommodate parking in other areas. Notifications of limited parking may be made through the NPS website and social network, park signage and/or email to interested parties.

Visitors would be expected to experience construction-related noise throughout the 6-month construction period and during future maintenance activities. Sources of construction noise would include: construction field trucks, concrete trucks, backhoe, small dozer, roller compactor, pile driver, and hand-held power tools. However, because the area is already subject to highway noise from Paredes Line Road and noise from park operations, the noise generated from temporary construction, maintenance, and future visitor use of the trail would not substantially contribute to the aggregate of human-caused sounds in the area and, therefore, the effects of noise on visitor experience would be negligible.

Park visitors would experience permanent beneficial impacts of the proposed trail with an increase in recreational and exercise opportunities in addition to educational opportunities regarding the park's historical significance. Because the trail would be located within the park boundary, the risk of accidents involving highway vehicles and trail users would be low. In addition, the trail would be removed or separated from the paved portion of the highway, within an inviting greenspace for visitors. The proposed trail would provide a link to the existing Historic Battlefield Trail thereby offering visitors additional opportunities for hiking, running or cycling to other Mexican-American War sites in Brownsville, including the Resaca de la Palma Battlefield.

Cumulative Impacts

Past and current projects initiated by NPS staff, including the installation of a visitor center, three recreational trails at the core battlefield area, and the development of cultural and natural resource education programs, have greatly increased the quality of the visitor use and experience at the park. Future projects affecting visitor use and experience include: extending the proposed trail to the north and east to other areas of Cameron County; implementing programs such as Nature Bingo and World Turtle Day; and presenting a number of public talks related to topics relevant to the park's history. In summary, the impacts of past, present, and reasonably foreseeable future actions have benefitted visitor use and experience by providing visitors educational and recreational opportunities relating to the park's historical significance. Collectively, all of these actions have had and would continue to have beneficial impacts on visitor use and experience. When the direct/indirect effects of Alternative 2 (described above) are combined with other past, present, and reasonably foreseeable future impacts, the total cumulative impact on visitor use and experience would continue to be beneficial. The incremental impacts of Alternative 2 would contribute to, but would not substantially change, the impacts that are already occurring.

3.1.4 Impacts of Alternative 3

Direct/Indirect Impacts

As under Alternative 2, direct/indirect adverse impacts during construction would include temporary traffic diversions/closures, possible reduction in parking space during construction, construction noise, and future temporary trail closures associated with maintenance activities (described in **Section 3.1.3** above). In addition, under Alternative 3, the visitor experience relating to the future use of the trail would be diminished compared to Alternative 2, since the trail would be located on a highway shoulder near highway traffic, thereby slightly increasing safety risks to trail users (though the risks would be still be low given the installation of the guardrail and the buffer between the trail and highway). Also, because the trail would be situated on a highway shoulder, Alternative 3 would not provide the aesthetics of a nature trail that trail users would presumably desire or expect, and would create a disconnect between the trail user and the natural environment in the park.

As under Alternative 2, beneficial impacts on visitor use and experience under Alternative 3 would include an increase in recreational, exercise and educational opportunities that would connect trail users to the park and other Mexican-American War sites in the area.

Cumulative Impacts

The effects of past, present, and reasonably foreseeable future actions would be the same as under Alternative 2 (described in **Section 3.1.3** above). When the direct/indirect effects of Alternative 3 (described above) are combined with other past, present, and reasonably foreseeable future impacts, the total cumulative impact on visitor use and experience would continue to be beneficial. The incremental impacts of Alternative 3 would contribute to, but would not substantially change, the impacts that are already occurring.

Section 4.0 CONSULTATION AND COORDINATION

Persons and agencies consulted for this environmental assessment are listed below.

National Park Service

Mark Spier, Superintendent, Palo Alto Battlefield NHP
Rolando Garza, Archeologist/Chief of Resource Management, Palo Alto Battlefield NHP
Douglas Murphy, Chief of Operations, Palo Alto Battlefield NHP
Heather Rice, NEPA Specialist, NPS Environmental Quality Division

Tribal Government

Bryant J. Celestine, Historic Preservation Officer, Alabama-Coushatta Tribe of Texas
Jimmy W. Arterberry, Comanche Nation Historic Preservation Office
Donald Patterson, President, Tonkawa Tribe of Oklahoma
Arthur “Butch” Blazer, President, Mescalero Apache Tribal Council
Terry Rambler, Chairman, San Carlos Apache Tribal Council

Federal Government

Ernesto Reyes, U.S. Fish & Wildlife Service, Alamo Ecological Service Sub-Office
Salvador Salinas, State Conservationist, USDA Natural Resources Conservation Service
Mike Long, National Hazards Program, FEMA Region VI

State Government

Mark Wolfe, SHPO, Texas Historical Commission
Russell Hooten, Wildlife Habitat Assessment Program, Texas Parks and Wildlife Department
Jesse Solis, Jr., Coastal Resources – Federal Consistency, Texas General Land Office
Ryan C. Vise, Division Director, Texas Commission on Environmental Quality
Robin Gelston, Environmental Coordinator, Texas Department of Transportation, Pharr District
Celestino Hernandez, Maintenance Supervisor, Texas Department of Transportation, Brownsville

Local Government

Ramiro Gonzalez, Government Affairs Liaison, City of Brownsville
Eva Garcia, Project Manager, Rails-to-Trails Conservancy
Paolina Vega, County Engineer, Cameron County Engineering Department
Albert Barreda, General Manager, Cameron County Drainage District No. 1
Constanza Miner, Director of Planning and Development Services, City of Brownsville

Section 5.0 REFERENCES

- Bates, E. M., Koczur, L. M., Krainyk, A., Ballard, B. M., & Kasner, A. C. (2016). Spatial and temporal dynamics of foraging habitat availability for reddish egrets in the Laguna Madre, Texas. *International Journal of Biodiversity and Conservation*, 8(10), 251-258.
- Benson, K. L. P., and K. A. Arnold. (2001). *The Texas Breeding Bird Atlas*. Texas A&M University System, College Station and Corpus Christi, TX. [Texas Breeding Bird Atlas Project website](#) 2 July 2001).
- Benson, D. L., & Gehlbach, F. R. (1979). Ecological and taxonomic notes on the rice rat (*Oryzomys couesi*) in Texas. *Journal of Mammalogy*, 60(1), 225-228.
- Birnbaum, S. J., Poole, J. M., & Williamson, P. S. (2011). Reintroduction of star cactus *Astrophytum asterias* by seed sowing and seedling transplanting, Las Estrellas Preserve, Texas, USA. *Conservation Evidence*, 8, 43-52.
- Brown, Jessi L., and Michael W. Collopy (2008) Nest-Site Characteristics Affect Daily Nest-Survival Rates of Northern Aplomado Falcons (*Falco Femoralis Septentrionalis*). *The Auk*: January 2008, Vol. 125, No. 1, pp. 105-112.
- Brush, T. (1999). Current status of Northern Beardless-Tyrannulet and Tropical Parula in Bentsen-Rio Grande Valley State Park and Santa Ana National Wildlife Refuge, southern Texas. *Bulletin of the Texas Ornithological Society*, 32, 3-12.
- Burrow, A. L., Kazmaier, R. T., Hellgren, E. C., & Ruthven III, D. C. (2001). Microhabitat selection by Texas horned lizards in southern Texas. *The Journal of Wildlife Management*, 645-652.
- Caran, S., McCulloch, S. and J. Jackson. 2005. Report on a Geoarcheological Investigation at the Palo Alto Battlefield National Historic Site (41CF92) Cameron County, Texas. (Report No. 1). Submitted to: National Park Service, Johnson City, Texas.
- Chow, T. J. 1970. Lead accumulation in roadside soil and grass. *Nature*, 225(5229), 295.
- Cooper, R. J. et al. 2004. Natural Resource Summary for Palo Alto Battlefield National Historic Site (park) Final Report. Warnell School of Forest Resources, University of Georgia. Athens, Georgia.
- Cornelison, John E., Jr. et al. 2015. Archeological Survey of the Core Battlefield Area at Palo Alto Battlefield National Historical Park 2005-2007, 2010-2012: Redefining the First Battle of the Mexican American War. Southeast Archeological Center, National Park Service, Tallahassee, Florida.
- Duran, C. M. 2004. An Inventory of Reptiles and Amphibians of Padre Island National Seashore, San Antonio Missions National Historical Park, and Palo Alto Battlefield National Historic Site. Texas Conservation Data Center & The Nature Conservancy. San Antonio, Texas.

- Farmer, A. M. 1992. A natural resource survey of Palo Alto National Battlefield. National Audobon Society, Brownsville, TX.
- Federal Emergency Management Agency. 2018. FEMA Flood Map Service Center, accessed September 25, 2018, [FEMA Flood Map Service Center webpage](#).
- Forbes, M. G., & Dunton, K. H. (2006). Response of a subtropical estuarine marsh to local climatic change in the southwestern Gulf of Mexico. *Estuaries and Coasts*, 29(6), 1242-1254.
- Forman, R. T., & Alexander, L. E. 1998. Roads and their major ecological effects. *Annual review of ecology and systematics*, 29(1), 207-231.
- Foroughbakhch, R., Alvarado-Vazquez, M. A., Hernandez-Pinero, J. L., Rocha-Estrada, A., Guzman-Lucio, M. A., & Trevino-Garza, E. J. (2006). Establishment, growth and biomass production of 10 tree woody species introduced for reforestation and ecological restoration in northeastern Mexico. *Forest Ecology and Management*, 235(1-3), 194-201.
- Harveson, P. M., Tewes, M. E., Anderson, G. L., & Laack, L. L. (2004). Habitat use by ocelots in south Texas: implications for restoration. *Wildlife Society Bulletin*, 32(3), 948-955.
- Hayes T. M. 2004. Inventory of the Bird, Fish, and Mammal Species at Palo Alto Battlefield National Historical Site. Accipiter Biological Consultants. Portal, Arizona.
- Holderby, Z., Hill, A., Palacios, E., Green, M. C., Amador, E., & de Dios, C. (2014). Comparisons of reddish egret (*Egretta rufescens*) diet during the breeding season across its geographic range. *Waterbirds*, 37(2), 136-144.
- The Mammals of Texas – Online Edition*. “Southern Yellow Bat,” accessed February 12, 2019. <[Mammals of Texas Online Edition Southern Yellow Bat](#)>
- McClure, C. J., Pauli, B. P., Mutch, B., & Juergens, P. (2017). Assessing the importance of artificial nest-sites in the population dynamics of endangered Northern Aplomado Falcons *Falco femoralis septentrionalis* in South Texas using stochastic simulation models. *Ibis*, 159(1), 14-25.
- Miller, K. S., McCarthy, E. M., Woodin, M. C., & Withers, K. (2013). Nest success and reproductive ecology of the Texas Botteri's Sparrow (*Peucaea botterii texana*) in exotic and native grasses. *Southeastern naturalist*, 12(2), 387-399.
- Mora, M. A., Montoya, A. B., Lee, M. C., Macias-Duarte, A., Rodriguez-Salazar, R., Juergens, P. W., & Lafón-Terrazas, A. (2008). Persistent environmental pollutants in eggs of aplomado falcons from Northern Chihuahua, Mexico, and South Texas, USA. *Environment international*, 34(1), 44-50.
- National Park Service. 1998. “NPS-28: Cultural Resource Management Guideline”. U.S. Department of the Interior. Washington D.C. June 11, 1998.

Section 5.0 REFERENCES

- National Park Service. 2006. "NPS Management Policies." U.S. Department of the Interior. U.S. Government Printing Office. Washington D.C. ISBN: 0-16-076874-8.
- National Park Service. 2010. Cultural Landscape Inventory. Palo Alto Battlefield landscape. Palo Alto Battlefield National Historical Park.
- National Park Service. 2013. Natural Resource Condition Assessment. Palo Alto Battlefield National Historical Park.
- National Park Service. 2016. "State of the Park Report for Palo Alto Battlefield National Historical Park." State of the Park Series No. 30. National Park Service, Washington, DC.
- National Park Service. 2018a. Visitor Use Statistics website ([NPS Visitor Use Statistics website](#)). Accessed October 5, 2018.
- National Park Service. 2018b. *2017 National Park Visitor Spending Effects*. Natural Resource Report NPS/NRSS/EQD/NRR—2018/1616 ([NPS Visitor Spending Effects website](#)). Accessed October 5, 2018.
- National Park Service. 2018c. Personal communication with Rolando Garza, Archeologist/Chief of Resource Management. October 19, 2018.
- National Park Service. 2019. Integrated Resource Management Applications Portal. NPS Species List. Accessed February 6, 2019.
- Ogden, J.C., Kushlan, J. A., & Tilmant, J. T. 1976. Prey selectivity by the Wood Stork. *Condor*, 78, 324-330.
- Quarles III, H. D., Hanawalt, R. B., & Odum, W. E. 1974. Lead in small mammals, plants, and soil at varying distances from a highway. *Journal of Applied Ecology*, 937-949.
- Richard N. L. and Richardson A. T. 1993. Biological Inventory, Natural History, and Human Impact of Palo Alto National Battlefield.
- Rodgers, J. A. and S. T. Schwikert. 2002. Buffer-zone distances to protect foraging and loafing waterbirds from disturbance by personal watercraft and outboard-powered boats. *Conservation Biology* 16:216-224.
- Safran, R. J., Colwell, M. A., Isola, C. R., & Taft, O. E. 2000. Foraging site selection by nonbreeding White-faced Ibis.
- Spellerberg, I. A. N. 1998. Ecological effects of roads and traffic: a literature review. *Global Ecology & Biogeography Letters*, 7(5), 317-333.

- Terry, M., Price, D., & Poole, J. (2007). A tale of two cacti—the complex relationship between peyote (*Lophophora williamsii*) and endangered star cactus (*Astrophytum asterias*). In *Barlow-Irick, P., Anderson, J., McDonald, C., tech eds. Southwestern rare and endangered plants: Proceedings of the fourth conference* (pp. 115-121).
- Texas Department of Transportation. 2019. Telephone communication with Mr. Celestino Hernandez, Maintenance Supervisor, TxDOT-Brownsville. June 7, 2019.
- Texas Historical Commission. 2018. Email correspondence from Mark Wolfe, State Historic Preservation Officer. August 13, 2018.
- Texas Parks and Wildlife. 2013 MOU – Best Management Practices, revised 2017.
- Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. TPWD County Lists of Protected Species and Species of Greatest Conservation Need. Cameron County, revised 08/08/2018. Accessed 01/22/2019.
- U.S. Department of Agriculture. Soil Conservation Service. 1977. *Soil Survey of Cameron County, Texas*.
- U.S. Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Plants *Ayenia limitaris* (Texas *Ayenia*) and *Ambrosia cheiranthifolia* (South Texas Ambrosia), 50 CFR § 17 (1994).
- U.S. Fish and Wildlife Service. 2010. South Texas Ambrosia (*Ambrosia cheiranthifolia*) 5-year Review: Summary and Evaluation.
- U.S. Fish and Wildlife Service. 2013. Gulf Coast Jaguarundi Recovery Plan (*Puma yagouaroundi cacomitli*), Original version part of Listed Cats of Texas and Arizona, 1990. Southwest Region. Albuquerque, New Mexico. December 2013.
- U.S. Fish and Wildlife Service. 2018. Written communication from Mr. Charles Ardizzone, Field Supervisor, USFWS-Corpus Christi, Texas. September 28, 2018.
- U.S. Fish and Wildlife Service. 2019a. Environmental Conservation Online System (ECOS). Accessed May 8, 2019. [U.S. FWS Threatened & Endangered Species Active Critical Habitat Report](#)
- U.S. Fish and Wildlife Service. 2019b. Information for Planning and Conservation (IPaC) website. Accessed May 8, 2019. [IPaC project planning tool website](#)
- U.S. Fish and Wildlife Service. 2019c. Telephone communication with Mr. Tim Anderson, USFWS. May 10, 2019.
- Williams, D., Thompson, C. M., Jacobs, J. L. 1977. *Soil survey of Cameron County, Texas*. US Department of Agriculture Soil Conservation Service, US Government Printing Office, Washington, DC.

Section 6.0 ACRONYMS

BMP	Best Management Practice
CAA	Clean Air Act
CCDD	Cameron County Drainage District
CEC	Commission for Environmental Cooperation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
E	Endangered
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
GLO	Texas General Land Office
LRGV	Lower Rio Grande Valley
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHL	National Historic Landmark
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
park	Palo Alto Battlefield National Historical Park
SHPO	State Historic Preservation Officer
SWP3	Storm Water Pollution Prevention Plan
T	Threatened
TAC	Texas Administrative Code
TCCC	Texas Coastal Coordination Council
TCEQ	Texas Commission on Environmental Quality
TCMP	Texas Coastal Management Program
THC	Texas Historical Commission
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks & Wildlife Department
TxDOT	Texas Department of Transportation
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
WMA	Wildlife Management Area

APPENDIX A

SITE PHOTOGRAPHS



Photo 1. View toward the north from the southern terminus of the proposed trail.
Paredes Line Road (FM 1847) is at left.



Photo 2. View toward the east showing park entrance.



Photo 3. View toward the south from the southern terminus of the proposed trail.



Photo 4. View toward the north near the park entrance. Paredes Line Road is at left.



Photo 5. View toward the east from Paredes Line Road showing apparent wetland area near park entrance.



Photo 6. View toward the north along west fence line and Paredes Line Road. Sign at right indicates presence of underground communications cable.



Photo 7. Photo of mesquite trees and thick vegetation along the west fence line.



Photo 8. Photo toward the north showing possible wetland area at right.



Photo 9. View toward the northeast showing possible wetland area.



Photo 10. View to the north showing west fence line in the northern portion of the proposed trail corridor.



Photo 11. Warning sign for buried natural gas pipe on the east side of Paredes Line Road, approximately 1.2 miles north of the park entrance.



Photo 12. View toward the south from the northern terminus of the proposed trail.

APPENDIX B

IMPACTS ON SPECIAL STATUS SPECIES

APPENDIX B

Impacts on Special Status Species

Under the Endangered Species Act of 1973 (ESA), the NPS has responsibility to address impacts to federally listed threatened, endangered, candidate, and species proposed for listing. Also, NPS policy requires that state listed species, and others identified as species of management concern by the park, are to be managed in a manner similar to those that are federally listed. The Texas Tortoise is a state listed species that has been identified as a special status species of management concern at the park (NPS, 2016).

Proposed Action Area

Potential project impacts to physical, chemical, and biological components of land, air, and water resources used by special status species include **construction-related impacts** (e.g., noise, dust) and the **permanent loss of approximately 1.8 acres of vegetation** along the proposed trail corridor. The proposed action area is defined as the construction zone for the proposed trail and covers approximately 3.7 acres (i.e. 8,000 ft x 20 ft). Within the construction zone, a 10-ft wide paved trail with 2-ft vegetated shoulders would be constructed along 7,700 feet of the western boundary of the park, including a 1,300-ft section within highway right-of-way consisting of regularly mowed, non-native grasses. The remaining 300 feet of trail would include a 10-ft wide boardwalk across a segment of the Resaca de Palo Alto near the southern terminus of the proposed trail.

Federally Threatened and Endangered Species Suspected Based on Habitat

The proposed project area was evaluated for potential risks to federally-listed threatened and endangered species using the USFWS' Information for Planning and Conservation (IPaC) website to obtain a list of federally endangered, threatened, proposed and candidate species that may occur in the project area. In addition, the USFWS Environmental Conservation Online System (ECOS) was used to obtain information regarding designated areas of critical habitat for Cameron County, Texas. IPaC and ECOS were initially accessed in August 2018 and most recently on May 8, 2019.

For Cameron County, IPaC currently lists 14 federally listed species, including five sea turtles, four birds, three mammals and two flowering plants (USFWS, 2019b). The ECOS database indicated no designated critical habitat for Cameron County (USFWS, 2019a) for any of the federally listed species.

The proposed action area was reviewed for potential or suitable habitat for the federally listed species. Species with no potential or suitable habitat or were outside of the species' distributional range were excluded from further review. Table B1 below lists those species that are either: 1) known to or could potentially occur in the proposed action area; 2) species having the potential to occur within the proposed action area based on habitat requirements and known locations; and 3) those that have been excluded from further analysis with rationale. A brief description of their range and habitat requirements is also included.

Table B1. Federally Listed Endangered, Threatened, Proposed and Candidate Species for Cameron County, Texas

Species Common Name, <i>Scientific Name</i>	Federal Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Amphibians and Reptiles					
Green Sea Turtle, <i>Chelonia mydas</i>	T	No	No	HAB	Marine - near shore, pelagic, estuarine bays/sounds
Hawksbill Sea Turtle, <i>Eretmochelys imbricata</i>	E	No	No	HAB	Marine near shore, pelagic, estuarine bays/sounds, lagoons, river mouths/tidal rivers
Kemp's Ridley Sea Turtle, <i>Lepidochelys kempii</i>	E	No	No	HAB	Marine near shore, pelagic, estuarine bays/sounds
Leatherback Sea Turtle, <i>Dermochelys coriacea</i>	T	No	No	HAB	Marine near shore, pelagic, estuarine bays/sounds
Loggerhead Sea Turtle, <i>Caretta caretta</i>	T	No	No	HAB	Marine near shore, pelagic, estuarine bays/sounds, lagoons, river mouths/tidal rivers
Birds					
Least Tern, <i>Sterna antillarum</i>	E	No	No	HAB	Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers; rests and loafs on sandy beaches, mudflats, and salt- pond dikes; interior populations nest mainly on riverine sandbars or salt flats that become exposed during periods of low water
Northern Aplomado Falcon, <i>Falco femoralis septentrionalis</i>	E	Yes	No		Open rangeland and savanna, semiarid grasslands with scattered trees and shrubs; in the U.S. also found in coastal prairies along sand ridges, in woodlands along desert streams, and in desert grasslands with scattered mesquite and yucca

Species Common Name, <i>Scientific Name</i>	Federal Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Piping Plover, <i>Charadrius melodus</i>	T	No	No	HAB	Sandy upper beaches, especially where scattered grass tufts are present, and sparsely vegetated shores and islands of shallow lakes, ponds, rivers, and impoundments; most abundant on expansive sandflats, sandy mudflats, and sandy beach in close proximity; at Laguna Madre, Texas found to be most abundant on algal flats in fall and spring, but used exposed sand flats more often in winter
Red Knot, <i>Calidris canutus rufa</i>	T	No	No	HAB	Breeding habitats are elevated and sparsely vegetated ridges or slopes often adjacent to wetlands and lake edges for feeding; wintering and migration habitats are often muddy or sandy coastal areas, such as the mouths of bays and estuaries, and tidal flats
Mammals					
Gulf Coast Jaguarundi, <i>Felis yagouaroundi cacomitli</i>	E	Yes	No		Found in the dense forest and more arid and open areas; mixed thornscrub and sometimes riparian habitats; TPWD considers the species extirpated from Texas
Ocelot, <i>Felis pardalis</i>	E	Yes	No		Habitats with good cover; inhabits dense chaparral thickets and brushland in Texas
West Indian Manatee, <i>Trichechus manatus</i>	T	No	No	HAB	Shallow coastal waters, estuaries, bays, rivers, and lakes
Flowering Plants					
South Texas Ambrosia, <i>Ambrosia cheiranthifolia</i>	E	Yes	No		Grasslands and various mesquite-dominated shrublands on soils ranging from heavy clays to lighter textured sandy loams; most commonly found in coastal prairie communities

Species Common Name, <i>Scientific Name</i>	Federal Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Texas Ayenia, <i>Ayenia limitaris</i>	E	No	No	HAB	Dense subtropical woodland communities at low elevations; known Texas population located in Ebony- Anacua plant community - a closed- canopy community of riparian terraces

¹Status Codes: E = Endangered; T = Threatened; P = Proposed; C = Candidate

²Exclusion Rationale Codes: ODR = Outside known distributional range of the species; HAB = No habitat is present in the action area; SEA = Species not expected to occur during the season of use/impact; EXT = Species is believed to be extirpated

Effect Determination for Federally Listed Species

The five sea turtles, West Indian Manatee, Least Tern, Piping Plover, Red Knot and Texas Ayenia are dismissed from further analysis since habitats for these species do not exist in the proposed action area. The remaining species carried forward for further analysis include: Northern Aplomado Falcon, Gulf Coast Jaguarundi, Ocelot, and South Texas Ambrosia. These species are discussed in detail below.

Northern Aplomado Falcon

The **northern Aplomado falcon** is known to inhabit coastal prairie habitat where the raptor diets primarily on other birds and insects (Mora et al., 2008). Nesting generally occurs during the months of March through July, during which time aplomados often depend on nests constructed by “other raptors or corvids” (McClure et al., 2017). According to USFWS, two nesting pairs of falcons are known to inhabit the eastern portion of the park, well outside of the proposed trail corridor (USFWS, 2019c).

During the 6-month construction period, any aplomados within the proposed trail corridor would be expected to disperse to open prairie habitat within the park or vicinity as a result of construction noise and vegetation removal activities; therefore, the risk of direct impacts (death or injury) to the species is considered to be low. A daily walking nest survey would be conducted prior to construction activities to identify active nests or potential nests which may be utilized by the aplomado. If active nests are identified, a 150-foot buffer of vegetation would remain around the nests until the young have fledged or the nest is abandoned.

Indirect impacts of the proposed action would include immediate and long-term (>5 years) changes in nesting and foraging behavior for birds found at the park in general. Given the aplomado's reliance on pre-constructed nests, removal of mature vegetation capable of supporting raptor or corvid nests would eliminate the availability of potential future aplomado nesting sites within the proposed trail corridor. Additionally, the aplomado's prey would be expected to disperse into adjacent areas in the park as a result of the proposed action. However, as stated above, the aplomado would also be expected to disperse to other open prairie habitat within the park or vicinity since a sufficiently wide coverage of preferential habitat is available; therefore, indirect impacts to the aplomado are considered to be negligible.

Based on the above rationale, the proposed action would constitute a "may effect not likely to adversely affect" determination under the Endangered Species Act; therefore, the northern Aplomado falcon has been dismissed from further analysis in the EA.

Felid Species

The proposed trail corridor includes suitable habitat for two endangered felid species – the **jaguarundi** (*Puma yagouaroundi cacomitli*) and the **ocelot** (*Leopardus pardalis*). Sightings of these species are rare in south Texas, and no confirmed sightings of either species have been recorded on park grounds. The last confirmed sighting of a jaguarundi was a roadkill specimen found east of Brownsville in April 1986 (USFWS, 2013) and one collared ocelot was killed by vehicular traffic on Paredes Line Road within the past five years near the proposed project area (USFWS, 2018). Both species are known to inhabit stands of native thornscrub and woodland habitats similar to those found at the park (Harveson et al., 2004; NPS, 2013). Approximately 2.0-2.5 acres of proposed project corridor is comprised of thornscrub or woodland upland prairie habitats. These areas are bordered by an open and maintained right-of-way of a major road (Paredes Line Road) immediately west of the proposed trail corridor.

Construction noise and vegetation clearing activities would impact felid habitat within the proposed action area. However, given the highly mobile and skittish nature of the jaguarundi and ocelot, construction noise would be expected to cause individuals to disperse into more protected areas of the park during the 6-month construction period. The permanent loss of habitat due to vegetation clearing would cause changes to movement patterns and foraging behaviors of individual felids in the proposed action area; however, the risk of these impacts is considered to be low as individuals would be expected to disperse to other areas of the park or vicinity where a sufficiently wide coverage of suitable habitat is available.

Adoption of best management practices (BMPs) listed in **Section 2.5** would aid in the mitigation of potential impacts to these species by preserving mature trees, brush, and dense thickets where feasible.

Based on the above rationale, the proposed action would constitute a “may effect not likely to adversely affect” determination under the Endangered Species Act; therefore, the ocelot and jaguarundi have been dismissed from further analysis in the EA.

South Texas ambrosia

According to the USFWS’s ECOS, no critical habitat areas have been designated for the **South Texas ambrosia** in Cameron County. The South Texas ambrosia is found in “low elevations” on “open clay-loam to sandy-loam prairies and savannas” (USFWS, 1994; USFWS, 2010). Potentially suitable habitat for the ambrosia would be found along the length of the proposed trail corridor (8,000 linear feet) with the exception of trail to be located in the highway right-of-way (1,300 lf) and at the southern wetland (300 lf). Therefore, impacts to the ambrosia may occur within a construction zone approximately three acres in size (i.e. 20 ft x 6,400 ft). Impacts may occur due to construction activities, including vegetation clearing activities and trampling by construction workers or heavy equipment.

Historically, there has been one documented observation of the South Texas ambrosia in Cameron County. This population was located approximately six miles west of the proposed project area and was first observed in 1932 and last observed in 1941. No populations of the ambrosia are known to currently exist in Cameron County (USFWS, 2010). Given that no critical habitat is located in the proposed trail corridor, and that the species has no known populations within Cameron County, the risk of impacts to the South Texas ambrosia as a result of the proposed action is considered to be low.

To avoid potential impacts to the South Texas ambrosia, the proposed trail corridor would be surveyed by a qualified botanist retained by the City of Brownsville prior to vegetation clearing activities. The survey would include an inspection of the proposed trail corridor for the presence of the **South Texas ambrosia** following protocols established by the USFWS. If the South Texas ambrosia are observed, the USFWS and TPWD would be notified to determine the next appropriate step for relocating the plants

Based on the above rationale, the proposed action would constitute a “may effect not likely to adversely affect” determination for these plant species; therefore, the South Texas ambrosia have been dismissed from further analysis in the EA.

State Threatened and Endangered Species Suspected Based on Habitat

The Texas Parks and Wildlife Department's (TPWD) Rare, Threatened, and Endangered Species of Texas by County webpage was accessed to obtain a list of state-identified threatened, endangered, and species of greatest conservation need for Cameron County, Texas. The following table presents a list of special status species for Cameron County as of May 8, 2019.

Of the 52 state-listed species, 22 were identified which could potentially be impacted by the proposed action. These include 5 amphibians: the Black-spotted newt, South Texas siren, Mexican treefrog, White-lipped frog, Sheep frog; 4 reptiles: the Black-striped snake, Texas indigo snake, Texas horned lizard, and Texas tortoise; 10 birds: the White-faced ibis, Wood stork, Sprague's pipit, Northern beardless-tyrannulet, Tropical parula, Golden-cheeked warbler, Texas Botteri's sparrow, White-tailed hawk, Zone-tailed hawk, and the Northern Aplomado Falcon; 2 mammals: the Ocelot and Coues' rice rat; and 1 plant: the South Texas Ambrosia. Three of these species (the Ocelot, Northern Aplomado Falcon, and South Texas Ambrosia) were simultaneously identified on Federally-listed species records and are discussed in the Federally Threatened and Endangered Species Suspected Based on Habitat.

A desktop review has indicated that these species have been confirmed in or possess the potential to occur within the project corridor based on the presence of suitable habitat and the apparent geographic distributions of these species.

Potential direct impacts to these 23 species would primarily be associated with construction activities related to noise and removal of vegetation within the proposed project corridor. These impacts arise from the possible contact with heavy machinery, trampling or compaction by heavy machinery, and the removal of native vegetation. Boardwalk pilings would similarly affect an estimated 75-150 cubic feet of sediments, resulting in potential mortality or injury to amphibians. Indirect impacts related to the completion of the project would include modification of behavior patterns in response to the alterations of vegetative structure and the anticipated increase in disturbance related to recreational use of the trail.

The proposed trail corridor is located approximately 15-20 feet from the Paredes Line Road ROW. Despite the diversity of habitat represented within the 8,000 linear foot corridor, the presence of this roadway has presented a major barrier to wildlife since its construction in the early 1950's. The roadway presents considerable dangers to wildlife, including vehicle mortality, runoff, and noise related disturbances. Consequently, areas within the trail corridor do not constitute optimal habitat for endemic, transient, or protected wildlife.

Removal of vegetation and excavation activities would pose the greatest risk of direct impacts to amphibians and the Texas tortoise, which are less capable of dispersing from the impacted area during construction activities. Given the active measures outlined in Section 2.5, that would be implemented to mitigate against such risks, the probability that these species would be adversely impacted by the proposed action is low. The remaining species identified in this evaluation are highly mobile and capable of unrestricted movement out of the impacted area; and therefore, direct impacts to these species are anticipated to be low.

Indirect impacts related to the trail's construction, implementation, and subsequent use are not anticipated to surpass threshold levels which would cause detrimental harm to wildlife. These impacts (noise, dusting of foliage) are expected to result in avoidance of the general project area during and after construction.

Given these considerations, the proposed action is not likely to adversely affect the state-listed species identified in this evaluation.

Table B2. State Listed Endangered and Threatened Species for Cameron County, Texas

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Amphibians and Reptiles					
Black-spotted newt, <i>Notophthalmus meridionalis</i>	T	Yes	No		Resacas and bodies of water with firm bottoms and little or no vegetation; wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions
South Texas siren (Large Form), <i>Siren sp. 1</i>	T	Yes	No		Bodies of quiet water, permanent or temporary, with or without submergent vegetation; wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions
Mexican treefrog, <i>Smilisca baudinii</i>	T	Yes	No		Subtropical Rio Grande embayment around Brownsville
White-lipped frog, <i>Leptodactylus fragilis</i>	T	Yes	No		Semi-permanent water bodies; lowlands, grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats where moisture is sufficient
Sheep frog, <i>Hypopachus variolosus</i>	T	Yes	No		Predominantly grassland and savanna
Green Sea Turtle, <i>Chelonia mydas</i>	T	No	No	ODR	Marine - near shore, pelagic, estuarine bays/sounds

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Hawksbill Sea Turtle, <i>Eretmochely imbricata</i>	E	No	No	ODR	Marine near shore, pelagic, estuarine bays/sounds, lagoons, river mouths/tidal rivers
Kemp's Ridley Sea Turtle, <i>Lepidochelys kempii</i>	E	No	No	ODR	Marine near shore, pelagic, estuarine bays/sounds
Leatherback Sea Turtle, <i>Dermochelys coriacea</i>	E	No	No	ODR	Marine near shore, pelagic, estuarine bays/sounds
Loggerhead Sea Turtle, <i>Caretta caretta</i>	T	No	No	ODR	Marine near shore, pelagic, estuarine bays/sounds, lagoons, river mouths/tidal rivers
Texas tortoise, <i>Gopherus berlandieri</i>	T	Yes	No		Open brush with a grass understory
Texas horned lizard, <i>Phrynosoma cornutum</i>	T	Yes	No		Open, arid and semi- arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees
Black-striped snake, <i>Coniophanes imperialis</i>	T	Yes	No		Extreme south Texas; semi-arid coastal plain, warm, moist micro- habitats and sandy soils
Texas indigo snake, <i>Drymarchon melanurus erebennus</i>	T	Yes	No		Thornbush-chaparral woodland of south Texas, in particular dense riparian corridors; suburban and irrigated croplands
Speckled racer, <i>Drymobius margaritiferus</i>	T	No	No	HAB	Extreme south Texas; dense thickets near water, Texas palm groves, riparian woodlands
Northern cat- eyed snake, <i>Leptodeira septentrionalis septentrionalis</i>	T	No	No	HAB	Gulf Coastal Plain south of the Nueces River; thorn brush woodland; dense thickets bordering ponds and streams
Birds					

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Reddish egret, <i>Egretta rufescens</i>	T	No	No	HAB	Resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear
White-faced ibis, <i>Plegadis chihi</i>	T	Yes	No		Freshwater marshes, sloughs, and irrigated rice fields; will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in "hog-wallow" prairies
Arctic Peregrine Falcon, <i>Falco peregrinus tundrius</i>	NL	No	No	HAB	West Texas; occupies a wide range of habitats; winters along coasts in south Texas; stopovers at leading landscape edges (lake shores, coastlines, barrier islands)
Brown pelican, <i>Pelecanus occidentalis</i>	SGCN	No	No	HAB	Coastal and nearshore areas; roosts and nests on islands and spoil banks
Sprague's Pipit, <i>Anthus spragueii</i>	SGCN	Yes	No		Winter migrant; native upland prairie, coastal grasslands, uncommon further west; avoids edges
Wood stork, <i>Mycteria americana</i>	T	Yes	No		Nests in large tracts of baldcypress (<i>Taxodium distichum</i>) or red mangrove (<i>Rhizophora mangle</i>); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing; breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Swallow-tailed kite, <i>Elanoides forficatus</i>	T	No	No	HAB	Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees
White-tailed hawk, <i>Buteo albicaudatus</i>	T	Yes	No		Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral
Zone-tailed hawk, <i>Buteo albonotatus</i>	T	Yes	No		Arid open country, including open deciduous or pine-oak woodland, mesa or mountain country; wooded canyons and tree-lined rivers along middle-slopes of desert mountains; rare winter resident in south Texas
Gray hawk, <i>Buteo plagiatus</i>	T	No	No	HAB	Mature riparian woodlands and nearby semiarid mesquite and scrub grasslands
Northern Aplomado Falcon, <i>Falco femoralis septentrionalis</i>	E	Yes	No		Open rangeland and savanna, semiarid grasslands with scattered trees and shrubs; coastal prairies along sand ridges, in woodlands along desert streams, and in desert grasslands with scattered mesquite and yucca

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Piping Plover, <i>Charadrius melodus</i>	T	No	No	HAB	Sandy upper beaches, sparsely vegetated shores and islands of shallow lakes, ponds, rivers, and impoundments; expansive sandflats and sandy mudflats in proximity to sandy beaches; at Laguna Madre, Texas found to be most abundant on algal flats in fall and spring and exposed sand flats in winter
Eskimo curlew, <i>Numenius borealis</i>	E	No	No	HAB	Shortgrass plains and prairies, marshes, beaches and sand flats, grasslands, pastures, plowed fields
Sooty tern, <i>Onychoprion fuscatus</i>	T	No	No	HAB	Primarily an offshore bird; does nest on sandy beaches and islands
Northern beardless- tyrannulet, <i>Camptostoma imberbe</i>	T	Yes	No		Mesquite woodlands; cottonwood, willow, elm, and tepeguaje near the Rio Grande in areas where epiphytic plants are present
Rose-throated becard, <i>Pachyramphus aglaiae</i>	T	No	No	HAB	Riparian corridors; trees, woodlands, open forest, scrub, and mangroves
Tropical parula, <i>Setophaga pitiayumi</i>	T	Yes	No		Semi-tropical evergreen woodland along rivers and resacas; Texas ebony, anacua and other trees with epiphytic plants hanging from them; dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas
Golden-cheeked warbler, <i>Setophaga chrysoparia</i>	E	Yes	No		Ashe juniper in mixed stands with various oaks; edges of cedar brakes; dependent on Ashe juniper (cedar)

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Texas Botteri's sparrow, <i>Peucaea botterii texana</i>	T	Yes	No		Grasslands and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca
Mammals					
Coues' rice rat, <i>Oryzomys couesi aquaticus</i>	T	Yes	No		Cattail-bulrush marsh with shallower zone of aquatic grasses near the salt or freshwater shorelines; shade trees around the shoreline are important features
Humpback whale, <i>Megaptera novaeangliae</i>	E	No	No	ODR	Open ocean and coastal waters, sometimes including inshore areas such as bays; tropical/subtropical waters near islands or coasts
Ocelot, <i>Felis pardalis</i>	E	Yes	No		Habitats with good cover; inhabits dense chaparral thickets and brushland in Texas
Southern yellow bat, <i>Lasiurus ega</i>	T	No	No	HAB	Relict palm grove is only known Texas habitat
White-nosed coati, <i>Nasua narica</i>	T	No	No	HAB	Woodlands, riparian corridors and canyons
Flowering Plants					
South Texas Ambrosia, <i>Ambrosia cheiranthifolia</i>	E	Yes	No		Grasslands and various mesquite-dominated shrublands on soils ranging from heavy clays to lighter- textured sandy loams; most commonly found in coastal prairie communities

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
Runyon's Cory Cactus, <i>Coryphantha macromeris var runyonii</i>	SGCN	No	No	HAB	Gravelly to sandy or clayey, calcareous, sometimes gypsiferous or saline soils, often over the Catahoula and Frio formations
Runyon's water- willow, <i>Justicia runyonii</i>	SGCN	No	No	HAB	Margins of and openings within subtropical woodlands or thorn shrublands on calcareous, alluvial, silty or clayey soils; can be common in narrow openings such as those provided by trails through dense ebony woodlands and is sometimes restricted to microdepressions
Star cactus, <i>Astrophytum asterias</i>	E	No	No	HAB	Gravelly clays or loams in the western Rio Grande Valley; gentle slopes and flats in sparsely vegetated openings between shrub thickets within mesquite grasslands or mesquite- blackbrush thorn shrublands; extant populations are restricted to Starr county
Texas Ayenia, <i>Ayenia limitaris</i>	E	No	No	HAB	Dense subtropical woodland communities at low elevations; known Texas population located in Ebony-Anacua plant community - a closed- canopy community of riparian terraces
Fishes					
Opossum pipefish, <i>Microphis brachyurus</i>	T	No	No	HAB	Brooding adults found in fresh or low salinity waters and young move or are carried into more saline waters after birth; southern coastal areas

Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur in Action Area	Critical Habitat in Action Area	Exclusion Rationale ²	Habitat Description & Range in Action Area
River goby, <i>Awaous banana</i>	T	No	No	HAB	Found in the mainstream of the Rio Grande; southern coastal waters; clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters
Mexican goby, <i>Ctenogobius claytonii</i>	T	No	No	HAB	Southern coastal area; brackish and freshwater coastal streams
Smalltooth sawfish, <i>Pristis pectinata</i>	E	No	No	HAB	Young found very close to shore in muddy and sandy bottoms; sheltered bays, on shallow banks, and in estuaries or river mouths; adult in various habitat types (mangrove, reef, seagrass, and coral)
Molluscs					
Texas hornshell, <i>Popenaias popeii</i>	T	No	No	HAB	Both ends of narrow shallow runs over bedrock, in areas where small-grained materials collect in crevices, along river banks, and at the base of boulders; Rio Grande Basin and several rivers in Mexico
Salina mucket, <i>Potamilus metnecktayi</i>	T	No	No	HAB	Lotic waters; submerged soft sediment (clay and silt) along river banks; Rio Grande Basin.
Mexican fawnsfoot mussel, <i>Truncilla cognata</i>	T	No	No	HAB	Largely unknown; Rio Grande basin

¹Status Codes: E = Endangered; T = Threatened; P = Proposed; C = Candidate; NL = Not listed

²Exclusion Rationale Codes: ODR = Outside known distributional range of the species; HAB = No habitat present in the action area; SEA = Species not expected to occur during the season of use/impact; EXT = Species believed to be extirpated

A total of 52 species are listed as threatened, endangered, or species of greatest conservation need in Cameron County. Twenty-two of these species were carried forward for further analysis based on: a review of the National Park Service's (NPS) species checklist for Palo Alto Battlefield National Historical

Park; the known distributional ranges of the species; and/or the presence of potential suitable habitat within the trail corridor. These species include 5 amphibians, 4 reptiles, 10 birds, 2 mammals, and 1 plant. Of these, three species (**Ocelot**, **Northern Aplomado falcon**, and the **South Texas Ambrosia**) are federally listed and, therefore, are discussed in the **Federally Threatened and Endangered Species** section above. The remaining species were dismissed from further evaluation based on reasons described in **Table B2**.

Effect Determinations for State Listed Species

Wetland-Associated Species

Previous park surveys have associated eight of the species identified for further analysis with ponded wetland areas (Farmer, 1992; Duran, 2004; Cooper et al, 2004). These species include the **Black-spotted newt**, **South Texas siren**, **Mexican treefrog**, **White-lipped frog**, **Sheep frog**, **White-faced ibis**, **Wood stork**, and **Coues' rice rat**.

Under the proposed action, a 300-ft boardwalk would affect an estimated 75-150 cu feet of sediment in a wetland area. Trampling and placement of boardwalk pilings may cause direct impacts (e.g. injury, death) to amphibians within this area. The risk potential for direct impacts (e.g. injury or death) to the **Black-spotted newt**, **South Texas siren**, **Mexican treefrog**, **White-lipped frog**, and **Sheep frog** would be temporary (<3 months) in duration and mitigated by using a "top-down" construction technique (see **Wetlands and Floodplains** above) which would localize adverse effects to individuals located within the sediments where boardwalk pilings would be placed. Furthermore, a top-down approach would prevent changes to hydrologic regimes or wetland functionality, allowing these species to move unrestricted into and out of adjacent wetland areas upon the boardwalk's completion. Additional mitigation measures

would include the implementation of TPWD's Amphibian and Aquatic Reptile BMPs, including conducting daily biotic surveys prior to the commencement of construction activities, advising contractors of the species' potential occurrence within the impacted area, and instructing contractors how to avoid harmful impacts (TWPDP rev., 2017). Thus, impacts are not likely to adversely affect amphibians in the wetland area; therefore, a further analysis of impacts to these species has been dismissed from this EA.

Two avian species, the **White-faced ibis** and **Wood stork**, also utilize wetland habitats for foraging. Given these species' high mobility, sensitivity to disturbances such as vehicular traffic along Paredes Line Road, direct impacts (e.g. injury, death) relating to the 6-month construction period are anticipated to be negligible. Indirect impacts as a result of the trail's completion and future use include avoidance of the area or utilization of larger, protected wetland areas in the park. These impacts are not likely to adversely affect these species; therefore, they have been dismissed from further analysis in this EA.

The **Coues' rice rat** is a semi-aquatic species that is dependent on riparian habitat, particularly "cattail-bulrush marsh" areas (Benson & Gehlbach, 1979). Given the ephemeral nature of ponded wetlands within and adjacent to the proposed action area, the presence of riparian vegetation is generally limited in duration (weeks to 2-3 months) after heavy rain events. For this reason, presence of the species is expected to be limited in the proposed action area. In addition, the **Coues' rice rat** has not been identified in past biotic surveys at the park (Hayes, 2004; NPS, 2016). Based on these conditions, potential impacts (direct and indirect) of the proposed action are not likely to adversely affect the **Coues' rice rat** and the species has been dismissed from further analysis in this EA.

Birds

Six state-listed species were identified as potentially occurring in the project corridor. Included are the **Sprague's pipit**, **Northern beardless-tyrannulet**, **Tropical parula**, **Golden-cheeked warbler**, and the **Texas Botteri's sparrow**. The pipit, parula, and warbler are migratory species which can be seasonally observed in Cameron County. The Botteri's sparrow and tyrannulet are year-round residents in south Texas.

While habitat preferences and life histories differ considerably among these five species, the proposed action area is characterized by a variety of vegetative regimes which may offer suitable habitat for establishment or temporary use by these species; however, given the trail's proximity to Paredes Line Road, it is anticipated they would be more likely to utilize less-disturbed areas in the park. Given their ability to move rapidly into or out of the project corridor, direct impacts (e.g. death or injury) are not likely to adversely affect juvenile or adult individuals. Of the five passerines, the **Northern beardless-tyrannulet**, **Tropical parula**, and the **Texas Botteri's sparrow** are known to nest in the lower Rio Grande Valley. If vegetation clearing activities occur during the migratory bird nesting period (March 15 - September 15), areas to be impacted would be surveyed for active nests of special status and migratory species no more than 5 days prior to clearing. If active nests are identified, a 150-foot buffer of vegetation would remain around the nests until the young have fledged or the nest is abandoned.

Indirect affects (e.g. noise, trampling of understory vegetation, and removal of canopy coverage) to these species during the trail's construction would likely result in avoidance of the area during the 6-month construction period. Given the species' unrestricted access to suitable habitat within the park,

the risk of impacts is considered to be negligible. Indirect impacts related to the presence of the completed trail and its future use would similarly result in avoidance of the area and utilization of protected interior areas within the park. Based on these considerations, impacts are not likely to adversely affect these passerine species; therefore, they have been dismissed from further analysis in this EA.

Raptors

In addition to the federally listed **Northern Aplomado Falcon** (discussed above), two species of raptors were identified as occurring or potentially occurring within the trail corridor: the **White-tailed hawk** and **Zone-tailed hawk**. Open areas within and adjacent to the trail corridor also offer suitable foraging areas for these species.

Given the highly mobile nature of these species, direct impacts (e.g. death or injury) to juvenile or adult individuals as a result of construction activities are not anticipated. Individuals within the corridor would be expected to disperse into adjacent park areas during the 6-month construction period. While the trail corridor is not considered optimal nesting habitat due to the presence of Paredes Line Road, it does contain potentially suitable nesting areas for these species. If vegetation clearing activities occur during the migratory bird nesting period (March 15 and September 15), areas to be impacted would be surveyed for active nests of special status and migratory species no more than 5 days prior to clearing. If active nests are identified, a 150-foot buffer of vegetation would remain around the nests until the young have fledged or the nest is abandoned.

Indirect impacts (e.g. noise, trampling of understory vegetation, and removal of canopy coverage) would be expected to result in avoidance of the proposed action area during the 6-month construction period. Given the presence of Paredes Line Road, it is likely that these species generally utilize less-disturbed areas within the park's interior; thus, no major changes in behavioral patterns would be expected as a result of the trail's future use. Similarly, individuals in or near the corridor would be expected to disperse from the area when trail users are present. Based on these conditions, impacts are not likely to adversely affect these species; therefore, a further analysis of potential impacts to these species has been dismissed from this EA.

Snakes

Two snakes were identified as potentially occurring within the trail corridor: the **Black-striped snake** and **Texas indigo snake**. The **Texas indigo** has been confirmed on park grounds and is most likely to be observed in or near resaca beds, temporarily ponded areas, and around rat dens (Duran, 2004; NPS, 2013). The park's coverboard monitoring program has also confirmed the presence of the **Black-striped snake** within the park.

Given the scope of the proposed action, the entire proposed action area would be subject to potential impacts by the proposed action (e.g. removal of vegetation, modification of vegetative structure, trampling). A risk of direct impacts (e.g. death, injury) would be highest during the estimated 30-day vegetation clearing period; however, given the mobility of the species, individuals located within the project corridor would be anticipated to disperse into less disturbed areas within the park. In addition, terrestrial reptile BMPs would be used to mitigate potential impacts to snake populations within the

impacted corridor. These measures include installing a permanent exclusion fence along the proposed trail corridor, conducting walking surveys prior to commencement of construction activities, visually inspecting excavated areas before backfilling, and allowing any reptiles identified in the corridor to leave the project area.

Potential indirect impacts to snakes as a result of the proposed action would include modification of the vegetative regime and increased human presence along the trail corridor. Loss of canopy coverage and the approximately 6-12 month understory recovery period would diminish quality of habitat for the two species'; however, the presence of the paved segments of trail and boardwalk structures (pilings, treads) would not restrict movement of these species into or out of the area. Given the snakes' general avoidance of open, bare areas, encounters with recreational trail users are anticipated to be rare. Based on these considerations, the species are not likely to be adversely affected by impacts related to the proposed action and a further analysis of potential impacts for the species has been dismissed from this EA.

Texas Horned Lizard

In south Texas, the **Texas horned lizard** is most commonly observed in open to patchy areas adjacent to "grasses, cacti, yucca, mesquite, and other woody shrubs" (Burrow et al., 2001). Texas horned lizards are present at the park and suitable habitat can be found along the entire proposed action area.

The risk of direct impacts (e.g. death, injury) to the horned lizard population would be possible during construction activities and is anticipated to be highest during the approximately 30-day vegetation clearing period. TPWD BMPs would be used during construction to avoid adverse impacts to horned lizard populations wherever possible (see **Section 2.5**). These measures include installing a permanent exclusion fence along the proposed trail corridor, conducting walking surveys prior to commencement of construction activities, visually inspecting excavated areas before backfilling, and allowing any reptiles identified in the corridor to leave the project area. Given the lizard's unrestricted access to suitable habitat in interior areas of the park, the species is not likely to be adversely affected by direct impacts relating to the proposed action.

Given the lizard's preference for thornscrub edges, post-construction impacts associated with the future use of the proposed trail would likely cause the lizard to disperse into more protected areas within the park. The presence of the **Texas horned lizard** is highly correlated to its main prey item, the **Red harvester ant** that often colonizes areas along trails and roads. Therefore, lizards which may become established in the corridor after the trail's completion would likely benefit from the presence of an edge and a potential increase in harvester ant mounds. Additionally, individuals who disperse from the trail corridor would be capable of unrestricted movement into adjacent areas within the park which contain suitable habitat. Impacts related to recreational use (e.g. hiking, biking) of the trail may result in disruption of feeding and avoidance behaviors of the **Texas horned lizard**; however, these potential impacts would not pose a major risk to the lizard. Based on these considerations, the Texas horned lizard is not likely to be adversely affected by post-construction related impacts or use of the trail. Therefore, a further analysis of potential impacts to the **Texas horned lizard** has been dismissed from further analysis in this EA.

Texas Tortoise

The **Texas tortoise** is known to inhabit the park grounds and adjacent areas where thornscrub and coastal prairie habitat is present (Rose & Judd, 1975). The entirety of the 3.5-acre trail corridor is characterized by vegetative communities in which a tortoise may be found.

Clearing of vegetation during construction activities would permanently remove Texas tortoise habitat from the proposed trail corridor. However, the risk of direct impacts (e.g. death, injury) to the Texas tortoise are considered to be low during the 6-month construction period. During this time, the highest risk would occur within the 30-day excavation period. TPWD-recommended BMPs would be implemented during the construction activity to avoid impacts to the tortoise, including: walking surveys by a qualified biologist prior to initiating construction activities, and the installation of a permanent exclusion fence. Should a tortoise be found, a qualified biologist would coordinate with NPS staff to remove the individual from the corridor for relocation to a protected, suitable habitat within the park. The exclusion fence would prevent tortoises from entering the construction area and the Paredes Line Road right-of-way during and after construction. Consequently, the **Texas tortoise** is not likely to be adversely affected by direct impacts associated with the construction of the proposed trail.

Indirect impacts associated with the trail's construction would likely include avoidance of the general area due to construction related disturbances (e.g. noise, dusting of foliation). Post-construction impacts to the Texas tortoise are not anticipated given the implementation of an impassible exclusion fence. Individuals who may disperse from the area during construction would be able to move freely into suitable, protected habitats within the park. Consequently, indirect impacts are not likely to adversely affect the park's tortoise population. Given these considerations, further analysis of impacts to the Texas tortoise has been dismissed from this EA.