

**INVENTORY OF THE BIRD, FISH AND MAMMAL
SPECIES
AT
PALO ALTO BATTLEFIELD NATIONAL HISTORICAL
SITE

FINAL**



February 2004

Submitted to

**National Park Service
1623 Central Blvd. Room 213
Brownsville, TX 78520**

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INTRODUCTION

Palo Alto Battlefield National Historic Site is a relatively new park established in its present boundary configuration in 1992 to preserve and protect the site of the first battle of the Mexican-American War. The 3400-acre site lies within the delta of the Rio Grande River and is less than 15 miles from the Gulf of Mexico. The climate of the area is subtropical and semi-arid and the site is dominated by coastal salt prairie and Tamaulipan brushland. The topography of the area is generally flat with elevations ranging from 9.7 to 20.9 feet above sea level. Several wetlands exist within the park including resacas (abandoned channels of the Rio Grande River), man-made stock tanks and remnants of lakes. Both tropical and subtropical plant and animal species occur within the park.

The Organic Act of August 25, 1916, as amended, 16 U.S.C. § 1, 2-4 (1988), declares that the National Park Service shall promote and regulate the use of the various federal areas known as units of the National Park System by such means and measures as conform to the fundamental purpose of the National Park System. This purpose is to conserve the scenery, cultural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. Currently, land managers at Palo Alto Battlefield National Historic Site possess neither a comprehensive baseline inventory nor the information upon which to base monitoring of the area's bird, fish and mammalian species utilizing its lands. In recent years, the shift to protecting biodiversity through the preservation of functional ecosystems, has made reliable inventory and monitoring programs of critical importance to natural resource management. Without detailed information on the distribution, habitat requirements and relative abundance of native bird, fish and mammalian species, resource managers may only preserve that portion of the fauna that is highly visible or economically important. For these reasons, Accipiter Biological Consultants was contracted by the National Park Service through its Gulf Coast Inventory and Monitoring Network to design and develop a park-wide inventory of bird, fish and mammalian species currently occurring at Palo Alto Battlefield National Historic Site. This inventory effort will provide Park resource managers with comprehensive scientifically based information about the species and status of the birds, fish and mammalian resources occurring within the Palo Alto Battlefield site. This information will be utilized for management decisions regarding park resources and their protection, as well as for education and outreach to the public. Furthermore, this effort is an important part of the groundwork necessary for managers to develop effective monitoring programs designed to ensure the continued long-term health of the Park's natural resources.

Two resource surveys have been produced for the Park in the past. Farmer (1992) completed "A Natural Resource Survey of Palo Alto National Battlefield", that made general observations on the climate, geology, hydrology, vegetation and wildlife of the Park, focusing on Threatened and Endangered species and appropriate habitat.

Richard and Richardson (1993) wrote “A Biological Inventory, Natural History and Human Impacts of Palo Alto National Battlefield”. Those authors mapped vegetation associations and noted the impacts of agriculture on the Park site through documentary and photographic analysis. This document is the most current overall inventory available identifying 84 bird, 10 fish and 11 mammalian species which they located on the Palo Alto National Battlefield site.

Because the previous studies lacked standardization in methodologies or left the status of species poorly defined, this inventory of the birds, fish and mammals of Palo Alto Battlefield National Historic Site has been deemed necessary.

INVENTORY GOALS AND OBJECTIVES

The Palo Alto Battlefield National Historic Site Bird, Fish and Mammal Inventory Project constitutes applied research designed to provide land managers with the following:

1. an annotated list of at least 90% of the bird, fish and mammal species thought to occur within the Park. This list will be arranged by family and will include scientific and common names, relative abundance, habitat associations and seasonal information.
2. a review and revision of the previous inventories, documenting species not identified during this inventory.
3. the entrance of all species information collected into NPSpecies database.
4. the collection of voucher specimens or photographs of documented species to the degree possible.

IMPORTANT HABITAT ASSOCIATIONS ON THE PALO ALTO BATTLEFIELD NATIONAL HISTORIC SITE

The Palo Alto Battlefield National Historic Site is wholly contained in the Matamorán district of the Tamaulipan biotic province. The combination of climate, vegetation and wildlife is a unique blend of western desert, northern, coastal and tropical affinities. Since rainfall is limited and irregularly distributed, there is little moisture available for plant growth. Thorny, small leafed, drought resistant plants characterize the region with plant distribution primarily influenced by soil types which can be correlated with geological formations (Farmer, 1992). Three major habitat units have been identified on the Palo Alto Battlefield National Historic Site. These include brushlands, coastal salt prairie and wetlands on the Park grounds.

Brushland

Brushland of the Tamaulipan Brush Association constitutes approximately 23 percent of the surface of the Palo Alto Battlefield National Historic Site. This brushland occurs adjacent to the old remnant meanders and distributary channels of the Rio Grande River with the densest vegetation on either side of the meander on the north side of the Park. Smaller portions of this habitat exist throughout the Park on slight elevations above the influence of saline ground water.

It also probably existed on all of the land cleared for agriculture (about 8% of the site, leaving 15% still in brush) and is still found on the spoil banks from cattle tank or drainage canal excavation. The overstory in these areas is dominated by Honey Mesquite (*Prosopis glandulosa*), Spiny Hackberry (*Celtis pallida*), Texas Ebony (*Pithecellobium flexicaule*) and Common Anaqua (*Ehretia anacua*) while the understory is dominated by Jujube or Lotebush (*Zizyphus obtusifolia*), Colima Lime Pricklyash (*Zanthoxylum fagara*), and Lindheimer's Prickly Pear (*Opuntia lindheimeri*). Trecul Yucca (*Yucca treculeana*) also exists as an observable feature of this vegetation type, as well as Wright's Dropseed (*Sporobolus wrightii*) a native grass.

Several agencies including the National Audubon Society, US Fish and Wildlife Service and Texas Parks and Wildlife Department have had significant success in revegetating brushlands cleared for agricultural purposes in South Texas (Farmer, 1992). The National Park Service could greatly increase the percentage of actual brushland on the Park by utilizing similar revegetation efforts. This may be important for purposes of natural resource management, as this habitat tends to provide home and sustenance to more wildlife species than any other on the Park.

Coastal Salt Prairie

The Coastal Salt Prairie zone occurs at lower elevations than the brushlands and occupies approximately 75 percent of the surface area of the Park. This vegetation type has probably grown over time as old resaca beds have filled in and by invading areas which have been disturbed by ranching and farming (Richard et al., 1993). The Coastal Salt Prairie is dominated by alternating patches of almost pure Gulf Cordgrass (*Spartina spartinae*), mixed areas of *Spartina spartinae* and Bushy Sea Ox Eye (*Borrichia frutescens*) and pure stands of *Borrichia frutescens* and succulents (also called *Borrichia* flats). *Spartina* is the dominant grass in this habitat, growing from one to three feet in height. Scattered Mesquites and Yuccas are common in places on the site and areas of scattered Mesquite overstory and *Spartina* understory are considered Coastal Salt Prairie for the purposes of this inventory.

Borrichia flats generally occur lower than lands containing *Spartina* where salinity is higher. *Borrichia* often dominates old meanders even though pure stands of *Spartina* lie adjacent to the channel only a foot higher in elevation. These areas are also typified by significant amounts of bare earth because of higher salt content in the soil.

The Coastal Salt Prairie habitat is of increasing interest because of the number of wildlife species that forage in the open areas.

Wetlands

Approximately 2 percent of the surface area of Palo Alto Battlefield National Historic Site is made up of natural wetlands or man made tanks and canals. The Rio Grande River has impacted the area with its meanders along the northern, western and southern areas of the Park. The resulting resacas are of different ages and at various stages of change. While erosion on the site has gradually filled in the resacas, some still hold small amounts of water after precipitation events. A number of man made tanks have been carved out of the clay soils where these

channels are found. Natural wetlands designated as PEMIC (palustrine, emergent, persistent, seasonal) are located in the northern and western portions of the site. PEMIF (palustrine, emergent, persistent, semipermanent) wetlands occur in the north central and southwestern portions of the Park and wetlands designated as PEMIA (palustrine, emergent, persistent, temporary) are located in the south central area of the property. A drainage ditch, completed in approximately 1915, forms the northern boundary of the site. Water from this ditch is apparently pumped into a fairly sizable pond in the north central portion of the site. The drainage ditch and pond seem to be the only permanent water on the battlefield site. According to Park personnel, the drainage ditch is not actually a part of the Park and has been excluded from this study.

The seasonal nature of the wetlands on the battlefield site in combination with their shallowness can be valuable to a number of species especially wading birds. There is an existing possibility that the National Park Service could restore several of the wetlands in the old resacas by excavating erosion material caused by agricultural practices on the site.

METHODOLOGIES

A detailed review of the field methods utilized in this inventory program is provided in the following paragraphs. This selection of methodologies was determined by the need to balance the availability of suitable personnel against the need to establish a valid, quantifiable inventory program.

This project began with a literature search to establish a potential list of bird, fish and mammal species that include Palo Alto Battlefield National Historic Site in their range of distribution. This search netted lists including 29 fish species, 54 mammal species and 258 bird species. Further search was conducted to determine if potential habitat exists on Palo Alto Battlefield National Historic Site for each species on that list and to gain insight on the life history of each species. Many species could be eliminated due to lack of suitable habitat on the Park. Previous inventories were reviewed and total annotated lists have been constructed (see Appendix A). Tables have been constructed to illustrate species by common and scientific name, seasonal distribution as documented by this inventory, species located in previous inventories, and species which should be found on the Park because habitat exists but were not located for any number of reasons including the prolonged drought in the area of the study (see Appendix A). Further discussion of the latter species will occur later in this report.

We utilized the following methods in the field.

1. Birds

Southeastern Point Count (SEPTCT)

The SEPTCT provides a stratified random sampling of habitats within the Park's Natural Zone lands and waters. The survey procedures and methods used by Accipiter Biological Consultants follow those published by the US Forest Service's Southern Research Station and is consistent with the guidelines of the monitoring working group of the Partners in Flight Neotropical Migratory Bird Conservation Program.

The sample stratification of plots proportions the number of sampling points within the park with at least two replicate sites in each major habitat block. Within each unit the sample points are further stratified to ensure that habitats that have experienced fragmentation or a significant reduction in former extent due to land use changes are also sampled. Each site is sampled during the breeding season (in May/June), in November during the year of this study and once during the spring and once during the fall migrations. All sampling using this methodology occurs only between 30 minutes prior to local sunrise and 10:00 a.m. daylight savings time or 9:00 a.m. standard time. Sixteen sites have been established on the Park. Each site has been GPSed to make them permanent for monitoring in the future. Each plot is sampled for five minutes listing all species seen or heard at distances of <25 meters, 25-50 meters and >50 meters. Table 1 shows the site designation, GPS coordinates and habitat type. A separate database has been developed to illustrate species found at each site. A copy of this database is included in Appendix B of this report.

Mistnetting

Mistnetting with monofilament nylon nets occurred throughout the Park. Sites have been set up within each major habitat on the Park with at least two sites per habitat per unit. Nets were constantly monitored and birds caught in the nets are marked with US Fish and Wildlife issued aluminum numbered bands and released. A database is being developed showing the band number, species caught, location, habitat, wing chord length, weight in grams, and date of capture. Only licensed bird banders or subpermittees were involved in this aspect of the study. Banding is being done under Federal Permit # 20773 and state permit as required by Texas. While these sites were established, wind at the Park site had a detrimental effect on mistnet use with little to show for this methodology except a very few voucher specimens.

Audio and Visual Observation

Audio and visual observation occurred at all times while on the Park lands. In addition, transects were established through the various habitats with notes taken on birds seen during the transect. These transects are run as a line transect through the widest section of each habitat block. Each transect was run a minimum of four times during the surveys as dictated under the SEPTCT Methodology. All birds heard or seen on Park lands are listed by species and number seen or heard on a separate database in Appendix B.

Sampling plots, transects and mistnetting locations were arranged to sample all accessible terrestrial and aquatic habitats within the Park units with at least two replications of each in each habitat type.

2. Fish

We had proposed the use of four primary inventory methods to attain goal 1. These are hand netting and dipnetting, minnow traps, seining and the use of nylon fish traps. Trap arrays, hand/dipnetting transects and seining locations were to be arranged to sample all aquatic habitats within the Park with at least two replications in each habitat type.

Two problems arose as to the implementation of this aspect of this inventory process: 1) the prolonged drought had completely dried up all wetland habitat on the Park except the larger pond in the north central part of the site, 2) This pond was inaccessible to Accipiter biologists until midsummer and by the time we had permission to survey the pond we had learned that the water levels had been allowed to run down to the point that fish could no longer survive in the pond. The pond levels had been raised again by the time we gained access to the site, however, the four methodologies mentioned above netted not a single fish.

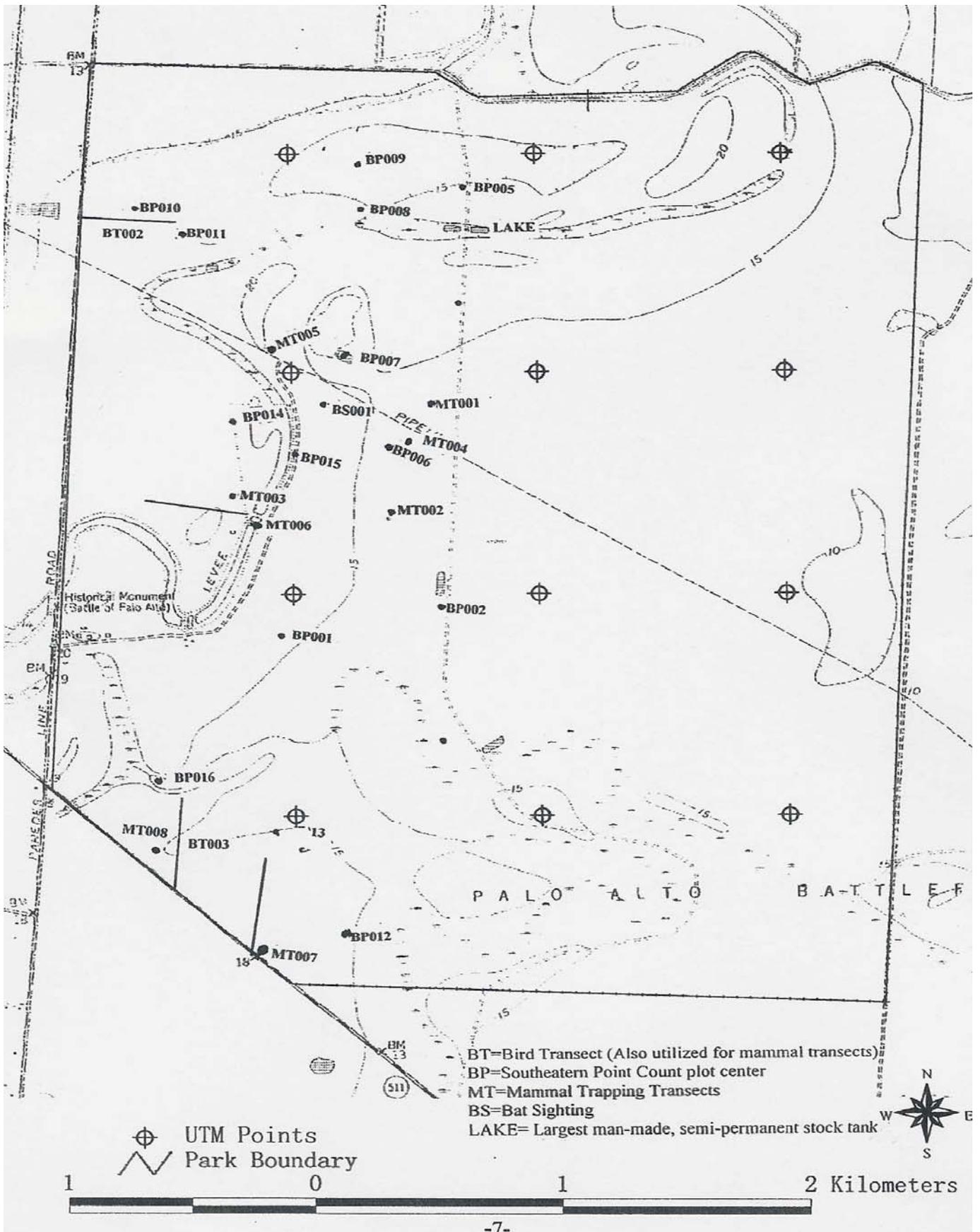
3. Mammals

Five field methodologies were utilized to survey mammals within the Park. These are the utilization of Sherman live traps for small mammals, use of larger Havahart type traps for medium sized herbivores and small carnivores, establishment of trip cameras for carnivores, use of ultrasonic bat detectors and mistnetting for bat survey and visual observation for large mammalian species.

Small mammal transects consist of Sherman live traps set up in a line for at least 50 meters at 10 meters apart. Traps are baited with a combination of peanut butter, wild birdseed and raisins. Traps are checked twice daily, once in the morning and once in the late afternoon. Eight such transects have been established and were run four times each. The results are contained in a database included in Appendix B of this report. Pitfall traps consisting of 5-gallon buckets embedded into the ground are not being utilized due to potential conflict with ground disturbance and the historical nature of the Park. Trapping for medium sized herbivores and small carnivores was accomplished by setting larger Havahart type traps randomly through the various habitat blocks available. Efforts were made to set the traps along natural wildlife transportation routes when available and discernable. Bait includes raw carrots, split apples, canned cat food or fish offal. At least two of each type of trap has been set in each habitat and traps are checked twice a day, once in the morning and once in the late afternoon.

Scent stations would have been established at various points in the Park, however, this also conflicted with the historical nature of the Park by producing a ground disturbing activity. This being the case, all habitats are being sampled by a station consisting of a trip camera baited with animal musk, Obsession™ perfume or a bait food consisting of fish offal, sardines or a fermented egg. The camera then takes a photograph of the animals that visit the site.

Ultrasonic bat detectors were utilized from sunset to 11:00 PM to sample habitats in each Park habitat. When areas of bat species use were located, mistnetting occurs to inventory species present and to attempt to ascertain species abundance at that point. Almost no bat activity occurred on the Park during the time of the inventory effort. Little water occurred in the area during the time of the inventory so bats possibly normally occurring in the area may have abandoned it for a more hospitable area. Only one bat species was located during the inventory process.



Visual observation occurred at all times while on the Park lands. In addition to visual sightings, signs of mammalian species presence such as tracks, scats or other certain sign that can be identified to species leaving it have been noted.

Trap arrays and trip camera station locations were arranged to sample all terrestrial habitats within the Park units with at least two replications in each habitat type.

SAMPLING SITE DESCRIPTIONS

The following table (Table 1) details the various sampling points utilized for this inventory. Also detailed is the habitat involved and GPS coordinates for each site.

Table 1: Sampling Sites at Palo Alto Battlefield National Historic Site

Park	State	Point	Habitat	Latitude	Longitude	UTM Zone	UTM E-W	UTM N-S
PAAL	TX	BT001	Brush	26.02525	097.47320	14	652777	2879374
PAAL	TX	BT002	Prairie	26.03575	097.47929	14	652154	2880529
PAAL	TX	BT003	Prairie	26.0136	097.47592	14	652519	2878080
PAAL	TX	BT004	Brush	26.00834	097.47366	14	652753	2877500
PAAL	TX	BP001	Brush	26.0192	097.47586	14	652519	2878700
PAAL	TX	BP002	Wetland	26.02167	097.46487	14	653615	2878987
PAAL	TX	BP003	Prairie	26.01623	97.46527	14	653582	2878384
PAAL	TX	BP004	Brush	26.00834	097.47366	14	653689	2880154
PAAL	TX	BP005	Prairie	26.03876	097.46359	14	653721	2880881
PAAL	TX	BP006	Brush	26.02798	097.46589	14	653505	2879685
PAAL	TX	BP007	Wetland	26.03136	097.46865	14	653224	2880056
PAAL	TX	BP008	Prairie	26.03273	097.46883	14	653205	2880207
PAAL	TX	BP009	Brush	26.03509	097.46881	14	653204	2880468
PAAL	TX	BP010	Prairie	26.03715	097.47638	14	652444	2880688
PAAL	TX	BP011	Brush	26.03588	097.47653	14	652430	2880547
PAAL	TX	BP012	Prairie	26.00659	097.47091	14	653030	2877309
PAAL	TX	BP013	Brush	26.01066	097.47036	14	653080	2877761
PAAL	TX	BP014	Brush	26.03128	097.47319	14	652770	2880041
PAAL	TX	BP015	Prairie	26.02637	097.47142	14	652953	2879500
PAAL	TX	BP016	Wetland	26.01439	097.47624	14	652486	2878166
PAAL	TX	MT001	Prairie	26.02929	097.46545	14	653547	2879830
PAAL	TX	MT002	Prairie	26.02729	097.46495	14	653599	2879609
PAAL	TX	MT003	Brush	26.02526	097.47320	14	652776	2879374
PAAL	TX	MT004	Brush	26.02778	097.46464	14	653630	2879663
PAAL	TX	MT005	Prairie	26.03115	097.47220	14	652869	2880029
PAAL	TX	MT006	Brush	26.02479	097.47260	14	652837	2879323
PAAL	TX	MT007	Brush	26.00845	097.47372	14	652747	2876512
PAAL	TX	MT008	Prairie	26.01038	097.47639	14	652477	2877723

Park	State	Point	Habitat	Latitude	Longitude	UTM Zone	UTM E-W	UTM N-S
PAAL	TX	BS001	Prairie	26.03078	097.46989	14	653101	2879990
PAAL	TX	LAKE	Wetland	26.03663	097.46370	14	653712	2880645

BT=Bird Transect (Also utilized for mammal transects)

BP=Southeastern Point Count plot center

MT=Mammal Trapping Transects

BS=Bat Sighting

LAKE= Largest man-made, semi-permanent stock tank in north central area of park

RESULTS

This inventory netted a total of 68 bird species, 14 mammal species and no fish species on the Palo Alto Battlefield National Historic Site. In reviewing the previous studies by Richards and Richardson (1993) and Farmer (1992) an additional 42 bird species, 4 mammal species and 10 fish species were added to the annotated list by virtue of having been observed on the Park. Table 2 lists the avian species found on the site and during which studies each was located. A similar list is included for mammals (Table 3). Richards and Richardson (1993) identified all fish species listed in Appendix A.

Table 2: Bird Species Encountered During Scientific Studies

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Pied-billed Grebe		X	
Least Grebe		X	
Double-crested Cormorant		X	
Yellow-crowned Night-Heron	BP 004	X	
Tricolored Heron		X	
Little Blue Heron		X	
Reddish Egret			X
Cattle Egret	OO near BP 005	X	
Snowy Egret		X	
Great Egret	BP 003, 004	X	
Great Blue Heron	BP 011	X	
Wood Stork			X
White-faced Ibis		X	X
White Ibis		X	
Black-bellied Whistling-Duck	OO near BP 014, 015	X	
Mottled Duck		X	
American Widgeon		X	
Blue-winged Teal	BT 001	X	
Hooded Merganser		X	
Turkey Vulture	OO near BP 003	X	

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Harris's Hawk	BP 013, BT 004	X	
Red-tailed Hawk	BT 001	X	
Swainson's Hawk		X	
Ferruginous Hawk			X
White-tailed Hawk		X	X
Aplomado Falcon	OO near BP 015		
Crested Caracara		X	
American Kestrel	OO near BT 001	X	
Merlin		X	
Plain Chachalaca	BP 005	X	
Northern Bobwhite	BP 002, 006, 007, 008, 009, 011, 012, 013, 014, 015, 016, BT 001, 003, 004	X	
King Rail		X	
Clapper Rail		X	
Wilson's Plover		X	
Killdeer	BP 003, 004, 005, BT 002	X	
Black-necked Stilt	OO near LAKE	X	
Willet	BP 002	X	
Greater Yellowlegs	OO near LAKE	X	
Lesser Yellowlegs		X	
Long-billed Curlew	BP 002, 003, 009, 015, BT 001	X	X
Baird's Sandpiper	OO near LAKE		
Laughing Gull	BP 002, 003, 004, 005, 009, 010, 011, 012, 013, 016, BT 001, 002, 003, 004	X	
Ring-billed Gull	BP 008, BT 003		
Herring Gull	OO near BP 004		
Least Tern		X	
Mourning Dove	BP 001, 002, 003, 004, 005, 006, 008, 009, 010, 011, 013, 014, 015, 016, BT 001, 003, 004	X	
White-winged Dove		X	
Common Ground-Dove	BP 004, 005, 008, 010, 014, BT 001, 002, 003	X	
White-tipped Dove		X	
Yellow-billed Cuckoo		X	
Greater Roadrunner		X	
Grooved-billed Ani	BT 004	X	
Barn Owl		X	
Common Nighthawk	BP 001, 002, 003, 005, 010, 014, BT 001, 002,	X	
Common Pauraque		X	
Whip-poor-will	BP 010		

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Ringed Kingfisher	OO near LAKE		
Golden-fronted Woodpecker	BP 003, 004, 005, 010, 011, 013, 014, 016, BT001, 003, 004	X	
Northern Flicker	BP 003, 004, 005, 007, 008, 011, 014, 015		
Ladder-backed Woodpecker	BP 005, 016	X	
Eastern Wood-pewee	BP 006		
Eastern Phoebe	OO near BP 014		
Brown-crested Flycatcher	BP 004, 009, 011, 016 BT 004	X	
Couch's Kingbird	BP 007	X	
Eastern Kingbird	OO near BP 015	X	
Scissor-tailed Flycatcher	BP 002, 005, 007, 008, 012, 013, 014, 015, 016 BT 002, 004	X	
Great Kiskadee	BP 004, BT 004	X	
Loggerhead Shrike	BP 009, 015	X	X
White-eyed Vireo	BP 010, 011, 014	X	
Chihuahuan Raven		X	
Horned Lark		X	
Purple Martin		X	
Cliff Swallow		X	
Barn Swallow	BP 002, 004, 007, 012, 013, 015, BT 001, 002, 004		
Tufted Titmouse		X	
Bewick's Wren	BP 001, 011, 013, 016	X	
Cactus Wren		X	
Northern Mockingbird	BP 001, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016 BT 001, 002, 003, 004	X	
Long-billed Thrasher		X	
Curve-billed Thrasher	BT 004	X	
Tennessee Warbler	BT 015		
Yellow-rumped Warbler	BP 004, 005, 007, 011, 014		
Blackburnian Warbler		X	
Common (Brownsville) Yellowthroat	BP 007		
Yellow-breasted Chat	OO near BP 014, MT 005		
Olive Sparrow		X	X
Botteri's Sparrow	BP 001, 002, 004, 006, 007, 008, 009, 012, 013, 015, BT 001, 004	X	X
Cassin's Sparrow	OO near BP 001		

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Lark Sparrow	BP 002, 007, 010, 012, 014, BT001, 004	X	
Grasshopper Sparrow	BP 008		
Savannah Sparrow	BP 008, 009, 010, 013, 015, BT 002, 004	X	
Song Sparrow	OO near BP 014		
Vesper Sparrow	BP 008		
Northern Cardinal	BP 004	X	
Pyrrhuloxia		X	
Blue Grosbeak	BP 006, 010		
Indigo Bunting	BP 002, 010, BT 004		
Varied Bunting	OO near BP 006		
Eastern Meadowlark	BP 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, BT 001, 002, 003, 004	X	
Red-winged Blackbird	BP 002, 005, 007, 008, 014	X	
Great-tailed Grackle	BP 004, 005, 006, 010, 011, 012, 015, 016 BT 004	X	
Brown-headed Cowbird	BP 009, 010, 014, 016BT 001, 003, 004		
Bronzed Cowbird	BP 001, 008, 013, 014, 016	X	
Bullock's Oriole		X	
House Finch	BP 001, 003, 010, 011, 012, BT 002		
House Sparrow	OO near parking lot, BT 004		

OO=Opportunistic Observation

BT=Bird Transect (Also utilized for mammal transects)

BP=Southeastern Point Count plot center

MT=Mammal Trapping Transects

LAKE= Largest man-made, semi-permanent stock tank in north central area of park

Table 3: Mammal Species Encountered During Scientific Studies

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Brazilian Free-Tailed Bat	BS 001		
Nine-Banded Armadillo		X	
Eastern Cottontail	BP 001	X	
Black-Tailed Jackrabbit	throughout	X	
Hispid Cotton Rat	MT 001, 002, 003, 004, 005		
Southern Plains Woodrat	MT 004, 007	X	
Nowray Rat	MT 004, 007		
Black Rat	MT 004, 007		

SPECIES	ACCIPITER BIOLOGICAL 2002	RICHARDS et al 1993	FARMER 1992
Coyote	throughout	X	
Common Raccoon	throughout	X	
Striped Skunk	throughout		
Ocelot			X
Bobcat	BP 001	X	
Feral Pig	throughout	X	
Collard Peccary		X	
Nilgai	throughout	X	

BS=Bat Sighting

BP=Southeastern Point Count plot center

MT=Mammal Trapping Transects

THREATENED AND ENDANGERED SPECIES SUMMARY

One species, listed under the Endangered Species Act as Federally Endangered, was located on the Park grounds. This was an Aplomado Falcon. It was reported to Park personnel soon after the sighting. The following is the report turned in to Park resource managers regarding the Aplomado Falcon:

APLOMADO FALCON OBSERVED AT THE PALO ALTO BATTLEFIELD NATIONAL HISTORIC SITE

On April 30, 2002 Thomas M. and Nancy J. Hays, biologists for Accipiter Biological Consultants in Portal, Arizona observed an adult Aplomado Falcon on the Palo Alto Battlefield National Historic Site. The bird displayed all fieldmarks prominently and displayed a wide range of behaviors common to the species.

The bird was originally observed on the ground on a prairie dominated by *Borrchia* with some *Spartina* and interspersed with Honey Mesquite. Upon our approach, at about 10 meters from the bird, it flew and was immediately mobbed by a male and female Great-tailed Grackle. The white throat and breast were immediately recognizable, as was the distinctive face pattern. The black patches on the sides of this individual met in the middle of the lower breast (an uncommon occurrence in this species). Once in flight, the barred tail was noted by both observers as was the prominent white eyestripes which joined at the back of the head. Size was easily noted by comparison to the grackles. In an attempt to free itself of the grackles, the bird utilized flight at high speeds as well as a helicopter-like hovering motion. The bird was carefully observed for approximately seven minutes at distances of 10-50 meters before it disappeared to the east of the Park.

Latitude/Longitude coordinates:

N 26° 01.582'

W 097° 28.285'

Respectfully submitted on 5/08/2002 by Thomas and Nancy Hays

The Ocelot, Federally listed as endangered, is also included in the annotated list of species occurring in the Park on the basis of Farmer's statement that, "This species is known to occur along brushy edged drainage ditches just north of the battlefield site and may occur on the site itself" (Farmer, 1992).

Both the Aplomado Falcon and Ocelot are listed as endangered in Texas by the Texas Parks and Wildlife and are monitored by that agency within the state.

Additionally, seven avian species on the final annotated list are listed by the Federal Government as Species of Concern under the Endangered Species Act. While these species do not have specific protections under the act, the US Fish and Wildlife Service, as well as Texas Parks and Wildlife are monitoring them. These species include Brownsville Common Yellowthroat, Ferruginous Hawk, Loggerhead Shrike, Reddish Egret, Texas Botteri's Sparrow, Texas Olive Sparrow and the White-faced Ibis. Of these species, the Brownsville Common Yellowthroat, Texas Botteri's Sparrow and the Loggerhead Shrike occurred on this inventory.

The Common (Brownsville) Yellowthroat was noted on 12/20/2002 foraging in Honey Mesquite trees along the bank of a wetland in the northwestern section of the study area. The pale coloration and comparatively large beak size of the specimen was noted. While this species is thought to leave the area during the winter (Bent, 1963), favorable weather and the coming of late rain may have helped to keep this individual in the vicinity. This species should be looked for during April through July in the vicinity of wetlands on the Park (Farmer, 1992).

The Texas Botteri's Sparrow occurs in grassland habitats with scattered trees, usually mesquite, and the battlefield site is prime nesting habitat for this species (Farmer, 1992). This species was located on the Park site during the previous two surveys as well as being located on all grassland transects and point counts during the current inventory.

The Loggerhead Shrike prefers open to semi-open habitats and was found in small numbers during the previous two surveys, as well as the current survey. It seems to have been found most often during the winter, but can occur on the Park at any time of year.

The Ferruginous Hawk was not located during the current inventory, but, is included on the basis of sightings during the fall and winter of several years on salt prairie just to the east of the battlefield site (Farmer, 1992).

The Reddish Egret was not located during the current inventory, but, is included on the basis of Farmer's statement that "National Audubon Society has documented over 50, largely young of the year, feeding on old meander wetlands just east of the site." (Farmer, 1992).

The Texas Olive Sparrow was not located during the current inventory, but is included on the basis of the statement that "This species was recorded on the site during July, 1992. It should be a common breeder in brush on the site" (Farmer, 1992). This species was also listed by Richard and Richardson (1993) as a permanent resident on the site. Reasons for not locating this species during the current inventory process are unknown, but prolonged drought in the area and lack of water on the Park during the inventory must certainly effect the species.

The White-faced Ibis was not located during the current inventory, but is included on the basis of Farmer's (1992) statement that "The National Audubon Society has observed large numbers (> 100) feeding in old meander beds on the west edge of the battlefield site (as well as similar areas just off site) for long periods after heavy rains." This species is also listed by Richard and

Richardson (1993) as a permanent resident of the site. Since freshwater wetlands are somewhat rare in the Park, this species' presence depends on access to shallow water feeding areas after rainfall. These did not exist during the timeframe of the current inventory due to prolonged drought.

Texas Parks and Wildlife monitor two additional species on the annotated list. These species are the White-tailed Hawk and the Wood Stork. Neither species were found during the current inventory.

The White-tailed Hawk is included on the basis of two birds found by the National Audubon Society on the site in 1992 and Farmer's statement that "It is probable that this pair nests on-site" (Farmer, 1992). Richard and Richardson (1993) also found this species on the battlefield site, listing them as permanent residents. Lack of water and therefore prey items during the current inventory may account for the lack of presence during the current inventory.

The Wood Stork is included on the basis of Farmer's finding that "National Audubon Society has seen this species on the old meanders of the site and on similar habitat immediately to the east." Richard and Richardson (1993) did not list this species as located during their study. Lack of water during the current inventory may account for this absence. Postbreeding dispersal into the area seems to account for past sightings in the Park.

No Federally listed or state monitored fish species are known to occur on the site.

DISCUSSION

A number of biases occurred during the course of this inventory process, some with potential to adversely affect the total outcome of the inventory for some species.

The weather provided the most dramatic bias to this study. The study area was in the third year of a severe drought. During spring, summer and part of the fall visits, no accessible surface water existed in the Park. This would negatively affect the presence of water birds and wetland dependent species on the Park, as well as affecting the outcome of relative abundance statistics of species which were still located on the site during the process.

Lack of accessibility to the eastern half of the study area during the spring, summer and approximately half of the fall visits to the site provides a distinct bias in the inventory results. The inaccessible area contained the only permanent surface water on the Park and many acres of grassland and brushland habitat. Since comparable habitat blocks of brushland and grassland exist on the accessible areas of the site, sampling was accomplished at those points during the period of inaccessibility to eastern points. It is presumed that there would be little effect on the annotated list of grassland and brushland species due to this inaccessibility, however, this is only speculation on the part of the investigators. The list of water and wetland birds and their relative abundance statistics would certainly have been tainted and relative abundance statistics for grassland and brushland species may have been skewed.

Due to the historic nature of the battlefield area, investigators were asked not to partake of “ground disturbing” activities. These included the following methodologies originally proposed for use in this inventory process: use of pitfall traps for small mammal sampling and use of scent stations to sample medium and large carnivores. The latter was replaced in the study with the use of the same baits and trip cameras. The investigators believe that the bias involved with that switch is minimal. Sampling for shrew, mole and pocket gopher species may be biased by the lack of ability to utilize the pitfall traps, however, since no species from these taxa are known from the site, the bias involved is thought to be minimal.

Wind was a factor in the mistnetting for bird species. The constant breeze on the study site made mistnetting far less valuable to the study than would have been the case otherwise. Only five individuals representing five species were captured utilizing this methodology. None were banded as all were collected as voucher specimens as indicated in the Scope of Work. Since good conditions for visual and audio identification of bird species existed most mornings of the inventory, the investigators believe the bias to species richness to be minimal. Some interpretations of relative abundance for some species may have been clarified if this methodology would have been more successful.

Four species of introduced mammals and one species of introduced bird were found to exist on the battlefield site. These include the Feral Pig, Nilgai, Norway and Black Rat and House Sparrow. All are presumed to have a negative impact on native species due to competition for food and shelter and on the natural environment. Feral Pigs root up large areas of vegetation, especially in wetland areas. Nilgai compete with native browsers for food and water. Norway and Black Rats compete with native rodents for food, water and shelter and contribute to the spread of diseases and their vectors in this country. House Sparrows compete with desirable native birds for nesting cavities, food and water and also contribute to disease spread among avian species in some areas. All should be eliminated from the Park, as they have no natural or historical significance to the Park (See Conservation Recommendations).

SPECIES SUSPECTED, BUT NOT VERIFIED BY THIS INVENTORY

In addition to the taxa listed in Appendix A, eighteen additional avian species were found to include portions of Palo Alto National Battlefield Historic Site in their range of distribution. Suitable habitat is available for all of these species on Park lands, however, none of these species have been verified on the Park to date as far as the researchers for this project know. These species are listed below:

American Avocet	Dickcissel
American Coot	Eastern Bluebird
American Goldfinch	Hooded Oriole
American Green-winged Teal	Inca Dove
American Robin	Lesser Goldfinch
Blue-Gray Gnatcatcher	Mallard
Brewer’s Blackbird	Vermilion Flycatcher
Carolina Wren	Tamaulipas Crow
Cooper’s Hawk	Chipping Sparrow

Reasons for not finding these species during the inventory would vary. Some would occur only as migrants or winter visitors. Others may have chosen greener pastures as a result of the drought affecting the study area. In a year of “normal” rainfall, these species may be found on the site.

Suitable forage space for a number of bat species known to include the Park in their area of distribution also exists. Although none showed up in this inventory, the Mexican Long-tongued Bat, Cave Myotis, Eastern Red Bat, Hoary bat, Southern and Northern Yellow Bats, Seminole Bat, Evening Bat and Big Free-tailed Bat all include the Park in their distribution. Lack of open water needed by these species probably accounts for their lack of presence on this inventory.

CONSERVATION RECOMMENDATIONS

As is the case with so many kinds of wildlife, desert animals, especially neotropical migrant birds and fish, are under great pressure and they are rapidly disappearing from many areas where they were formerly abundant. This is due in the largest part to habitat destruction. Current regulations of the National Park Service protect and manage all native wildlife within the National Park System lands. With this progressive attitude in mind, land managers at the Palo Alto National Battlefield Historic Site should enforce laws relating to killing or harassing of these animals to the highest degree possible.

Planting native grasses around wetlands to control erosion and reduce nutrient inputs into the water could enhance all wetland areas. This is particularly a problem along the resacas in the western and northern sections of the Park. While this type of wetland degradation is natural it was expedited on the Park by agricultural practices. The resacas played a part in the Battle of Palo Alto and are thus important in the interpretation of the battle. Preservation would benefit wetland dependant species of wildlife in the Park also.

Chemical pesticides and non-biodegradable herbicides should be avoided, especially within 300 feet of any wetland. They should be used only in conjunction with an established Integrated Pest Management Plan.

While the wetlands in the Park appear to be in fair shape when they have water in them, they do not exist alone, but have hydrologic and biologic ties with the surrounding landscape. Vegetative corridors should be provided or maintained where they exist between wetlands and surrounding upland areas. Land managers should encourage natural vegetative diversity in all habitats located on the Park. Maintaining natural vegetative diversity throughout the Park should be a primary conservation objective of the land managers.

Brushlands previously cleared for agricultural reasons, especially the northwest corner of the Park should be rejuvenated. Several agencies, including the National Audubon Society, US Fish and Wildlife Service and Texas Parks and Wildlife have had success in rejuvenating brushlands in south Texas. This habitat provides shelter to more species than does any other on the Park and rejuvenation would return these areas to their old historical and biological status.

Fragmentation of wildlife habitat areas should be avoided whenever possible. If such areas must be cleared or developed, such as for the new visitor's center, development should be concentrated in one area, preferably adjacent to areas already developed and not spread throughout natural communities. This will minimize edge effects caused by fragmentation. Activities that will interrupt ecosystem processes should be avoided, or an alternative location for the activity should be sought. For example, avoid fragmentation activities that will interrupt the water flow patterns in wetland communities or create barriers between connected habitats used by avian species. Roads and firebreaks that disrupt natural hydrologic and burn patterns in higher quality ecotones that serve as wildlife habitat should be reduced to the minimum level necessary to accomplish the National Park Service mission, with remaining ecotones being allowed to recover. Roads that transect ecotones should be stabilized to prevent unnecessary erosion impacts and fire ditches and breaks should be restored to the original grade to restore natural hydrologic patterns.

No ecological benefits are gained by utilizing intensive site preparation activities that cause severe soil disturbance at sites. Therefore, mechanical site preparation activities in susceptible areas should be minimal and restricted to nonmechanical approaches, if possible. Intensive site preparation activities are known to lead to invasion by invasive exotic weedy species, and to exacerbate erosion problems. Instead, regular, frequent prescribed burning should be used to control hardwoods and regenerate native prairie whenever feasible. In areas that have been fire suppressed, additional methods, such as thinning may be needed.

Introduced Feral Pigs and Nilgai should be removed from the Park as they have no natural or historical basis for being in the area. Since public hunting is not currently allowed in this unit of the National Park Service system, this should be accomplished by Park staff or by trained hunters hired through the Texas Parks and Wildlife Department. Useable meat could be donated to nearby food pantries or goodwill organizations.

Introduced Norway and Black Rats and House Sparrows should be removed from the Park. Currently these species tend to exist near old structures and debris piles within the Park. Removal of all old structures and debris piles which are not important to the historical qualities of the battlefield or in use by the National Park Service for storage or other purposes would mitigate these introduced pests. Live trapping and destroying captured rats and House Sparrows would also help to eliminate these animals. Poisons and snap trapping should not be utilized as these methodologies may negatively affect native rodent and bird populations.

Visitors and employees at the Palo Alto Battlefield National Historic Site should be encouraged to leave habitats intact. This encouragement could potentially come in the form of bulletins or notices on Park maps, literature and bulletin boards currently located at the Park Headquarters and the developed area of the Park. Brief statements prior to or following the Park film shown in the Visitors Center in Brownsville could also be utilized. These same sources could also be used to educate visitors and employees on the value of these animals, and to prohibit the harassment of birds and other native wildlife within the Park.

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Figure 1: Typical Scrubland Habitat on the Palo Alto battlefield National Historical Site



Figure 2: Typical Grassland Habitat on the Palo Alto battlefield National Historical Site



Figure 3: Investigator Checking Small Mammal Traps



Figure 4: Western Diamondback Rattlesnake Standing Guard Over Small Mammal Trap



Appendix A Key

Native

N=Native

I=Introduced

Seasonal Status

A=Abundant

C=Common

U=Uncommon

R=Rare

?=Unknown

Habitat Preference

• = Present within habitat

ANNOTATED BIRD CHECKLIST	NATIVE	SPRING	SUMMER	FALL	WINTER	BRUSH	PRAIRIE	WETLAND
Podicipedidae -- Grebes								
Pied-billed Grebe -- <i>Podilymbus podiceps</i>	N	U	U	U	U			•
Least Grebe -- <i>Tachybaptus dominicus</i>	N	R	R	R	R			•
Phalacrocoracidae								
Double-crested Cormorant -- <i>Phalacrocorax auritus</i>	N				C			•
Ardeidae -- Herons and Bitterns								
Yellow-crowned Night-Heron -- <i>Nyctanassa violacea</i>	N	U	U	U	U			•
Tricolored Heron -- <i>Egretta tricolor</i>	N	U	U	U	U			•
Little Blue Heron -- <i>Egretta caerulea</i>	N	U	U	U	U			•
Reddish Egret -- <i>Egretta rufescens</i>	N	U	U	U	U			•
Cattle Egret -- <i>Bulbulcus ibis</i>	N	U	U	U	U		•	•
Snowy Egret -- <i>Egretta thula</i>	N	U	U	U	U			•
Great Egret -- <i>Ardea alba</i>	N	U	U	U	U			•
Great Blue Heron -- <i>Ardea herodias</i>	N	U	U	U	U			•
Ciconiidae -- Storks								
Wood Stork -- <i>Mycteria americana</i>	N	R	R	R	R			•
Threskiornithidae -- Ibises and Spoonbills								
White-faced Ibis -- <i>Plegadis chihi</i>	N	U	U	U	C			•
White Ibis -- <i>Eudocimus albus</i>	N	U	U	U	U			•
Anatidae -- Ducks, Geese and Swans								
Black-bellied Whistling-Duck -- <i>Dendrocygna autumnalis</i>	N	U	U	U	U		•	•
Mottled Duck -- <i>Anas fulvigula</i>	N	U	U	U	U			•
American Wigeon -- <i>Anas americana</i>	N				U			•
Blue-winged Teal -- <i>Anas discors</i>	N				C			•
Hooded Merganser -- <i>Lophodytes cucullatus</i>	N				R			•
Cathartida -- New World Vultures								
Turkey Vulture -- <i>Cathartes aura</i>	N	C	C	C	C		•	
Accipitridae -- Hawks, Kites and Eagles								
White-tailed Kite -- <i>Elanus leucurus</i>	N	C	C	C	C	•	•	•
Northern Harrier -- <i>Circus cyaneus</i>	N				C		•	•
Harris's Hawk -- <i>Parabuteo unicinctus</i>	N	C	C	C	C	•	•	•
Red-tailed Hawk -- <i>Buteo jamaicensis</i>	N	C	C	C	C	•	•	•
Swainson's Hawk -- <i>Buteo swainsoni</i>	N	C	U	C		•	•	•
Ferruginous Hawk -- <i>Buteo regalis</i>	N				R		•	
White-tailed Hawk -- <i>Buteo albicaudatus</i>	N	U	U	U	U	•	•	
Falconidae -- Caracaras and Falcons								
Aplomado Falcon -- <i>Falco femoralis</i>	N	R				•	•	
Crested Caracara -- <i>Caracara planus</i>	N	U	U	U	U	•	•	•
American Kestrel -- <i>Falco sparverius</i>	N				C	•	•	•
Merlin -- <i>Falco columbarius</i>	N				U	•	•	
Cracidae -- Chachalaca								
Plain Chachalaca -- <i>Ortalis vetula</i>	N	U	U	U	U	•		
Odontophoridae -- New World Quail								
Northern Bobwhite -- <i>Colinus virginianus</i>	N	A	A	A	A	•	•	•
Rallidae -- Rails, Gallinules and Coots								
King Rail -- <i>Rallus elegans</i>	N	R	R	R	R			•
Clapper Rail -- <i>Rallus longirostris</i>	N	R	R	R	R			•
Charadriidae -- Lapwings and Plovers								
Wilson's Plover -- <i>Charadrius wilsonia</i>	N				R			•
Killdeer -- <i>Charadrius vociferus</i>	N	C	C	C	C		•	•

ANNOTATED BIRD CHECKLIST	NATIVE	SPRING	SUMMER	FALL	WINTER	BRUSH	PRAIRIE	WETLAND
Recurvirostridae -- Stilts and Avocets								
Black-necked Stilt -- <i>Himantopus mexicanus</i>	N	U	U	U	U			•
Scolopacidae -- Sandpipers and Phalaropes								
Willet -- <i>Catoptrophorus semipalmatus</i>	N	U	U	U	U			•
Greater Yellowlegs -- <i>Tringa melanoleuca</i>	N	U		U	U			•
Lesser Yellowlegs -- <i>Tringa flavipes</i>	N			U	U			•
Long-billed Curlew -- <i>Numenius americanus</i>	N	C	C	C	C		•	•
Baird's Sandpiper -- <i>Calidris bairdii</i>	N	U		U				•
Laridae -- Skuas, Gulls, Terns and Skimmers								
Laughing Gull -- <i>Larus atricilla</i>	N	A	A	U	U		•	•
Ring-billed Gull -- <i>Larus delawarensis</i>	N	U		U	U		•	•
Herring Gull -- <i>Larus argentatus</i>	N	U		U	C		•	•
Least Tern -- <i>Sterna antillarum</i>	N		R					•
Columbidae -- Pigeons and Doves								
Mourning Dove -- <i>Zenaida macroura</i>	N	A	A	A	A	•	•	•
White-winged Dove -- <i>Zenaida asiatica</i>	N		C			•		•
Common Ground-Dove -- <i>Columbina passerina</i>	N	C	C	C	C	•	•	•
White-tipped Dove -- <i>Leptotila verreauxi</i>	N	R	U	R	R	•		
Cuculidae -- Cuckoos, Roadrunners and Anis								
Greater Roadrunner -- <i>Geococcyx californianus</i>	N	U	U	U	U	•	•	
Grooved-billed Ani -- <i>Cotophaga sulcirostris</i>	N	C	C	C	C	•		
Tytonidae -- Barn Owls								
Barn Owl -- <i>Tyto alba</i>	N	R	R	R	R	•	•	
Strigidae -- Typical Owls								
Eastern Screech-Owl -- <i>Otus asio</i>	N	U	U	U	U	•	•	
Caprimulgidae -- Nighthawks and Nightjars								
Lesser Nighthawk -- <i>Chordeiles acutipennis</i>	N		C				•	
Common Nighthawk -- <i>Chordeiles minor</i>	N	C	C	C			•	
Common Pauraque -- <i>Nyctidromus albicollis</i>	N	U	U	U	U	•	•	
Whip-poor-will -- <i>Caprimulgus vociferus</i>	N	U		U	U	•	•	
Alcedinidae -- Kingfishers								
Ringed Kingfisher -- <i>Ceryle torquata</i>	N	U	U	U	U			•
Picidae -- Woodpeckers								
Golden-fronted Woodpecker -- <i>Melanerpes aurifrons</i>	N	C	C	C	C	•		
Northern Flicker -- <i>Colaptes auratus</i>	N			C	C	•	•	
Ladder-backed Woodpecker -- <i>Picoides scalaris</i>	N	C	C	C	C	•	•	
Tyrannidea -- Tyrant Flycatchers								
Eastern Wood-pewee -- <i>Contopus virens</i>	N	C	C	C		•		•
Eastern Phoebe -- <i>Sayornis phoebe</i>	N				U			•
Brown-crested Flycatcher -- <i>Myiarchus tyrannulus</i>	N	C	C	C		•	•	•
Couch's Kingbird -- <i>Tyrannus couchii</i>	N	U	C	U	R	•	•	•
Eastern Kingbird -- <i>Tyrannus tyrannus</i>	N	U	U	U			•	
Scissor-tailed Flycatcher -- <i>Tyrannus forficatus</i>	N	A	A	A		•	•	•
Great Kiskadee -- <i>Pitangus sulphuratus</i>	N	U	U	U	C	•		
Laniidae -- Shrikes								
Loggerhead Shrike -- <i>Lanius ludovicianus</i>	N	C	C	C	C	•	•	•
Vireonidae -- Vireos								
White-eyed Vireo -- <i>Vireo griseus</i>	N	C	C	C	C	•	•	

ANNOTATED BIRD CHECKLIST (Cont.)	NATIVE	SPRING	SUMMER	FALL	WINTER	BRUSH	PRAIRIE	WETLAND
Corvidae -- Crows and Jays								
Chihuahuan Raven -- <i>Corvus cryptoleucus</i>	N	U	U	U	U	•	•	
Alauda -- Larks								
Horned Lark -- <i>Eremophila alpestris</i>	N	U	U	U	U		•	
Hirundinidae -- Swallows								
Purple Martin -- <i>Progne subis</i>	N	U		U			•	•
Cliff Swallow -- <i>Petrochelidon pyrrhonota</i>	N		U				•	•
Barn Swallow -- <i>Hirundo rustica</i>	N	U	U	U			•	•
Paridae -- Chickadees and Titmice								
Tufted Titmouse -- <i>Baeolophus bicolor</i>	N	U	U	U	U	•		
Troglodytidae -- Wrens								
Bewick's Wren -- <i>Thrymones bewickii</i>	N	C	C	C	U	•		
Cactus Wren -- <i>Campylorhynchus brunneicapillus</i>	N	C	C	C	C	•		
Mimidae -- Mockingbirds and Thrashers								
Northern Mockingbird -- <i>Mimus polyglottos</i>	N	A	A	A	A	•	•	•
Long-billed Thrasher -- <i>Toxostoma longirostre</i>	N	U	U	U	U	•		
Curve-billed Thrasher -- <i>Toxostoma curvirostre</i>	N	C	C	C	C	•		
Parulidae -- Wood-Warblers								
Tennessee Warbler -- <i>Vermivora peregrina</i>	N	R		R		•		
Yellow-rumped Warbler -- <i>Dendroica coronata</i>	N				C	•		•
Blackburnian Warbler -- <i>Dendroica fusca</i>	N	R		R		•		
Common (Brownsville) Yellowthroat -- <i>Geothlypis trichas insperata</i>	N	R	R	R	R	•		•
Yellow-breasted Chat -- <i>Icteria virens</i>	N	U	U	U		•		•
Emberizidea -- Emberizids								
Olive Sparrow -- <i>Arremonops rufivirgatus</i>	N	C	C	C	C	•	•	
Botteri's Sparrow -- <i>Aimophila botterii</i>	N	C	C	C			•	
Cassin's Sparrow -- <i>Aimophila cassinii</i>	N	U	U	U	U		•	
Lark Sparrow -- <i>Chondestes grammacus</i>	N	C	C	C	C	•	•	•
Grasshopper Sparrow -- <i>Ammodramus savannarum</i>	N	U			U		•	
Savannah Sparrow -- <i>Passerculus sandwichensis</i>	N				C		•	
Song Sparrow -- <i>Melospiza melodia</i>	N	U				•		•
Vesper Sparrow -- <i>Pooecetes gramineus</i>	N				C	•	•	
Cardinalidae -- Cardinals								
Northern Cardinal -- <i>Cardinalis cardinalis</i>	N	U	U	U	U	•		
Pyrrhuloxia -- <i>Cardinalis sinuatus</i>	N	U	U	U	U	•		
Blue Grosbeak -- <i>Guiraca caerulea</i>	N	U	C	U		•		•
Indigo Bunting -- <i>Passerina cyanea</i>	N	U	U			•		
Varied Bunting -- <i>Passerina versicolor</i>	N	R				•	•	
Icteridae -- Blackbirds								
Eastern Meadowlark -- <i>Sturnella magna</i>	N	A	A	A	A	•	•	•
Red-winged Blackbird -- <i>Agelaius phoeniceus</i>	N	C	C	C	C	•	•	•
Great-tailed Grackle -- <i>Quiscalus mexicanus</i>	N	C	C	C	C	•		•
Brown-headed Cowbird -- <i>Molothrus ater</i>	N	C	C	C	C	•	•	•
Bronzed Cowbird -- <i>Molothrus aeneus</i>	N	C	C	C	C	•	•	•
Bullock's Oriole -- <i>Icterus bullockii</i>	N	U		U		•		•
Fringillidae -- Finches								
House Finch -- <i>Carpodacus mexicanus</i>	N	C	C	C	C	•	•	•
Passeridae -- Old World Sparrows								
House Sparrow -- <i>Passer domesticus</i>	I	C	C	C	C	•		

ANNOTATED MAMMALCHECKIST	NATIVE	SPRING	SUMMER	FALL	WINTER	BRUSH	PRAIRIE	WETLAND
Molossidae -- Free-tailed Bats								
Brazilian Free-tailed Bat -- <i>Tadarida brasiliensis</i>	N	U	?	?		•	•	•
Dasypodidae -- Armadillos								
Nine-banded Armadillo -- <i>Dasyopus novemcinctus</i>	N	?	?	?	?	•	•	
Leporidae -- Rabbits and Hares								
Eastern Cottontail -- <i>Sylvilagus floridanus</i>	N	?	U	?	?	•		
Black-tailed Jackrabbit -- <i>Lepus californicus</i>	N	A	A	C	C		•	
Sciuridae -- Squirrels								
Mexican Ground Squirrel -- <i>Spermophilus mexicanus</i>	N	?	?	?	?		•	
Muridae -- Rats and Mice								
White-footed Mouse -- <i>Peromyscus leucopus</i>	N	C	C	C	C	•	•	
Hispid Cotton Rat -- <i>Sigmodon hispidus</i>	N	C	C	C	C	•	•	
Southern Plains Woodrat -- <i>Neotoma micropus</i>	N	C	U	C	U	•		
Norway Rat -- <i>Rattus norvegicus</i>	I	?	?	?	C	•		
Black Rat -- <i>Rattus rattus</i>	I	?	?	U	?	•		
Canidae -- Wolves, Foxes, and Coyote								
Coyote -- <i>Canis latrans</i>	N	C	C	C	C	•	•	
Procyonidae -- Raccoons and Kin								
Common Raccoon -- <i>Procyon lotor</i>	N	C	C	C	C	•	•	•
Mustelidae -- Weasels, Skunks and Kin								
Striped Skunk -- <i>Mephitis mephitis</i>	N	C	C	C	C	•	•	•
Felidae -- Cats								
Ocelot -- <i>Felis pardalis</i>	N	?	?	?	?	•		
Bobcat -- <i>Lynx rufus</i>	N	U	U	U	U	•	•	•
Suidae -- Old World Swine								
Feral Pig -- <i>Sus scrofa</i>	I	C	C	C	C	•	•	•
Diocotylidae -- Peccaries								
Collared Peccary -- <i>Tayassu tajacu</i>	N	?	?	?	?	•	•	
Bovidae -- Goats, Sheep, and Cattle								
Nilgai -- <i>Boselophus tragocamelus</i>	I	C	C	C	C	•	•	•

ANNOTATED FISH CHECKLIST		NATIVE
Characidae -- Characins		
Mexican Tetra -- <i>Astyanax mexicanus</i>		N
Fundulidae -- Topminnows and Killifishes		
Gulf Killifish -- <i>Fundulus grandis</i>		I
Cyprinodontidae -- Pupfishes		
Sheepshead Minnow -- <i>Cyprinodon variegatus</i>		N
Poeciliidae -- Livebearers		
Sailfin Molly -- <i>Poecilia latipinna</i>		N
Mosquitofish -- <i>Gambusia affinis</i>		N
Centrarchidae -- Sunfishes and Basses		
Bluegill -- <i>Lepomis macrochirus</i>		N
Cichlidae -- Cichlids		
Rio Grande Cichlid -- <i>Cichlasoma cyanoguttatum</i>		N
Eliotridae -- Sleepers		
Fat Sleeper -- <i>Dormitator maculatus</i>		N
Mugilidae -- Mullet		
Striped Mullet -- <i>Mugil cephalus</i>		N
Atherinidae -- Silversides		
Inland Silverside -- <i>Menidia beryllina</i>		N

ALPHA CODES FOR BIRD SPECIES

AMKE	American Kestrel	HOFI	House Finch
APFA	Aplomado Falcon	HOSP	House Sparrow
BARS	Barn Swallow	INBU	Indigo Bunting
BASA	Baird's Sandpiper	KILL	Killdeer
BBWD	Black-bellied Whistling-Duck	LAGU	Laughing Gull
BCFL	Brown-crested Flycatcher	LASP	Lark Sparrow
BEWR	Bewick's Wren	LBCU	Long-billed Curlew
BHCO	Brown-headed Cowbird	LBWO	Ladder-backed Woodpecker
BLGR	Blue Grosbeak	LOSH	Loggerhead Shrike
BNST	Black-necked Stilt	MODO	Mourning Dove
BOSP	Botteri's Sparrow	NOBO	Northern Bobolink
BROC	Bronzed Cowbird	NOCA	Northern Cardinal
BWTE	Blue-winged Teal	NOFL	Northern Flicker
CAEG	Cattle Egret	NOHA	Northern Harrier
CASP	Cassin's Sparrow	NOMO	Northern Mockingbird
CBTH	Curved-billed Thrasher	PLCH	Plain Chachalaca
COGD	Common Ground Dove	RBGU	Ring-billed Gull
COKI	Couch's Kingbird	RIKI	Ringed Kingfisher
CONI	Common Nighthawk	RTHA	Red-tailed Hawk
COYEB	Common (Brownsville) Yellowthroat	RWBL	Red-winged Blackbird
EAKI	Eastern Kingbird	SAVS	Savannah Sparrow
EAME	Eastern Meadowlark	SOSP	Song Sparrow
EAPH	Eastern Phoebe	STFL	Scissor-tailed Flycatcher
EAWP	Eastern Wood Pewee	TEWA	Tennessee Warbler
GBAN	Grooved-billed Ani	TUVU	Turkey Vulture
GBHE	Great Blue Heron	VABU	Varied Bunting
GFWO	Golden-fronted Woodpecker	VESP	Vesper Sparrow
GKIS	Great Kiskadee	WEVI	White-eyed Vireo
GREG	Great Egret	WILL	Willet
GRSP	Grasshopper Sparrow	WPWI	Whip-Poor-Will
GRYE	Greater Yellowlegs	WTKI	White-tailed Kite
GTGR	Great-tailed Grackle	YBCH	Yellow-breasted Chat
HAHA	Harris' Hawk	YCNH	Yellow-crowned Night Heron
HERG	Herring Gull	YRWA	Yellow-rumped Warbler

PAAL POINT COUNT

Park	State	Habitat	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Brush	001	5	1	2002	9:23	TMH	83	2	1	BROC	1								1	0	1	0
												NOMO	1		1						2	0	2	0
												EAME			3		1				3	0	4	0
PAAL	TX	Wetland	002	5	1	2002	6:43	TMH	79	2	2	STFL	3								3	0	3	0
												LAGU			1				1		1	0	2	0
												BARS			1				1		1	0	2	0
												LASP			1						1	0	1	0
												INBU			1						1	0	1	0
												MODO			1						1	0	1	0
												EAME			1		3				1	0	4	0
												LBCU					2				0	0	2	0
PAAL	TX	Prairie	003	5	1	2002	6:30	TMH	78	2	2	MODO			1						1	0	1	0
												EAME			1		2				1	0	3	0
												LBCU			1						1	0	1	0
PAAL	TX	Brush	004	5	1	2002	7:08	TMH	79	2	2	NOMO	1					1			1	0	1	1
												GTGR			1						1	0	1	0
												NOCA			1						1	0	1	0
												LAGU			1		1		3		1	0	5	0
												EAME						1			0	0	0	1
PAAL	TX	Prairie	005	5	2	2002	6:30	TMH	78	1	1	RWBL	1		1		1				2	0	3	0
												NOMO			1			1			1	0	1	1
												EAME			1		1				1	0	2	0
PAAL	TX	Brush	006	5	1	2002	7:28	TMH	78	2	2	EAME			3	1	1			2	3	1	4	3
												MODO						1			0	0	0	1
PAAL	TX	Wetland	007	5	1	2002	7:41	TMH	79	2	1	RWBL	1								1	0	1	0
												COKI		1							0	1	0	1
												STFL	2								2	0	2	0
												BARS	1						1		1	0	2	0
												NOBO				1					0	1	0	1
												KILL			1						1	0	1	0
												NOMO			1						1	0	1	0
												EAME						1			0	0	0	1
																					0	0	0	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Prairie	008	5	1	2002	80	TMH	80	2	1	GRSP		1										
												RWBL	1								1	0	1	0
												EAME			2						2	0	2	0
												NOMO			1						1	0	1	0
												BOSP			1						1	0	1	0
												BROC				1					0	1	0	1
												RBGU							1		0	0	1	0
PAAL	TX	Brush	009	5	1	2002	81	TMH	81	2	1	MODO	1								1	0	1	0
												EAME			2		1				2	0	3	0
												NOBO			1						1	0	1	0
												BOSP			1						1	0	1	0
												NOMO			1						1	0	1	0
												LAGU					1	1			0	0	1	1
												LBCU									0	0	0	1
PAAL	TX	Prairie	010	5	2	2002	6:56	TMH	84	1	1	MODO	1								1	0	1	0
												EAME			2	2					2	2	2	2
												KILL			1						1	0	1	0
												NOMO					1	1			0	0	1	1
												WPWI					1				0	0	1	0
												INBU					1				0	0	1	0
												BHCO			1						1	0	1	0
												LAGU							2		0	0	2	0
PAAL	TX	Brush	011	5	2	2002	7:09	TMH	80	1	1	GTGR				1					0	1	0	1
												NOMO	1								1	0	1	0
												LAGU					1				0	0	1	0
PAAL	TX	Prairie	012	5	2	2002	7:40	TMH	87	2	1	EAME			1		2	1			1	0	3	1
												BOSP					1				0	0	1	0
												LAGU					1		1		0	0	2	0
PAAL	TX	Brush	013	5	2	2002	&:53	TMH	87	2	1	BARS	1								1	0	1	0
												EAME	1		1						2	0	2	0
												STFL	1								1	0	1	0
												NOBO				1					0	1	0	1
												NOMO						1			0	0	0	1
												LAGU					1				0	0	1	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Brush	014	5	1	2002	8:54	TMH	81	2	1	STFL	1								1	0	1	0
												COGD		1							0	1	0	1
												CONI		1							0	1	0	1
												NOMO	1		1						2	0	2	0
												BHCO			2	1					2	1	2	1
												EAME			1	1					1	1	1	1
												MODO						1		1	0	0	0	2
PAAL	TX	Prairie	015	5	1	2002	9:09	TMH	83	2	1	BARS	1								1	0	1	0
												MODO			1						1	0	1	0
												EAME			2						2	0	2	0
												LBCU					1				0	0	1	0
PAAL	TX	Wetland	016	5	2	2002	9:14	TMH	89	2	2	STFL		2							0	2	0	2
												TEWA	1								1	0	1	0
												BEWR	1								1	0	1	0
												EAME			2						2	0	2	0
												LAGU			1						1	0	1	0
												BROC			1						1	0	1	0
												LBWO			1						1	0	1	0
												NOMO						1			0	0	0	1
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Habitat	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL	
PAAL	TX	Brush	001	5	27	2002	8:50	TMH	87	1	2	EAME	2		1							3	0	3	0
												MODO		1	2							2	1	2	1
												BROC	1									1	0	1	0
												NOMO	1		1							2	0	2	0
PALL	TX	Wetland	002	5	27	2002	6:26	TMH	77	0	1	BOSP	1									1	0	1	0
												EAME	1		2		2					3	0	5	0
												LBCU				2						0	2	0	2
												CONI				1						0	1	0	1
												RWBL			1							1	0	1	0
												MODO						1				0	0	0	1
												NOBO					2					0	0	2	0
												WILL							2			0	0	2	0
PAAL	TX	Prairie	003	5	27	2002	6:15	TMH	75	0	1	CONI	1									1	0	1	0
												LAGU			1							1	0	1	0
												GREG			6							6	0	6	0
												LBCU			1							1	0	1	0
												MODO				2						0	2	0	2
												EAME					5					0	0	5	0
												GFWO						1				0	0	0	1
												LAGU							19			0	0	19	0
PAAL	TX	Brush	004	5	27	2002	7:07	TMH	83	0	0	BCFL		1								0	1	0	1
												NOMO	1				1					1	0	2	0
												MODO			2				1			2	0	3	0
												COGD			2							2	0	2	0
												KILL			1		2					1	0	3	0
												BOSP			1							1	0	1	0
												YCNH							4			0	0	4	0
												GREG								1		0	0	0	1
																						0	0	0	0
																						0	0	0	0
																						0	0	0	0
																						0	0	0	0
																						0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Prairie	005	5	27	2002	6:53	TMH	80	0	1	KILL	2		1						3	0	3	0
												STFL	1								1	0	1	0
												CONI	1		2						3	0	3	0
												NOMO			1		1				1	0	1	1
												LBWO				1					0	1	0	1
												KILL				1					0	1	0	1
												RWBL			1		1				1	0	2	0
												LAGU							1		0	0	1	0
												GTGR							1		0	0	0	1
PAAL	TX	Brush	006	5	27	2002	7:47	TMH	86	0	0	BOSP	1		1						2	0	2	0
												EAME	1		3						4	0	4	0
												MODO	2					1			2	0	2	1
												NOBO			1						1	0	1	0
												BLGR				1					0	1	0	1
												EAWP					2				0	0	2	0
												NOMO					1				0	0	1	0
PAAL	TX	Wetland	007	5	27	2002	7:50	TMH	86	0	0	BOSP	1								1	0	1	0
												NOMO	2			1					2	1	2	1
												NOBO			1						1	0	1	0
PAAL	TX	Prairie	008	5	27	2002	7:59	TMH	86	0	0	STFL	2								2	0	2	0
												EAME	1		1						2	0	2	0
												NOMO			1						1	0	1	0
												NOBO			1	1					1	1	1	1
PAAL	TX	Brush	009	5	27	2002	8:07	TMH	88	0	0	EAME	2		1	1					3	1	3	1
												MODO	1								1	0	1	0
												BHCO	1								1	0	1	0
												BCFL	1								1	0	1	0
												NOBO			1						1	0	1	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Prairie	010	5	28	2002	6:11	TMH	82	0	1	CONI	1		2						3	0	3	0
												LASP			1						0	1	0	1
												INBU			1						1	0	1	0
												BLGR					1				0	0	1	0
												NOMO					2				0	0	2	0
												GTGR					1				0	0	1	0
												EAME					1				0	0	1	0
PAAL	TX	Brush	011	5	28	2002	6:21	TMH	80	0	1	BEWR	1								1	0	1	0
												MODO	2			1					2	1	2	1
												NOMO	1		1						2	0	2	0
												BCFL			1						1	0	1	0
												NOBO					1				0	0	1	0
PAAL	TX	Prairie	012	5	28	2002	6:59	TMH	83	0	1	NOBO				1					0	1	0	1
												LASP			1						1	0	1	0
												GTGR			1						1	0	1	0
												EAME			1		2				1	0	3	0
												NOMO						2			0	0	0	2
												STFL					1				0	0	1	0
												LAGU							1		0	0	1	0
PAAL	TX	Brush	013	5	28	2002	7:11	TMH	83	0	1	EAME	3		2	1					5	1	5	1
												BROC	1								1	0	1	0
												NOBO			1						1	0	1	0
PAAL	TX	Brush	014	5	28	2002	8:10	TMH	84	1	0	NOBO	1		2						3	0	3	0
												MODO	1			1					1	1	1	1
												NOMO	2								2	0	2	0
												EAME	1								1	0	1	0
												BROC				1					0	1	0	1
												LASP				1					0	1	0	1
PAAL	TX	Prairie	015	5	28	2002	8:21	TMH	85	1	1	NOBO	1		1						2	0	2	0
												EAME	1		3			1			4	0	4	1
												BOSP	1								1	0	1	0
												GTGR		1			1				0	1	1	1
												STFL		1							0	1	0	1
												NOMO			1						1	0	1	0

PAAL POINT COUNT

Park	State	Habitat	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Wetland	016	5	28	2002	7:43	TMH	84	2	1	BEWR	1								1	0	1	0
												MODO	3		1						4	0	4	0
												NOMO			1						1	0	1	0
												BCFL	2								2	0	2	0
												GTGR	1								1	0	1	0
												BHCO			1						1	0	1	0
												EAME	1		1		1				2	0	3	0
												NOBO				2					0	2	0	2
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Brush	001	9	16	2002	8:50	TMH	85	0	2	EAME				1		1			0	1	0	2
												NOMO			1	2					1	2	1	2
												CONI		1							0	1	0	1
												HOFI		1							0	1	0	1
												BOSP		1							0	1	0	1
PAAL	TX	Wetland	002	9	14	2002	7:13	TMH	84	0	1	BOSP			1						1	0	1	0
												EAME					4				0	0	4	0
PAAL	TX	Prairie	003	9	14	2002	7:00	TMH	84	0	1	EAME			1		3				1	0	4	0
												HOFI			2						2	0	2	0
												NOFL					1				0	0	1	0
												GFWO						1			0	0	0	1
PAAL	TX	Brush	004	9	14	2002	7:40	TMH	84	2	1	BARS	1								1	0	1	0
												NOMO			3		1				3	0	4	0
												KILL			2						2	0	2	0
												NOFL			1						1	0	1	0
												GFWO			2						2	0	2	0
PAAL	TX	Prairie	005	9	14	2002	7:29	TMH	84	0	1	MODO			1						1	0	1	0
												NOMO			1		1	1			1	0	2	1
												NOFL					1				0	0	1	0
												COGD					2				0	0	2	0
PAAL	TX	Brush	006	9	14	02	9:11	TMH	84	0	0	NOMO	1								1	0	1	0
												EAME			1						1	0	1	0
PAAL	TX	Wetland	007	9	14	2002	9:20	TMH	84	1	0	LASP	1								1	0	1	0
												MODO	1						2		1	0	3	0
												NOFL			1						1	0	1	0
												NOMO			2						2	0	2	0
PAAL	TX	Prairie	008	9	14	2002	9:30	TMH	86	1	0	COGD	1			2					1	2	1	2
												NOMO			1						1	0	1	0
												EAME			1						1	0	1	0
												NOFL						1			0	0	0	1
PAAL	TX	Prairie	009	9	14	2002	9:40	TMH	86	1	1	LOSH	1								1	0	1	0
												NOMO			2						2	0	2	0
												BOSP			1						1	0	1	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Prairie	010	9	13	2002	8:52	TMH	87	1	2	COGD	3		1						4	0	4	0
												MODO			2						2	0	2	0
												WEVI			2						2	0	2	0
												GFWO					1				0	0	1	0
PAAL	TX	Brush	011	9	16	2002	9:08	TMH	85	0	2	EAME			1		1	1			1	0	2	1
												GBHE							1		0	0	1	0
												NOFL					1				0	0	1	0
												NOMO	1		1	2					2	2	2	2
												HOFI	1								1	0	1	0
PAAL	TX	Prairie	012	9	15	2002	8:40	TMH	77	0	2	EAME					2				0	0	2	0
												GTGR			1						1	0	1	0
												NOMO					1				0	0	1	0
												HOFI					2				0	0	2	0
												BARS					1				0	0	1	0
PAAL	TX	Brush	013	9	15	2002	9:05	TMH	80	0	2	BEWR	1								1	0	1	0
												NOMO	1		1		1				2	0	3	0
												BOSP	1								1	0	1	0
												MODO			1						1	0	1	0
												GFWO			1						1	0	1	0
												HAHA					1				0	0	1	0
PAAL	TX	Brush	014	9	13	2002	9:14	TMH	89	1	2	MODO			1						1	0	1	0
												NOMO			1						1	0	1	0
												GFWO			1						1	0	1	0
PAAL	TX	Prairie	015	9	16	2002	9:23	TMH	88	0	2	EAME			1		2				1	0	3	0
												NOFL								1	0	0	0	1
												NOMO					1				0	0	1	0
												MODO			1						1	0	1	0
PAAL	TX	Wetland	016	9	15	2002	9:50	TMH	88	1	1	MODO			1						1	0	1	0
												GFWO			2						2	0	2	0
												NOMO			1						1	0	1	0
												EAME					2				0	0	2	0
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Habitat	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Brush	001	12	20	2002	9:50	TMH	70	0	0	EAME					3				0	0	3	0
												NOMO	1								1	0	1	0
												BEWR		1							0	1	0	1
PAAL	TX	Wetland	002	12	20	2002	7:00	TMH	49	1	0	EAME			1		3				1	0	4	0
PAAL	TX	Prairie	003	12	20	2002	7:11	TMH	49	1	0	MODO						1	4		0	0	4	1
												EAME	1		1		2				2	0	4	0
												NOMO					1				0	0	1	0
												KILL			1						1	0	1	0
PAAL	TX	Brush	004	12	20	2002	7:22	TMH	51	1	0	EAME					1	1			0	0	1	1
												KILL					1				0	0	1	0
												YRWA	3		2						5	0	5	0
												MODO			1						1	0	1	0
												NOMO	2		1						3	0	3	0
												GKIS	1								1	0	1	0
PAAL	TX	Prairie	005	12	20	2002	7:33	TMH	54	1	0	PLCH							1		0	0	1	0
												EAME					1	1			0	0	1	1
												GFWO					1				0	0	1	0
												YRWA	1								1	0	1	0
PAAL	TX	Brush	006	12	20	2002	8:02	TMH	60	1	2	GTGR	1						1		1	0	2	0
												EAME			1		1	2			1	0	2	2
												NOMO			1		1				1	0	2	0
PAAL	TX	Wetland	007	12	20	2002	8:14	TMH	60	0	0	NOHA					1				0	0	1	0
												EAME				1	1				0	1	1	1
												NOMO			1			1			1	0	1	1
												RWBL			8						8	0	8	0
												NOBO			8						8	0	8	0
												YRWA		2	1						1	2	1	2
												COYEB		1							0	1	0	1
PAAL	TX	Prairie	008	12	20	2002	8:24	TMH	60	1	0	COGD							12		0	0	12	0
												EAME			1		2				1	0	3	0
												NOMO			1						1	0	1	0
												SAVS			2						2	0	2	0
												VESP	1								1	0	1	0
																					0	0	0	0

PAAL POINT COUNT

Park	State	Station	Point #	Month Sample	Day Sample	Year Sample	Time	Observer	Temp	Wind	Sky Condition	Species	0-3 min <25m	4-5 min <25m	0-3 min 25-50 m	4-5 min 25-50 m	0-3 min > 50 m	4-5 min >50 m	0-3 min Flyovers	4-5 min Flyovers	0-3min <50 m	4-5 min < 50 m	0-3 min TOTAL	4-5 min TOTAL
PAAL	TX	Brush	009	12	20	2002	8:58	TMH	64	1	0	EAME			1		2				1	0	3	0
												NOMO	1		1						2	0	2	0
												SAVS	1		2						3	0	3	0
												BSKI			1						1	0	1	0
PAAL	TX	Prairie	010	12	20	2002	9:16	TMH	71	1	0	HOFI			1				2		1	0	3	0
												NOMO					3				0	0	3	0
												SAVS			1						1	0	1	0
PAAL	TX	Brush	011	12	21	2002	9:36	TMH	70	1	0	NOMO					1				0	0	1	0
												GFWO			1						1	0	1	0
												WEVI				1					0	1	0	1
												YRWA	1								1	0	1	0
PAAL	TX	Prairie	012	12	21	2002	8:10	TMH	61	2	0	EAME			1		1	1			1	0	2	1
												NOMO		1			1				0	1	1	1
												HOFI					2				0	0	2	0
PAAL	TX	Brush	013	12	21	2002	8:25	TMH	64	2	0	MODO							1		0	0	1	0
												NOMO					1				0	0	1	0
												EAME			1		1				1	0	2	0
												SAVS	1								1	0	1	0
PAAL	TX	Brush	014	12	21	2002	9:14	TMH	66	1	0	EAME					2				0	0	2	0
												NOFL					1				0	0	1	0
												WEVI			1						1	0	1	0
												NOMO			1						1	0	1	0
												RWBL			11						11	0	11	0
												YRWA	1								1	0	1	0
PAAL	TX	Prairie	015	12	20	2002	9:38	TMH	66	0	0	EAME	1		1		2	1			2	0	4	1
												NOBO					1				0	0	1	0
												MODO			2						2	0	2	0
												NOMO			1						1	0	1	0
												SAVS	2								2	0	2	0
												LOSH	1								1	0	1	0
PAAL	TX	Wetland	016	12	20	2002	9:45	TMH	77	2	0	EAME					1	1			0	0	1	1
																					0	0	0	0
																					0	0	0	0
																					0	0	0	0

Small Mammal Trapping Data

Park	State	Habitat	Point	Month	Day	Year	Species	Comments
PAAL	TX	Prairie	001	5	2	2002	Hispid Cotton Rat	
PAAL	TX	Brush	007	5	3	2002	S. Plains Woodrat	juvenile
PAAL	TX	Brush	007	5	3	2002	S. Plains Woodrat	adult-male
PAAL	TX	Prairie	008	5	3	2002	White-footed Mouse	
PAAL	TX	Brush	007	5	4	2002	S. Plains Woodrat	
PAAL	TX	Brush	007	5	4	2002	S. Plains Woodrat	
PAAL	TX	Prairie	008	5	4	2002	White-footed Mouse	
PAAL	TX	Brush	004	5	27	2002	Hispid Cotton Rat	
PAAL	TX	Prairie	005	5	27	2002	White-footed Mouse	
PAAL	TX	Brush	004	5	28	2002	Hispid Cotton Rat	
PAAL	TX	Prairie	001	5	28	2002	Hispid Cotton Rat	juvenile
PAAL	TX	Brush	007	5	30	2002	White-footed Mouse	
PAAL	TX	Prairie	002	9	14	2002	Hispid Cotton Rat	adult
PAAL	TX	Brush	004	9	15	2002	S. Plains Woodrat	
PAAL	TX	Brush	004	9	15	2002	Black Rat	
PAAL	TX	Brush	003	9	15	2002	White-footed Mouse	
PAAL	TX	Prairie	001	9	15	2002	Hispid Cotton Rat	juvenile
PAAL	TX	Brush	007	9	16	2002	Black Rat	
PAAL	TX	Brush	007	9	17	2002	White-footed Mouse	
PAAL	TX	Brush	007	9	17	2002	White-footed Mouse	
PAAL	TX	Brush	004	12	19	2002	Nowray Rat	
PAAL	TX	Brush	004	12	19	2002	White-footed Mouse	
PAAL	TX	Brush	003	12	19	2002	Hispid Cotton Rat	juvenile
PAAL	TX	Brush	004	12	20	2002	Nowray Rat	adult female
PAAL	TX	Brush	004	12	20	2002	Nowray Rat	adult male
PAAL	TX	Prairie	002	12	20	2002	Hispid Cotton Rat	adult female
PAAL	TX	Brush	007	12	21	2002	Nowray Rat	adult female
PAAL	TX	Prairie	008	12	21	2002	White-footed Mouse	adult female
PAAL	TX	Prairie	008	12	22	2002	White-footed Mouse	
PAAL	TX	Prairie	005	12	22	2002	Hispid Cotton Rat	adult female
PAAL	TX	Prairie	005	12	22	2002	White-footed Mouse	adult female

