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INTRODUCTION

BACKGROUND

As a result of a consultation between the United States Fish and Wildlife Service (USFWS) and Air Combat Command (ACC) concerning the Realistic Bomber Training Initiative (RBTI), ACC is required to survey for the presence of Northern Aplomado Falcons (*Falco femoralis septentrionalis*) in west Texas beneath Military Training Route (MTR) IR 178 and IR 102/141. These MTR's coincide in some areas. The north part of Big Bend National Park (BBNP) lies under these MTR's.

DISTRIBUTION

The aplomado falcon (*Falco femoralis*) is a mid-sized neotropical falcon which uses a variety of habitats including grasslands, savannahs and cultivated fields (Blake 1977, Hector 1981, Keddy-Hector 1990). Three subspecies of aplomado falcon are currently recognized (Brown and Amadon 1968). The northern subspecies, *F. f. septentrionalis*, occurs in Mexico and the United States and may intergrade with *F. f. femoralis* along the Nicaraguan Gulf coast, the Pacific slope and in Belize (Keddy-Hector 1990). Historically, the aplomado falcon ranged from south Texas through Trans-Pecos Texas to southern New Mexico and southeastern Arizona (Montoya 1995) to Sinaloa, Chihuahua and Tamaulipas south to Chiapas, the Yucatan Peninsula and Belize to eastern Honduras and northeastern Nicaragua to western Panama south generally throughout South America to Tierra del Fuego and the Falkland Islands (American Ornithologist Union 1983).

Within its range in the U.S. it was considered a fairly common raptor of grassland areas (Bendire 1892, Ligon 1961, Hector 1987), however, numbers declined rapidly in the early 1900's and the bird was largely absent from the U.S. by 1940 (Hector 1987). Specimen records and documented sightings indicated that the species was common throughout its U.S. range until about 1930 (Hector 1987). After the 1930's aplomado falcons apparently declined rapidly within their U.S. range. Until 2002, the last nest documented in the U.S. was located near Deming, New Mexico in 1952 (Ligon 1961). Since 1952, only occasional sightings of birds have been documented in the southwestern states of New Mexico and Arizona (Keddy-Hector 1990, Cade et al. 1991, Williams and Hubbard 1991, Williams 1993). Aplomado falcons were documented in south Texas until the mid-1970's but were considered rare.

Because of its decline in the U.S. and elsewhere, the Northern Aplomado Falcon was listed as an endangered species in 1986 by the U.S. Department of the Interior (USFWS 1986). The cause for the decline of the Northern Aplomado Falcon in the U.S. is unknown. Habitat loss and degradation are likely factors (Humphrey 1953, Buffington and Herbel 1965, York and Dick-Peddie 1969, Hector 1987). Persecution and specimen and egg collection also may have had negative effects. In addition, pesticide use may be limiting the potential of aplomado falcons to recolonize its historical range in Mexico (Kiff et al. 1980, Hector 1987, Keddy-Hector 1990).

Only two confirmed sightings of aplomado falcons were made in Arizona between 1910 and 1940 and no confirmed sightings have been made since then (Corman 1992). Several unconfirmed sightings have been made in Cochise and Pima counties in Arizona (Hector 1981). Several additional unconfirmed sightings have been made in Arizona in the 1990's especially near the Sonora/Arizona border. The first confirmed sighting of an aplomado falcon in New Mexico since the 1950's was made on White Sands Missile Range by A. Montoya in 1991 (Williams and Hubbard 1991). Since then confirmed sightings in New Mexico have been made southwest of Deming, New Mexico (E. Wootten, T & E Inc. Tucson, AZ., pers. comrn.), east of San Antonio, New Mexico and north of Las Cruces, New Mexico (A. Montoya, The Peregrine Fund, Boise, ID., pers. comm.). More recent sightings have been again north of Las Cruces in early September 1999 and less than two weeks later at Otero Mesa on Fort Bliss Military Reservation (R. Meyer, La Tierra Environmental Consulting, Las Cruces, NM., pers. comm.). This bird was a juvenile banded a few months earlier 180 miles south in Chihuahua, Mexico. In 2000 a pair was seen southwest of Deming, New Mexico (R. Meyer, La Tierra Environmental Consulting, Las Cruces, NM., pers. comm.). This pair attempted to nest in 2001 but failed. In 2002 the pair again attempted to nest. The first attempt failed but the second attempt produced three fledglings. In 2003 only the female was observed and no known nesting occurred. In 2004 the pair was periodically seen and may have attempted to nest but was not successful. For the past three years only a female has been sighted in the area sporadically. In late 2005, an aplomado falcon was photographed by BLM personnel on Otero Mesa in south central New Mexico. A second bird was seen and thought to be an aplomado falcon but it was not documented. The origin of this bird is not known but it is possible that it is one of the Peregrine Fund release birds. The nearest release site in Texas is a new one started in 2005 which is about 75 air miles from the sighting location in New Mexico.

The status of the falcon in Mesoamerica is not well known (Keddy-Hector 1990). However, the discovery of a population in central Chihuahua by Montoya (1995) and current studies being conducted by The Peregrine Fund and Universidad Autonoma de Chihuahua indicate the species may occur in suitable grasslands throughout northern and central Chihuahua. In August 1999 an aplomado falcon was confirmed in northern Chihuahua a few miles southwest of Columbus, New Mexico. Until the recent introductions in west Texas, the only confirmed sighting in that area was one near Valentine in the mid-1990's. The Peregrine Fund has been releasing aplomado falcons in south Texas since the early 1990s and nesting pairs have been observed in the area for the past ten years (A. Montoya, The Peregrine Fund, Boise ID., pers. comm.). More than 840 aplomado falcons have been released in south Texas. The last releases in south Texas were in 2004. Twenty-nine territories were known to be occupied in 2007 but monitoring is minimal and there are probably many more territories in south Texas. In 2002 a release program in west Texas was initiated by The Peregrine Fund. A total of about 506 aplomado falcons have been released in west Texas so far with 86 of those released in 2007. There were 2 known nests, one failed and the other fledged 2 young. In addition, under a new release program, 11 aplomado falcons were released in south central New Mexico in 2006 and 39 were released in 2007. Surprisingly one pair nested in south central New Mexico in 2007 and fledged 2 young (A. Montoya, The Peregrine Fund, Boise, ID., pers. comm.).

Aplomado falcon habitat is described by Keddy-Hector (1990) as open terrain with scattered

trees or shrubs. In eastern and southern Mexico they inhabit palm-oak savannas, open tropical deciduous woodlands, wooded fringes of extensive marshes, various desert grassland associations and upland pine parklands (Keddy-Hector 1990). In Chihuahua aplomado falcons appear to inhabit yucca grassland with other scattered woody plants such as mesquite (*Prosopis glandulosa*), javelina bush (*Condalia sp.*) and ephedra (*Ephedra trifurca*). The spacing of these plants ranged from 11 to 145 meters in south Texas (Perez 1995) while Keddy-Hector (1990) found the spacing in eastern Mexico to range from 15 to 45 meters. In Chihuahua the average spacing ranged from 5 to 100 meters.

METHODS

All surveys were conducted in accordance with the U. S. Fish and Wildlife Service's Interim Survey Methodology for Northern Aplomado Falcon (*Falco femoralis septentrionalis*) in Desert Grasslands. All survey routes were a minimum of 10.0 miles long and observations were made every 0.5 mile with 8X binoculars and a spotting scope. Incidental data was also recorded on observations of song birds and stick nests.

ROUTE SELECTION

Although the aplomado falcon is believed extirpated as a breeding species in the overflight area of west Texas, recent sightings in the southwest as well as the documentation of a breeding population in northern Chihuahua, Mexico and a nesting pair in southwestern New Mexico have lead to speculation that breeding aplomado falcons might occur in the large expanses of unsurveyed grasslands of the southwestern United States. The documented sighting on Otero Mesa, in 2005, in south central New Mexico and the continued re-introduction in west Texas is further reason to survey these areas. Based on satellite imagery and field visits by a permitted surveyor, survey routes were established beneath MTR IR 178 and IR 102/141 in the Trans-Pecos region of west Texas. Most of the routes in this region were established in 1999. In 2004 those routes were re-evaluated. As a result of this evaluation some routes were eliminated and others were established to better cover the habitat in the general area of recent re-introductions of aplomado falcons. In 2006, as a result of discussion with Big Bend National Park (BBNP) personnel, one route was established in the north end of BBNP. This route is described below and is shown relative to other routes being surveyed in the trans Pecos region in Appendix A. The route surveyed in 2007 is the same as in 2006.

Big Bend National Park: This route begins about 4.5 kilometers south of the Persimmon Gap Ranger Station. It extends north about 4.0 kilometers on the paved road then turns west on the gravel county road for about 13 kilometers. It ends where this road turns sharply south away from the boundary fence. The eastern terminus of this route is at the coordinates 0679106E; 3279292N and the western terminus is at 0665155E; 3285723N (NAD 27).

ROUTE DESCRIPTION

The Big Bend National Park route is dominated by creosote bush with a lot of bare ground, however, it is also interspersed with grass in some areas. The last 1 ½ mile of the west end of the route goes along the boundary fence. The north side of the fence is on private land that has had brush removed. It is a good grassland composed mostly of exotic grasses and numerous yuccas while the south side is composed mostly of creosote bush, bare ground and scattered grass.(Appendix B).

SURVEYS

The route was surveyed three times, once each in April, June and August, 2007. All surveys were conducted according to the USFWS Interim Survey Methodology For The Northern Aplomado Falcon In Desert Grasslands protocol. Because the exact coordinates of the location where the route enters and exits the overflight zone was not known the eastern terminus of the route starts a mile or so outside overflight zone. Low flying military aircraft have been seen flying several miles to the south and east of the eastern terminus. The route is 10.5 miles (17.0 kilometers) long. The survey which was conducted along the public road, began a few minutes prior to sunrise and continued for about 4 to 4.5 hours. Stops were made at intervals of about 0.5 mile where visibility was good but at intervals of 0.4 to 0.6 mile if obstructions were present. At each stop the area was briefly scanned without binoculars then a 360° circle was surveyed with 8 power binoculars for at least 5 minutes. When necessary a spotting scope was used to identify raptors.

Although emphasis during these surveys was on aplomado falcons, all falcons, hawks, kites, eagles, owls, vultures, shrikes and ravens were recorded. Occasionally heat conditions and/or distance made it impossible to identify a raptor. All of these situations were identified as Unidentified Raptor. Large stick nests were also recorded if they were observed, but no special effort was made to locate nests since time for surveying was limited. Therefore, the number of nests recorded is probably below the actual number present since nests are often difficult to detect unless the observer is in an optimal position or very close to the nest. Song birds were incidentally noted but again no special effort was made to accurately count or identify these birds.

RESULTS AND DISCUSSION

The number of raptors and ravens observed on the Big Bend National Park survey route was among the lowest of all west Texas routes surveyed (Appendices C, D and E). Three species of raptors were seen on the BBNP route, Red-tailed Hawk (*Buteo jamaicensus*), Swainson's Hawk (*Buteo swainsoni*) and American Kestrel (*Falco sparverius*). Raptors were seen on all three surveys. The average number of Swainson's Hawk per survey was only 1.67 while Red-tailed Hawk and American Kestrel was 0.33. The average number of Swainson's Hawk and Red-tailed Hawk per route on other routes in west Texas ranged from a high of 26.50 and 3.33 respectively to a low of 1.67 to 0.0 respectively. The average number per mile of survey on other routes in west Texas ranged from a high of 3.33 and 0.33 respectively to a low of 1.59 to 0.0 respectively.

No Aplomado Falcons were seen on BBNP survey routes in 2007. However, a single aplomado falcon was documented by a park visitor about 30 miles south of the BBNP route in the spring of 2007.

The number of Ravens (*Corvis* spp.) seen was only 3.33 per route. The number of Ravens per mile of survey ranged from 0.0 to 0.86. There were 8.33 Turkey Vultures (*Cathartes aura*) seen per route which resulted in a range of 0.10 to 1.43 per mile. The average number Raptors, Ravens and Turkey Vultures, those species that build nests that Aplomado Falcons can use, per route and per mile was 11.67 and 1.11 respectively. Only two stick nests were seen along this route. Since nests are difficult to see and no special effort was made to locate nests, this number represents a minimum number along this route. The number of stick nests seen on other west Texas survey routes ranged from 0 to 17.

The food supply for Aplomado Falcon on this route appeared to be low but sufficient. The total number of songbirds per route in 2007 was higher than in 2006 ranging from 249 in April to 332 in August. The number of songbirds was in the lower 25% of other west Texas survey routes in April and June but near the average in August. The Loggerhead Shrike (*Lanius ludovicianus*) is a species of concern. The number of this species seen on this route ranged from 3 to 27 with an average of 10.67. This average is well above the average number of this species seen on other west Texas routes and is a result of the large number seen in August.

The most common five species of songbird found in the diet of aplomado falcons in Chihuahua are Nighthawk sp., Meadowlark, Sparrow sp., Mockingbird and Dove sp. (Macias-Duarte et al 2004). The latter three species were fairly abundant on BBNP routes in 2007. It appears that there is sufficient prey for Aplomado Falcons.

This year is the sixth year that these falcons have been released in the west Texas area. Although Aplomado Falcon have been seen on other west Texas routes, no nesting has been documented on the survey routes. However, at least two nests have been found in west Texas and at least two chicks fledged in 2007. Although survival is low from re-introduction, with about 506 aplomado falcons introduced since 2002 and more to be introduced next year, it is likely more nesting will be documented somewhere in west Texas in 2007. One re-introduction site is within 50 miles of the BBNP survey route.

Often a known location of a raptor is visited many times before the bird is seen. Therefore, surveys can not definitively demonstrate the absence of a raptor like the aplomado falcon. A single aplomado falcon may utilize a larger area than a pair or a breeding pair. Breeding pairs are known to occur in Chihuahua within 125 air miles of the BBNP route.

Locating raptors that occur in low numbers is difficult. The end of the breeding season for aplomado falcons in Chihuahua, Mexico is usually in June. The birds become less active and are more difficult to see when they do not have young to feed,. Conversely, if successful fledging has occurred more birds are available to be seen. Along any route a reasonable search area probably extends 0.5 mile on either side of the road which is a very small fraction of the total habitat. If an aplomado falcon were present in the general area it may spend little or no time in the one mile search path. Searches would need to be focused temporally and spatially to improve the chance of a sighting.

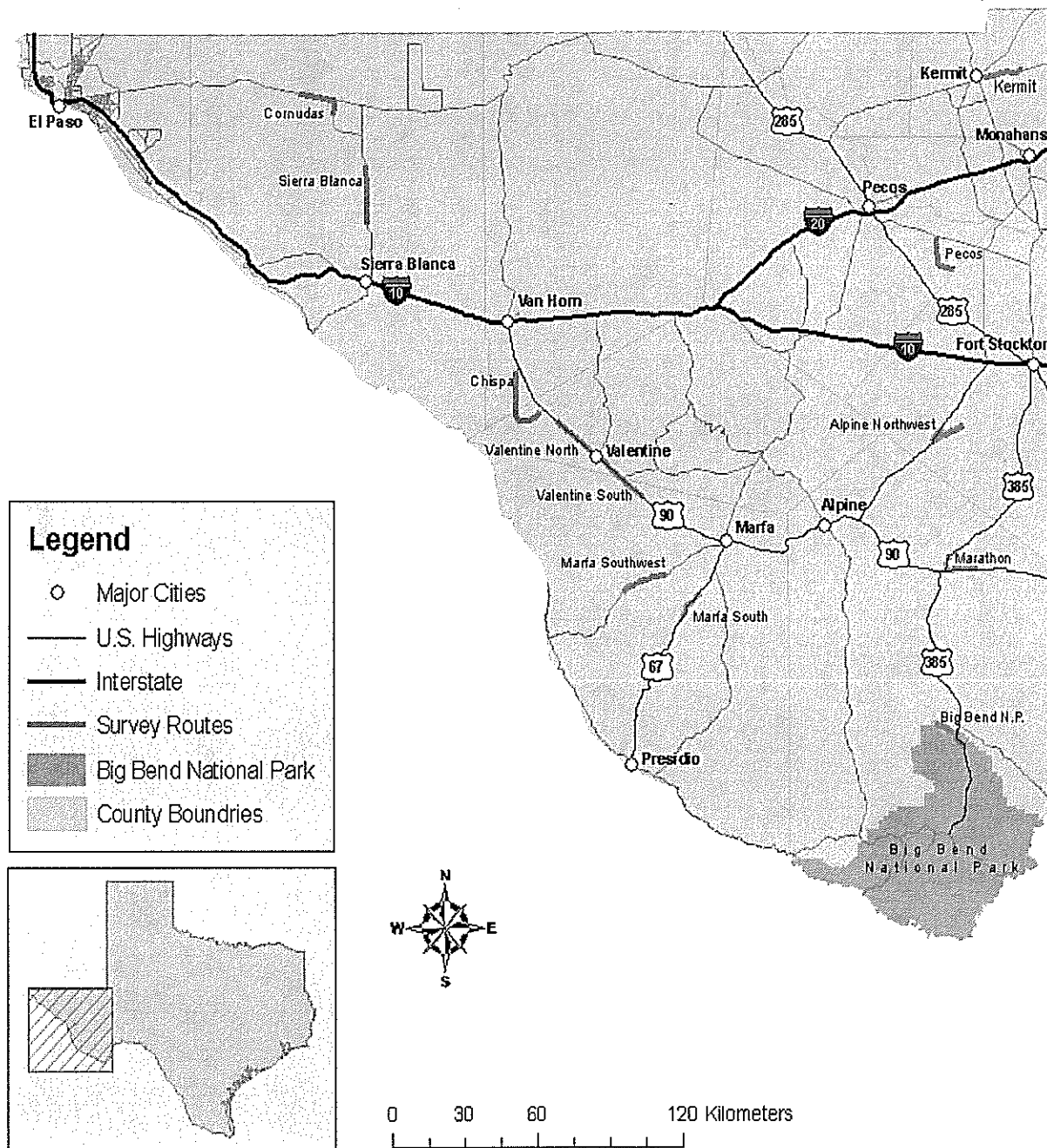
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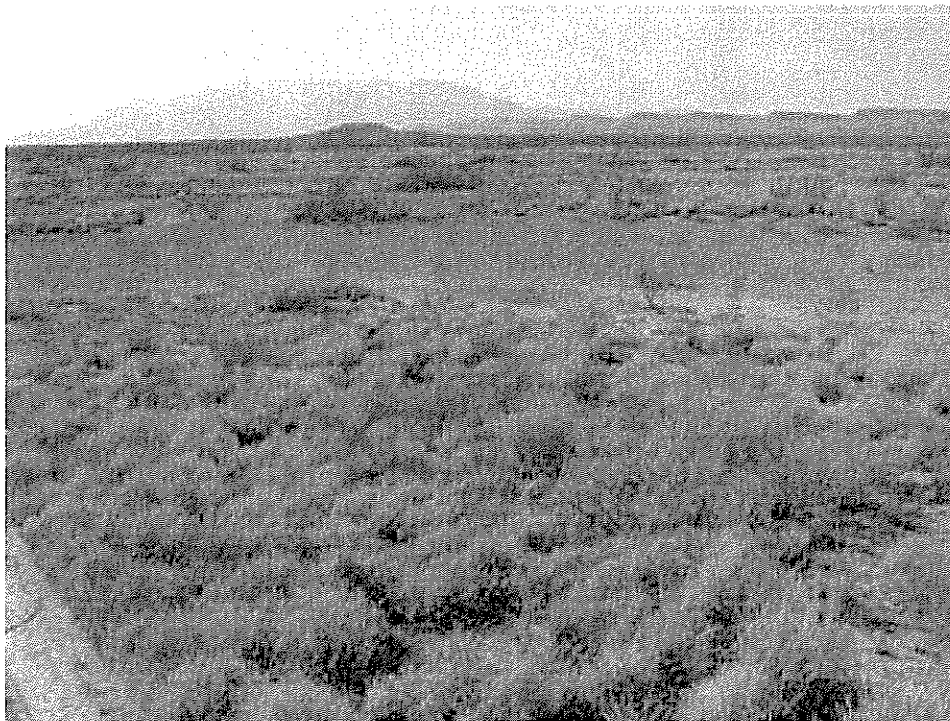
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APPENDICES

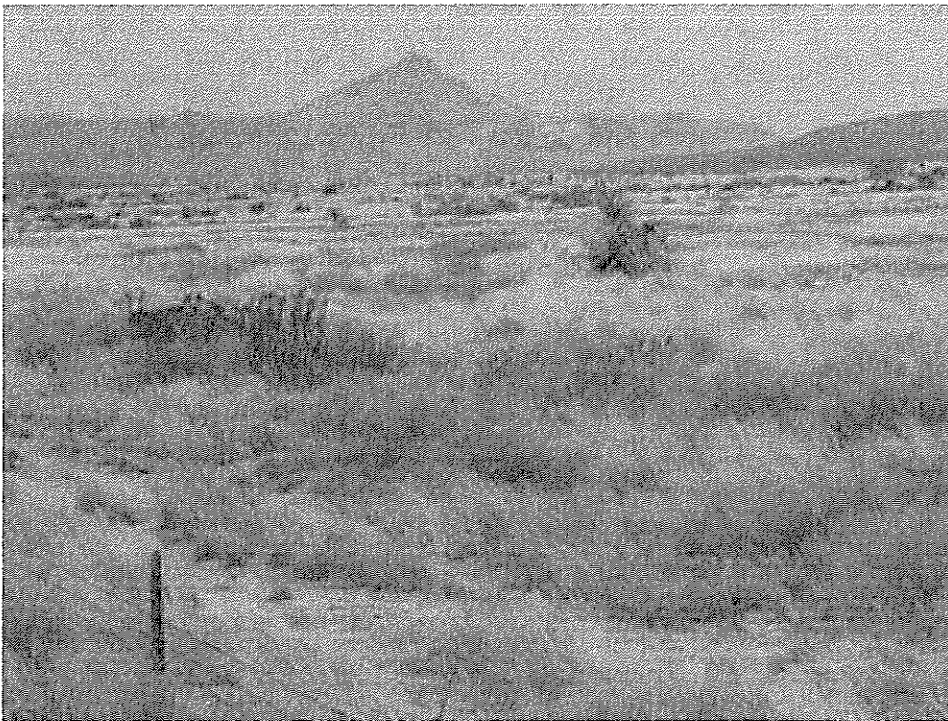
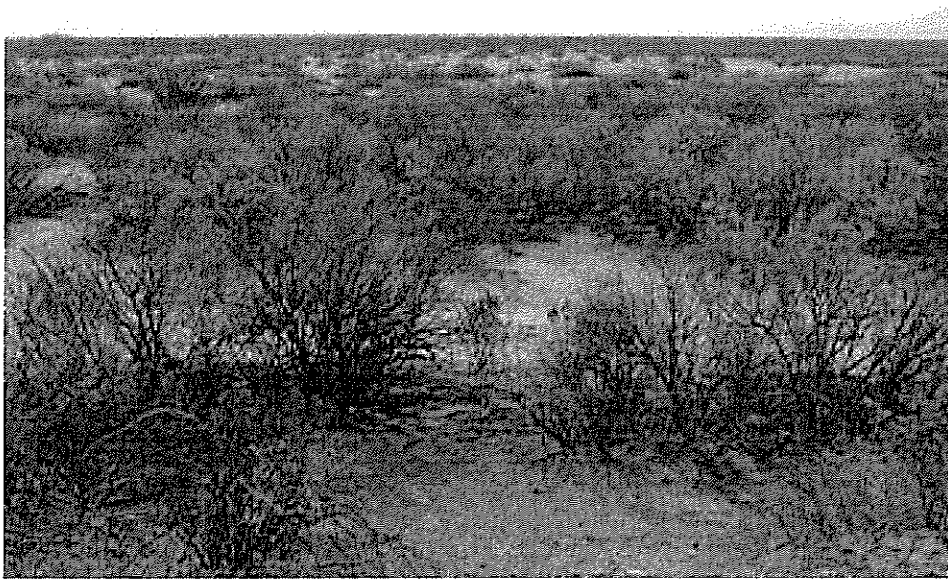
Appendix A. Overview showing location of aplomado falcon survey routes in BBNP relative to other Texas trans-Pecos routes, 2007.



Appendix B. Examples of brush, grass and open ground habitat on BBNP route.



Appendix B (con't). Example of brushy (top) and grassland habitat (bottom) on BBNP route.



Appendix C. Summary of aplomado falcon survey results in the Trans-Pecos area of West Texas including BBNP, April 2007.

Texas 2007 Survey Results SUMMARY																
Abbreviation	Common Name	Scientific Name	Number Observed in April Surveys													
Passerines			P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB	BB	
ATFL	Ash Throated Flycatcher	Myiarchus cinerascens	---	---	15	4	1	1	---	3	7	10	1	8	---	
BASW	Barn Swallow	Hirundo rustica	---	---	---	---	---	---	---	---	---	---	---	---	---	
BHCO	Brown-headed Cowbird	Molothrus ater	---	---	---	10	2	---	---	---	---	---	35	---	---	
BLGR	Blue Grosbeak	Guiraca caerulea	15	---	---	---	---	---	---	---	---	---	---	---	---	
BLSP	Black-throated Sparrow	Amphispiza bilineata	4	2	13	3	14	12	---	25	6	3	---	14	---	
BRBL	Brewer's Blackbird	Euphagus cyanocephalus	---	---	6	15	10	---	15	---	---	---	10	2	---	
BRSP	Brewer's Sparrow	Spizella breweri	---	---	---	---	---	---	---	---	---	---	---	---	---	
BTGN	Black-tailed Gnatcatcher	Poliophtila melanura	---	---	---	---	---	---	---	---	---	---	---	---	---	
CAKI	Cassin's Kingbird	Tyrannus vociferans	---	---	---	---	---	---	---	---	---	---	---	---	---	
CASP	Cassin's Sparrow	Aimophila cassinii	78	20	5	27	8	16	8	27	16	16	61	14	---	
CASW	Swallow sp	Petrochelidon	---	---	---	---	---	---	---	4	---	---	---	---	---	
CATO	Canyon Towhee	Pipilo fuscus	---	---	---	---	---	---	---	---	---	---	---	---	---	
CAWR	Cactus Wren	Campylorhynchus brunneicapillus	21	---	32	6	1	2	4	35	15	14	15	22	---	
CBTH	Thrasher sp	Toxostoma sp	---	1	---	3	---	---	---	5	2	---	---	---	---	
CHSP	Chipping Sparrow	Spizella passerina	---	---	---	---	---	---	---	---	---	---	---	18	---	
CLSW	Cliff Swallow	Petrochelidon pyrrhonota	---	---	---	---	---	---	---	---	---	---	---	---	---	
CONI	Common Nighthawk	Chordeiles minor	---	---	---	---	---	---	---	---	---	---	---	---	---	
GAQU	Gambel's Quail	Callipepla gambelii	---	---	3	---	---	---	---	---	---	---	---	---	---	
GTTO	Green-tailed Towhee	Pipilo Chlorurus	---	---	---	---	---	---	---	---	---	---	---	---	---	
HOLA	Horned Lark	Eremophila alpestris	---	---	---	---	---	---	---	---	---	---	---	---	---	
HUMM	Hummingbird Species		---	---	---	---	---	---	---	---	---	---	---	---	---	

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
LABU	Lark Bunting	<i>Calamospiza menalocorys</i>	858	225	200	597	---	---	---	---	---	3	215	5
LASP	Lark Sparrow	<i>Chondestes grammacus</i>	---	2	2	---	2	1	1	2	20	---	30	1
LBWO	Ladder-backed Woodpecker	<i>Picoides scalaris</i>	---	---	---	---	---	---	---	---	---	---	---	---
LOSH	Loggerhead Shrike	<i>Lanius ludovicianus</i>	3	---	6	4	9	3	6	3	3	3	5	3
MELA	Meadow Lark	<i>Sturnella neglecta</i>	4	8	16	46	11	52	56	13	45	8	39	---
MODO	Mourning Dove	<i>Zenaida macroura</i>	24	5	42	42	193	82	19	11	18	4	23	15
NOMO	Northern Mockingbird	<i>Mimus polyglottos</i>	21	3	20	5	28	53	7	45	35	18	18	25
NOOR	Northern Oriole	<i>Icterus galbula</i>	---	---	---	---	---	---	---	---	---	---	---	---
OCWA	Orange-crowned Warbler	<i>Vermivora celata</i>	---	---	---	---	---	---	---	---	---	---	---	---
PYRR	Pyrrhoxia	<i>Cardinalis sinuatus</i>	2	4	1	---	1	---	---	1	---	4	2	4
RCSP	Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	---	---	---	---	---	---	---	---	---	---	---	---
ROAD	Greater Roadrunner	<i>Geococcyx californianus</i>	1	---	2	1	1	---	2	---	1	3	---	1
SAPH	Say's Phoebe	<i>Sayornis saya</i>	3	---	---	2	1	1	1	2	7	---	---	---
SASP	Savannah Sparrow	<i>Passerculus sandwichensis</i>	---	---	---	---	---	---	---	---	---	---	---	---
SCOR	Scott's Oriole	<i>Icterus parisorum</i>	---	---	7	4	---	4	---	---	1	---	---	2
SCQU	Scaled Quail	<i>Callipepla squamata</i>	17	---	24	14	22	17	20	21	19	18	8	11
STFL	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	---	2	---	---	---	---	---	---	---	---	11	---
VERD	Verdin	<i>Auriparus flaviceps</i>	---	---	---	---	---	---	---	---	3	---	---	---
VESP	Vesper Sparrow	<i>Spizella atrogularis</i>	---	---	---	---	---	---	---	---	---	---	---	---
WCSP	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	2	---	---	---	3	10	---	---	---	4	---	---
WEKI	Kingbird sp	<i>Tyrannus sp</i>	---	---	27	15	20	19	52	1	7	---	6	---
WIWA	Wilson's Warbler	<i>Wilsonia pusilla</i>	---	---	---	---	---	---	---	---	---	---	---	---
WWDO	White-winged Dove	<i>Zenaida asiatica</i>	---	2	---	---	35	---	---	---	---	---	---	---
YHBB	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	---	---	---	4	---	---	---	---	---	---	---	---
YRWA	Yellow-rumped Warbler	<i>Dendroica coronata</i>	---	---	---	---	---	---	---	---	2	---	---	---
UNK SONG	Unknown Passerine/Songbird		255	97	267	191	167	176	96	130	102	61	236	104

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
Songbird Totals			1308	371	688	993	529	449	287	328	309	169	715	249
CORA	Common Raven	<i>Corvus corax</i>	8	19	2	21	35	17	38			7	10	9
FEHA	Ferruginous Hawk	<i>Buteo regalis</i>												
GHOW	Great Horned Owl	<i>Bubo virginianus</i>												
GOEA	Golden Eagle	<i>Aquila chrysaetos</i>												
MAKE	American Kestrel	<i>Falco sparverius</i>	22	3		4	1	4				1	1	
MERL	Merlin	<i>Falco coumbarius</i>												
NAFA	Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>												
NOHA	Northern Harrier	<i>Circus cyaneus</i>	9	2				3	4			5	4	
PEFA	Peregrine Falcon	<i>Falco peregrinus</i>												
RTHA	Red tailed Hawk	<i>Buteo jamaicensis</i>			3		1			1	4		1	1
SWHA	Swainson's Hawk	<i>Buteo swainsoni</i>	7	5		9	9	14	13	3	1	4	13	2
BUOW	Burrowing Owl	<i>Athene cunicularia</i>			8	7								
SEOW	Short-eared Owl	<i>Asio flammeus</i>												
TUVU	Turkey Vulture	<i>Cathartes aura</i>			1		8	10	6	6	6	18	14	15
UNK RAP	Unknown Raptor		1	4	3		4	4	4	1		3	4	
WTKI	White-tailed Kite	<i>Elanus leucurus</i>												
Raptor, Raven and Turkey Vulture Totals			47	33	17	41	58	52	65	11	11	38	48	27
Routes incl: PECOS 1 (P-1), KERMIT 1 (K1), SIERRA BLANCA (SB), CORNUDAS 1 (CO), CHISPA (CH), VALENTINE NORTH (VN), VALENTINE SOUTH (VS), MARFA SOUTH (MS), MARFA SW (MW), ALPINE NORTHEAST (AN), MARATHON (MA), BIG BEND NP=BB														

Appendix D. Summary of aplomado falcon survey results in the Trans-Pecos area of West Texas including BBNP, June 2007.

Texas 2007 Survey Results SUMMARY																
Abbreviation	Common Name	Scientific Name	Number Observed in June Surveys													
Passerines			P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB		
ATFL	Ash Throated Flycatcher	<i>Myiarchus cinerascens</i>	---	4	3	4	9	3	---	5	1	---	---	3	---	---
BASW	Barn Swallow	<i>Hirundo rustica</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BHCO	Brown-headed Cowbird	<i>Molothrus ater</i>	---	---	---	---	3	---	---	2	---	---	---	---	---	---
BLGR	Blue Grosbeak	<i>Guiraca caerulea</i>	1	---	---	---	9	3	---	6	3	8	3	5	---	---
BLSP	Black-throated Sparrow	<i>Amphispiza bilineata</i>	3	2	18	5	---	1	---	14	3	5	1	37	---	---
BRBL	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BRSP	Brewer's Sparrow	<i>Spizella breweri</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BTGN	Black-tailed Gnatcatcher	<i>Poliopitila melanura</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CAKI	Cassin's Kingbird	<i>Tyrannus vociferans</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CASP	Cassin's Sparrow	<i>Aimophila cassinii</i>	89	37	2	11	35	45	32	37	48	13	94	23	---	---
CASW	Swallow sp	<i>Petrochelidon</i>	---	---	---	---	---	---	---	58	---	---	18	---	---	---
CATO	Canyon Towhee	<i>Pipilo fuscus</i>	---	---	---	---	---	---	---	2	2	---	---	---	---	---
CAWR	Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	11	7	21	6	1	---	5	25	9	6	12	25	---	---
CBTH	Thrasher sp	<i>Toxostoma sp</i>	1	1	10	2	5	---	---	2	---	---	---	---	---	---
CHSP	Chipping Sparrow	<i>Spizella passerina</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLSW	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CONI	Common Nighthawk	<i>Chordeiles minor</i>	6	---	2	---	8	1	3	12	12	15	5	1	---	---
GAQU	Gambel's Quail	<i>Callipepla gambelii</i>	---	---	---	---	---	---	1	---	---	---	---	---	---	---
GTTO	Green-tailed Towhee	<i>Pipilo chlorurus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HOLA	Horned Lark	<i>Eremophila alpestris</i>	11	---	---	7	---	---	---	---	---	---	---	---	---	---
HUMM	Hummingbird Species		---	---	---	---	---	---	---	1	---	---	---	---	---	---

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
LABU	Lark Bunting	<i>Calamospiza menalocorys</i>												
LASP	Lark Sparrow	<i>Chondestes grammacus</i>			2	1	1				22	4	4	
LBWO	Ladder-backed Woodpecker	<i>Picoides scalaris</i>			1					1				
LOSH	Loggerhead Shrike	<i>Lanius ludovicianus</i>	1	4	30	8	5	4	1		6		3	4
MELA	Meadow Lark	<i>Sturnella neglecta</i>	10	9	10	38	18	48	83	17	58	8	28	
MODO	Mourning Dove	<i>Zenaida macroura</i>	24	22	55	54	123	75	33	13	9	4	2	9
NOMO	Northern Mockingbird	<i>Mimus polyglottos</i>	25	31	71	16	67	66	8	37	32	43	58	34
NOOR	Northern Oriole	<i>Icterus galbula</i>	1	5				1					1	
OCWA	Orange-crowned Warbler	<i>Vermivora celata</i>												
PYRR	Pyrrhoxia	<i>Cardinalis sinuatus</i>	4	30	1					1		4		13
RCSP	Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>												
ROAD	Greater Roadrunner	<i>Geococcyx californianus</i>	2	1	2		7	1	2		2	2		
SAPH	Say's Phoebe	<i>Sayornis saya</i>	1				1				3			
SASP	Savannah Sparrow	<i>Passerculus sandwichensis</i>												
SCOR	Scott's Oriole	<i>Icterus parisorum</i>			16	2	3			1	5	1	1	
SCQU	Scaled Quail	<i>Callipepla squamata</i>	29	42	14	13	27	21	34	43	15	12	8	28
STFL	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>		5									8	
VERD	Verdin	<i>Auriparus flaviceps</i>												
VESP	Vesper Sparrow	<i>Spizella atrogularis</i>												
WCSP	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>												
WEKI	Kingbird sp	<i>Tyrannus sp</i>	17	23	61	11	44	24	61	6	19		7	
WIWA	Wilson's Warbler	<i>Wilsonia pusilla</i>												
WWDO	White-winged Dove	<i>Zenaida asiatica</i>												
YHBB	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>												
YRWA	Yellow-rumped Warbler	<i>Dendroica coronata</i>												
UNK SONG	Unknown Passerine/Songbird		89	118	176	94	206	156	159	147	137	56	142	80

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
Songbird Totals			325	341	495	272	572	449	422	460	386	181	395	262
CORA	Common Raven	<i>Corvus corax</i>	10	10	3	15	11	54	14			2	5	1
FEHA	Ferruginous Hawk	<i>Buteo regalis</i>												
GHOW	Great Horned Owl	<i>Bubo virginianus</i>						1						
GOEA	Golden Eagle	<i>Aquila chrysaetos</i>												
MAKE	American Kestrel	<i>Falco sparverius</i>		1	4	7	5	3						
MERL	Merlin	<i>Falco coumbarius</i>												
NAFA	Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>					2		2					
NOHA	Northern Harrier	<i>Circus cyaneus</i>							2				1	
PEFA	Peregrine Falcon	<i>Falco peregrinus</i>												
RTHA	Red tailed Hawk	<i>Buteo jamaicensis</i>			2	5	5	2	2	4		3	1	
SWHA	Swainson's Hawk	<i>Buteo swainsoni</i>	15	7	4	2	2	9	16	2	3	1	25	2
BUOW	Burrowing Owl	<i>Athene cucicularia</i>		1	14			3	5			3	4	
SEOW	Short-eared Owl	<i>Asio flammeus</i>												
TUVU	Turkey Vulture	<i>Cathartes aura</i>	8	3	9	3	3	7	8	7	6	6	25	9
UNK RAP	Unknown Raptor		1	3		2		2	10			2	5	
WTKI	White-tailed Kite	<i>Elanus leucurus</i>												
Raptor, Raven and Turkey Vulture Totals			34	25	33	37	31	81	59	13	9	17	66	11
Routes incl: PECOS 1 (P1), KERMIT 1 (K1), SIERRA BLANCA (SB), CORNUDAS 1 (CO), CHISPA (CH), VALENTINE NORTH (VN), VALENTINE SOUTH (VS), MARFA SOUTH (MS), MARFA SW (MW), ALPINE NORTHEAST (AN), MARATHON (MA), BIG BEND NP=BB														

Appendix E. Summary of aplomado falcon survey results in the Trans-Pecos area of West Texas including BBNP, August 2007.

Texas 2007 Survey Results SUMMARY																
Abbreviation	Common Name	Scientific Name	Number Observed in August Surveys													
Passerines			P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB		
ATFL	Ash Throated Flycatcher	<i>Myiarchus cinerascens</i>						1			1					
BASW	Barn Swallow	<i>Hirundo rustica</i>														
BHCO	Brown-headed Cowbird	<i>Molothrus ater</i>					40					7				
BLGR	Blue Grosbeak	<i>Guiraca caerulea</i>	1				5	5		10		9	4	6		
BLSP	Black-throated Sparrow	<i>Amphispiza bilineata</i>	6		7	10	1			20			1	18		
BRBL	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>														
BRSP	Brewer's Sparrow	<i>Spizella breweri</i>														
BTGN	Black-tailed Gnatcatcher	<i>Poliophtila melanura</i>														
CAKI	Cassin's Kingbird	<i>Tyrannus vociferans</i>														
CASP	Cassin's Sparrow	<i>Aimophila cassinii</i>	32	2		2		1	1	61	40	29	29	2		
CASW	Swallow sp	<i>Petrochelidon</i>								1			11			
CATO	Canyon Towhee	<i>Pipilo fuscus</i>														
CAWR	Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	11		61	5	3	4		4	4	17	26	16		
CBTH	Thrasher sp	<i>Toxostoma sp</i>	3	1	14	3	2			2	2	1				
CHSP	Chipping Sparrow	<i>Spizella passerina</i>														
CLSW	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>					2	1	3			27				
CONI	Nighthawk sp	<i>Chordeiles sp</i>	2		1	2				25		5	3			
GAQU	Gambel's Quail	<i>Callipepla gambelii</i>					2									
GTTO	Green-tailed Towhee	<i>Pipilo chlorurus</i>														
HOLA	Horned Lark	<i>Eremophila alpestris</i>														
HUMM	Hummingbird Species					2										

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
LABU	Lark Bunting	<i>Calamospiza menalocorys</i>	264	---	46	31	3	61	19	4	---	13	---	32
LASP	Lark Sparrow	<i>Chondestes grammacus</i>	---	---	---	5	5	---	---	4	8	16	17	---
LBWO	Ladder-backed Woodpecker	<i>Picoides scalaris</i>	---	---	1	---	2	---	---	1	---	---	---	---
LOSH	Loggerhead Shrike	<i>Lanius ludovicianus</i>	8	5	22	9	20	14	13	---	8	12	16	27
MELA	Meadow Lark	<i>Sturnella neglecta</i>	1	2	11	16	8	49	46	18	119	17	84	---
MODO	Mourning Dove	<i>Zenaida macroura</i>	77	34	8	5	129	29	24	8	6	22	11	125
NOMO	Northern Mockingbird	<i>Mimus polyglottos</i>	23	13	2	7	2	8	2	10	21	18	36	12
NOOR	Northern Oriole	<i>Icterus galbula</i>	---	---	---	---	---	---	---	---	---	2	---	---
OCWA	Orange-crowned Warbler	<i>Vermivora celata</i>	---	---	---	---	---	---	---	---	---	---	---	---
PYRR	Pyrrhoxia	<i>Cardinalis sinuatus</i>	1	5	2	---	---	---	---	1	---	4	2	2
RCSP	Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	---	---	---	---	---	---	---	---	---	---	---	---
ROAD	Greater Roadrunner	<i>Geococcyx californianus</i>	3	3	2	---	10	7	4	1	3	2	2	5
SAPH	Say's Phoebe	<i>Sayornis saya</i>	---	---	---	---	---	1	---	---	1	---	---	---
SASP	Savannah Sparrow	<i>Passerculus sandwichensis</i>	---	---	---	---	---	---	---	---	---	---	---	---
SCOR	Scott's Oriole	<i>Icterus parisorum</i>	1	---	---	2	---	---	---	---	---	---	---	1
SCQU	Scaled Quail	<i>Callipepla squamata</i>	17	7	22	18	12	7	1	13	17	10	17	8
STFL	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	---	7	---	---	---	---	---	---	---	7	23	---
VERD	Verdin	<i>Auriparus flaviceps</i>	---	---	---	---	---	---	---	---	---	---	---	---
VESP	Vesper Sparrow	<i>Spizella atrogularis</i>	---	---	---	---	---	---	---	---	---	---	---	---
WCSP	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	---	---	---	---	---	---	---	---	---	---	---	---
WEKI	Kingbird sp	<i>Tyrannus sp</i>	12	9	14	13	50	22	13	5	67	8	7	2
WIWA	Wilson's Warbler	<i>Wilsonia pusilla</i>	---	---	---	---	---	---	---	---	---	---	---	---
WUDO	White-winged Dove	<i>Zenaida asiatica</i>	---	---	---	---	---	---	---	---	---	---	---	2
YHBB	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	---	---	---	---	---	---	---	---	---	---	---	---
YRWA	Yellow-rumped Warbler	<i>Dendroica coronata</i>	---	---	---	---	---	---	---	---	---	---	---	---
UNK SONG	Unknown Passerine/Songbird		152	96	131	131	326	117	176	112	98	94	145	72

Abbreviation	Common Name	Scientific Name	P1	K1	SB	CO	CH	VN	VS	MS	MW	AN	MA	BB
Songbird Totals			614	184	344	261	617	327	602	300	395	313	408	332
CORA	Common Raven	<i>Corvus corax</i>	12			43	8	93	35				11	
FEHA	Ferruginous Hawk	<i>Buteo regalis</i>										4		
GHOW	Great Horned Owl	<i>Bubo virginianus</i>				1				1				
GOEA	Golden Eagle	<i>Aquila chrysaetos</i>												
MAKE	American Kestrel	<i>Falco sparverius</i>			1	6	11	8	1					1
MERL	Merlin	<i>Falco coumbarius</i>												
NAFA	Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>					2							
NOHA	Northern Harrier	<i>Circus cyaneus</i>					1	3	6				1	
PEFA	Peregrine Falcon	<i>Falco peregrinus</i>												
RTHA	Red tailed Hawk	<i>Buteo jamaicensis</i>			3	1	2	2		2	3	7	2	
SWHA	Swainson's Hawk	<i>Buteo swainsoni</i>	12	10	5	15	6	11	10	4	1	4	35	1
BUOW	Burrowing Owl	<i>Athene cunicularia</i>			2	10			2			8	7	
SEOW	Short-eared Owl	<i>Asio flammeus</i>												
TUVU	Turkey Vulture	<i>Cathartes aura</i>	3	4	51	32	9	9	4	18	4	5		1
UNK RAP	Unknown Raptor		11	3	3	2	2	5	11	1	1		9	
WTKI	White-tailed Kite	<i>Elanus leucurus</i>												
Raptor, Raven and Turkey Vulture Totals			38	17	35	79	64	131	74	12	23	27	70	3
Routes incl: PECOS 1 (P-1), KERMIT 1 (K-1), SIERRA BLANCA (SB), CORNUDAS 1 (CO), CHISPA (CH), VALENTINE NORTH (VN), VALENTINE SOUTH (VS), MARFA SOUTH (MS), MARFA SW (MW), ALPINE NORTHEAST (AN), MARATHON (MA), BIG BEND NP=BB														