2011 Breeding Raptor Survey
Bureau of Land Management
Taos Field Office Resource Area
Final Report

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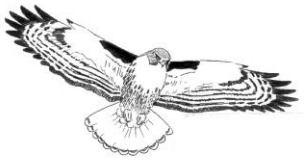

January, 2011

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Executive Summary

The Upper Rio Grande Gorge, Rio San Antonio Gorge, and Orilla Verde Recreation Area are important sites for breeding raptors in northern New Mexico and southern Colorado. In 2000, Hawks Aloft, Inc. was contracted to conduct distribution and productivity surveys of breeding raptors in the region. These surveys, although variable in survey area, effort, and species monitored, were continued from 2003 to 2007, 2010 (with a different contractor and protocol), and 2011. This report summarizes results from 2011 and provides a review of results from previous survey years. Funding for 2011 was delayed until fairly late in the raptor breeding season, and surveys were not initiated until 1 June 2011. Fifteen previously undocumented raptor nest sites were discovered, bringing the total number of documented sites to 92. A total of two occupied territories and 17 active nest sites, representing five raptor species, were documented in 2011. Of the active sites, reproductive success was determined at 16 sites. All sites with known fates were successful, but due to the late start, any sites that failed or fledged chicks before June were not included in the sample. A minimum of 28 chicks were fledged, resulting in an average productivity of 1.75 chicks per site. Productivity was highest for Ferruginous Hawk (3.00, n=1), Prairie Falcon (2.40, n=5) and Peregrine Falcon (2.00, n=2), and lowest for Red-tailed Hawk (1.25, n=4) and Golden Eagle (1.00, n=4). A variety of factors decrease the strength of productivity results for this study, and gauging the validity of inter-year comparisons is difficult. Surveys conducted from 2003-2007 were most similar in methodology to 2011, and the number of successful sites in 2011 were similar to the 2003-2007 mean. Because the delayed initiation of 2011 surveys likely resulted in an underestimation of failed sites, comparisons of nest success and productivity are difficult. Despite drought conditions during the 2010-2011 water year, productivity at successful nest sites was relatively high in 2011.

Introduction

The Upper Rio Grande Gorge, Orilla Verde Recreation Area, and the Rio San Antonio Gorge are important areas for nesting raptors in north-central New Mexico, as well as migration corridors for many other raptor species. This relatively undeveloped area includes an abundance of cliff walls that provide an ideal nesting substrate for many raptor species including Golden Eagle (*Aquila chrysaetos*), Prairie Falcon (*Falco mexicanus*), Peregrine Falcon (*F. peregrinus*), Red-tailed Hawk (*Buteo jamaicensis*), and Great Horned Owl (*Bubo virginianus*). Over the past two decades, recreational use of the Upper Rio Grande Gorge and Orilla Verde Recreation Area has substantially increased. Activities such as boating, fishing, hiking, and cycling can potentially have adverse impacts on nesting raptors (Call 1978, New Mexico Avian Protection Working Group 2005, Watson and Dennis 1992). All raptor species and their nests are protected under the Migratory Bird Treaty Act of 1918. Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles receive further protection under the Bald and Golden Eagle Protection Act of 1940.

Prior to 2000, little information concerning the status of raptors in the Upper Rio Grande Gorge region was available, and official surveys had not occurred since the 1980s. In 2000, the Taos Field Office of the Bureau of Land Management (BLM) contracted Hawks Aloft, Inc. to conduct a survey of the breeding raptor population in the Upper Rio Grande Gorge. In 2003, this work was extended to include the Orilla Verde Recreation Area and the Rio San Antonio Gorge, and these surveys were continued through 2007. In 2009, only Golden Eagle sites in the Upper Rio Grande Gorge were monitored. Full surveys were reinstated in 2010, but were not conducted by Hawks Aloft, Inc., and a different protocol was followed. For the first time since 2007, Hawks Aloft conducted surveys for all raptor species in the full survey area in 2011. The primary

purpose of this project is to document raptor distribution, productivity, and population trends in the project area in order to assist the BLM in the development of management decisions that may impact raptor populations. This report documents the results of 2011 breeding raptor surveys and also summarizes findings from past survey years.

Study Area

Surveys were conducted in three areas in northern New Mexico and southern Colorado: the Upper Rio Grande Gorge, the Rio San Antonio Gorge, and the Orilla Verde Recreation Area (Figure 1). These sites occur in Taos and Rio Arriba counties, New Mexico, and in Conejos and Costilla counties, Colorado.

The Upper Rio Grande Gorge survey area covers approximately 66 kilometers of river from the John Dunn Bridge in New Mexico to the Lobatos Bridge in southern Colorado. The John Dunn Bridge is located approximately four kilometers west of the town of Arroyo Hondo, and the Lobatos Bridge crosses the Rio Grande approximately 13 kilometers north of the Colorado-New Mexico border. The Rio Grande begins to cut into the layered basalt of the Taos Plateau just south of the Lobatos Bridge where the Upper Gorge technically begins. The gorge is approximately 60 meters wide and 45 meters deep at the New Mexico-Colorado border. The gorge meanders south and gradually widens and deepens, reaching its maximum size at the Wild Rivers Area where it is approximately one kilometer across and 250 meters deep. Continuing south, the canyon narrows and becomes shallower again; at the John Dunn Bridge it is approximately 0.4 kilometers wide and 100 meters deep.

The Taos Plateau is flanked by the alluvial fans of the Sangre de Cristo Mountains to the east, and the Tusas Mountains to the west. The plateau is dotted with numerous cinder cones and a few widely scattered, large shield volcanoes. The elevation of the Taos Plateau along the canyon rim ranges from 2,072 meters at the John Dunn Bridge to about 2,316 meters in southern Colorado. Habitat on the Taos Plateau can be generally categorized as Great Basin desert shrub

with big sagebrush (*Artemisia tridentata*) as the major shrub component. From the John Dunn Bridge north through the Wild Rivers Area, the east rim of the gorge is predominantly pinyon-juniper woodland, containing Colorado pinyon pine (*Pinus edulis*) and juniper (*Juniperus* sp.). Some of the larger side canyons contain mixed conifer woodland with ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*). The west rim is primarily juniper savanna and shrub/grassland habitat, with pinyon-juniper woodland becoming dominant along the Wild Rivers Area. Both the east and west rim from Sheep Crossing north to the Lobatos Bridge are mainly shrub/grassland and sparse shrub/grassland with scattered areas of juniper savanna. The bottom of the Rio Grande Gorge consists of riparian woodland, with areas of mixed conifer woodland occurring mainly in the southern portion of the survey area north through the Wild Rivers Area. This reach of the Rio Grande Gorge has large, widely scattered mature ponderosa pines along the canyon bottom in close proximity to the river. North of the Wild Rivers Area the canyon bottom narrows and few trees are found in this portion of the survey area.

The Orilla Verde Recreation Area begins just north of the town of Pilar, New Mexico and follows the Rio Grande north for approximately 10 kilometers to the point where county road No. 570 climbs to the west rim of the gorge. Riparian habitat here is relatively consistent with the upper gorge area. The east and west rims are also characterized as Great Basin desert shrub. The elevation ranges from 1,830 meters on the canyon bottom to 2,073 meters at the canyon rim. The width of the canyon is about one kilometer at the north end and widens to over a kilometer near Pilar.

The Rio San Antonio Gorge is located approximately 35 kilometers north of the town of Tres Piedras, New Mexico and five kilometers west of Highway 285. The headwaters of the Rio San Antonio originate approximately 25 kilometers west of San Antonio Mountain at the boundary line of the Tierra Amarilla Land Grant and the Carson National Forest. The study area covers approximately 10 kilometers of the Rio San Antonio Gorge, from just south of the town of Ortiz, Colorado, south to the northwestern flank of San Antonio Mountain (3,325 meters), one of several large shield volcanoes that rise above the Taos Plateau. The Rio San Antonio Gorge has been cut through the basaltic rock of the Taos Plateau, with the canyon depth ranging from approximately 15 meters to 46 meters, and its width ranging from approximately 75 meters to 150 meters. At the canyon rim, the elevation ranges from 2,438 meters at the northern end to 2,621 meters at the southern end. The Rio San Antonio Gorge is very similar in structure and associated habitats to the Rio Grande Gorge, with basalt canyon walls and vegetation characteristic of an inverted ecosystem.

Methods

Surveys were conducted on foot and by vehicle using existing roads and tracks. Areas that had previously documented raptor nests and territories were visited first; additional areas were searched for undocumented sites as the season progressed. Canyon walls were scanned with binoculars and spotting scopes for active nests and raptor activity. In order to adequately cover the survey area, attempts were made to search each canyon wall for signs of raptor presence. In areas with easy access, this could be accomplished by scanning both sides from the canyon bottom, but in most areas, it was necessary to search visible cliff faces from the canyon rims. Where possible, surveys occurred on both canyon rims, but in several areas, such as the northern half of the upper Rio Grande Gorge and the Rio San Antonio Gorge, accessing one side of the canyon (in these instances, the west side) was difficult and time consuming due to the poor condition of the existing roads. As a result, some sections of the survey area were surveyed only from one side and coverage was less than ideal.

When undocumented nest sites were found, coordinates of the site or vantage point were recorded with GPS units, and information on nest type, substrate, height, and habitat were recorded. During all visits, species attendance, number and development stage of chicks, and behavioral data were collected and catalogued on field data forms. Active raptor nests were viewed from a distance of more than 100 yards to avoid disturbance to the nest (Fuller and Mosher 1987) and were monitored for a minimum of 15 minutes to accurately determine nesting status. All active nests were visited a minimum of three times throughout the breeding season. Visiting sites more often results in better estimates of productivity, and effort was made to visit active sites as often as resources allowed.

Nest status was determined to be "active" (occupied by a breeding pair) if an adult was observed in the incubating position, or nestlings were observed in the nest. Nest sites were considered to be "occupied territories" if adult or sub-adult birds were observed near the nest and/or displayed territorial behavior, and no evidence of breeding was observed. All nests determined to be active during the incubation or brooding periods received a minimum of two additional visits to determine the number of nestlings and the number of young fledged. Young still in the nest were considered fledged if they were 90% feathered and estimated to be within 1-2 weeks of leaving the nest. Active sites where chick fates could not be determined were assigned "unknown" productivity statuses. Nest success is calculated as the number of sites that fledge at least one chick divided by the number of sites with known fates, and productivity is calculated as the number of fledglings divided by the number of nests with known fate. The period of nest monitoring is not factored into success calculations (see Discussion).

Results

Overview of Documented Sites

Fifteen previously undocumented raptor nest sites were discovered in 2011. Field observations in 2011, along with an analysis of previously documented sites by Geographic Information System (GIS), led to the conclusion that two sites reported as new in 2010 were actually previously documented sites: NewMEB04 appears to be synonymous with historic site 47 and NewMEB05 appears synonymous with site 11b (Figure 3). Factoring the newly documented sites with the adjustments to the historic database brings the total number of sites documented in the study area since 2000 to 92. This number includes sites with multiple proximate stick nests that were judged to be alternate nests for a single raptor pair. Of the 92 sites, five represent stick nests located outside of the primary gorges; these sites include one Golden Eagle nest, three Ferruginous Hawk (*Buteo regalis*) nests and one nest likely used by Swainson's Hawk (*Buteo swainsoni*). Although not located in the focus survey area, these nests are situated along routes used to access other gorge sites and were included because of the ease with which they could be monitored. Universal Traverse Mercator (UTM) coordinates for all nest sites are provided in Appendix 1, and the location of nest sites, as well as the last year the site was active, the last species to breed at the site, and the number of years the site has been active are displayed in Figures 2 – 8.

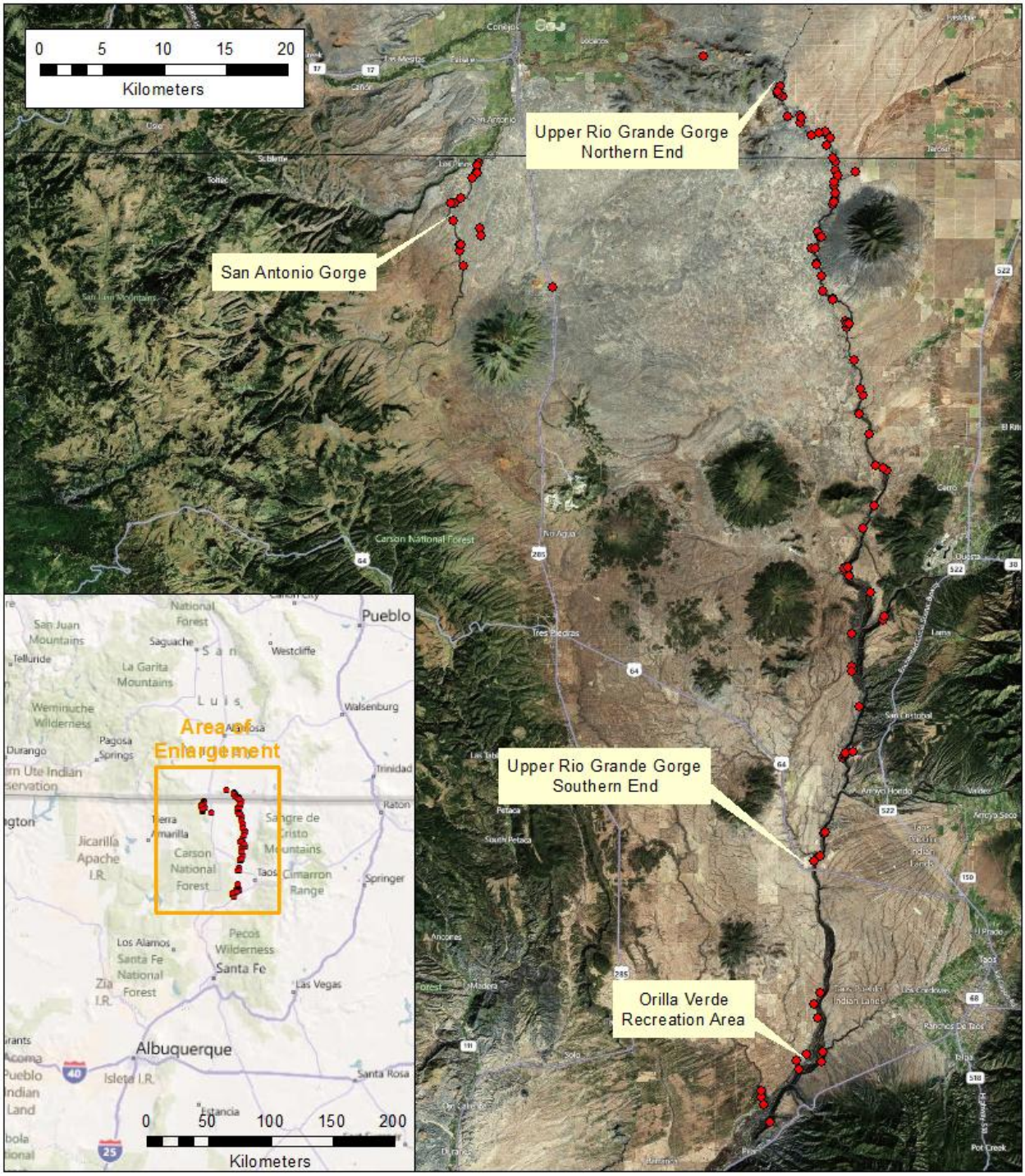

Figure 1. Overview of the 2011 BLM Taos breeding raptor survey area, Taos and Rio Arriba Counties, NM and Costilla and Conejos Counties, CO.

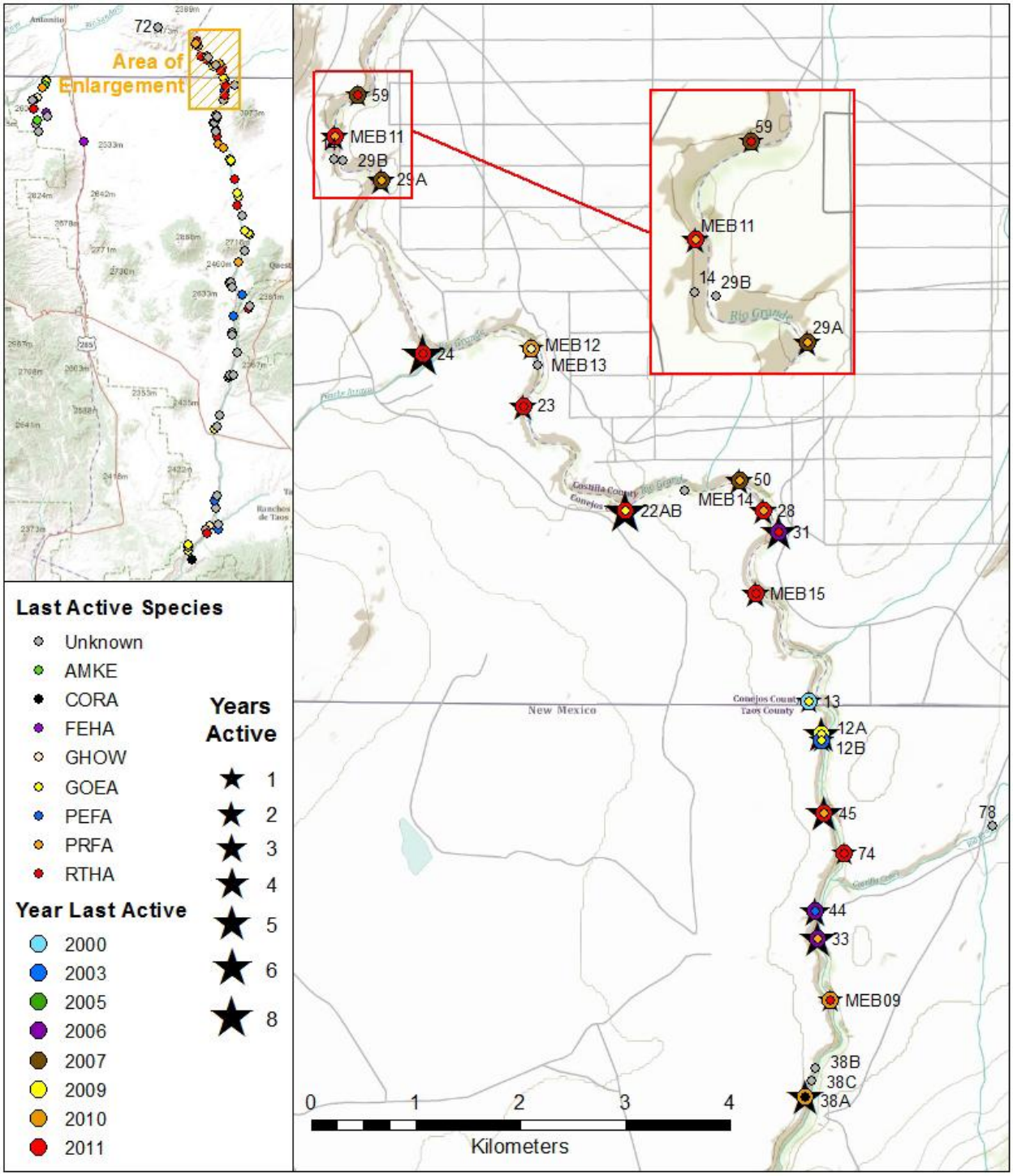

Figure 2. Enlargement (1 of 5, north to south) of the Upper Rio Grande Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

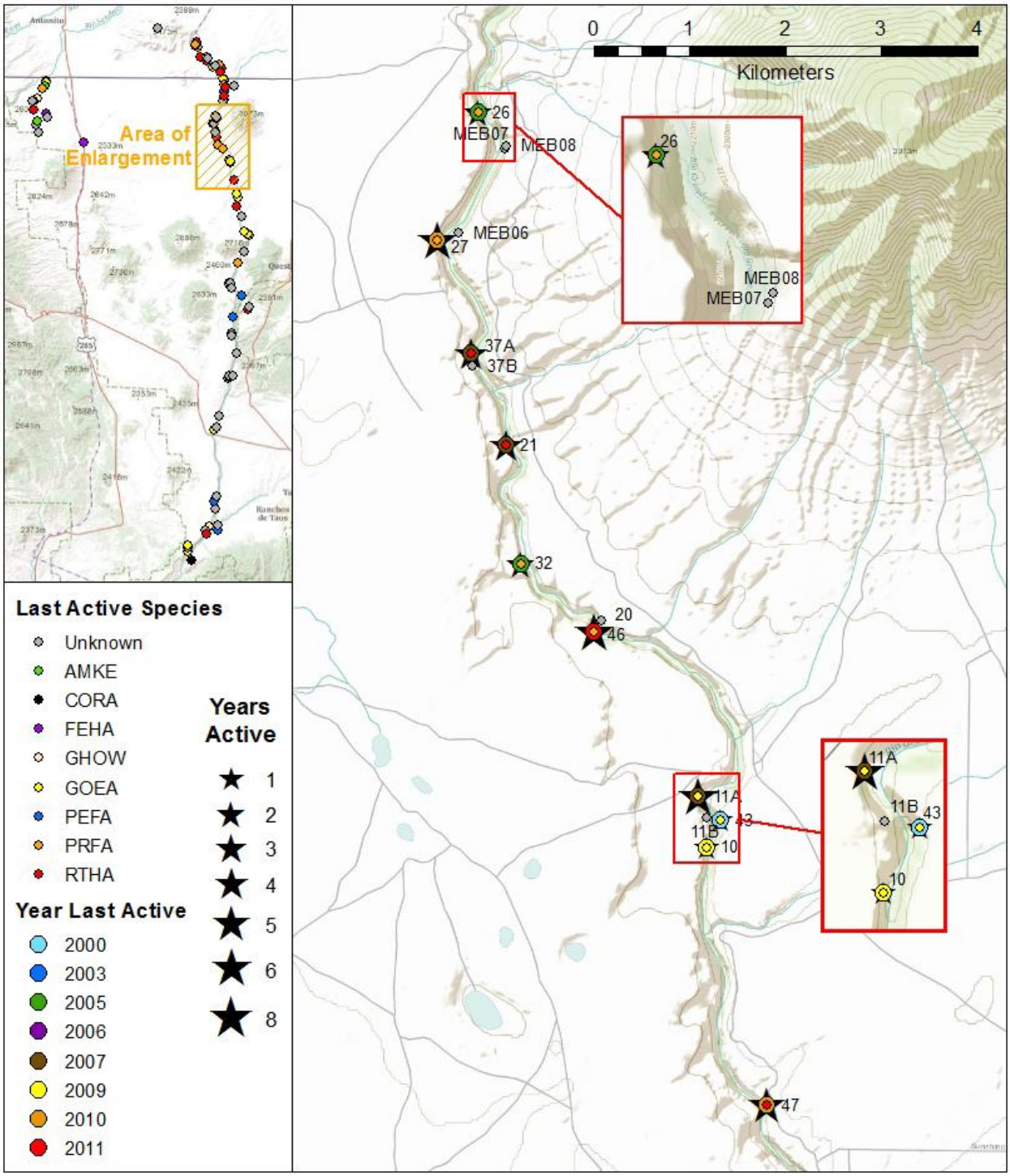

Figure 3. Enlargement (2 of 5, north to south) of the Upper Rio Grande Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

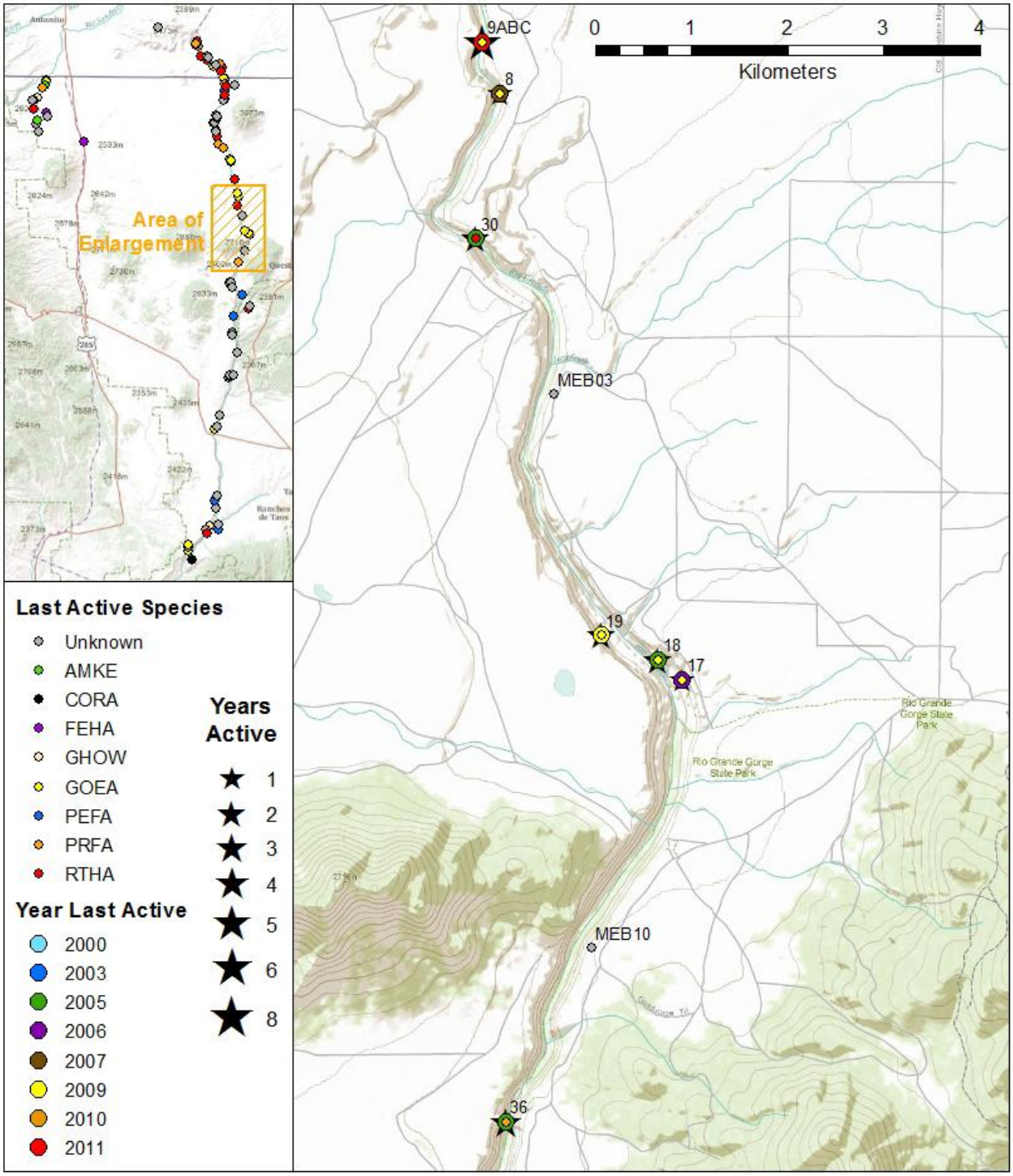

Figure 4. Enlargement (3 of 5, north to south) of the Upper Rio Grande Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

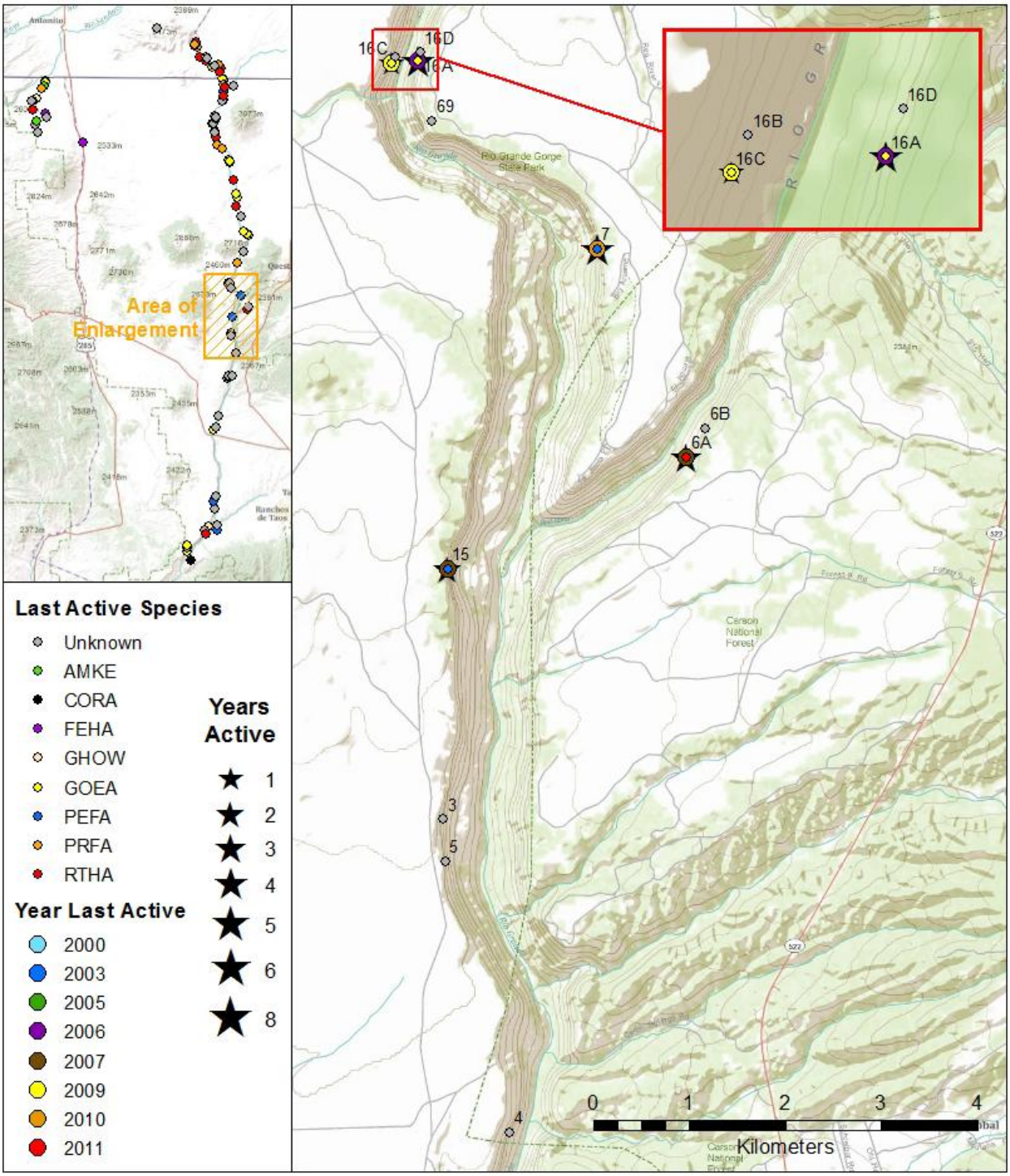

Figure 5. Enlargement (4 of 5, north to south) of the Upper Rio Grande Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

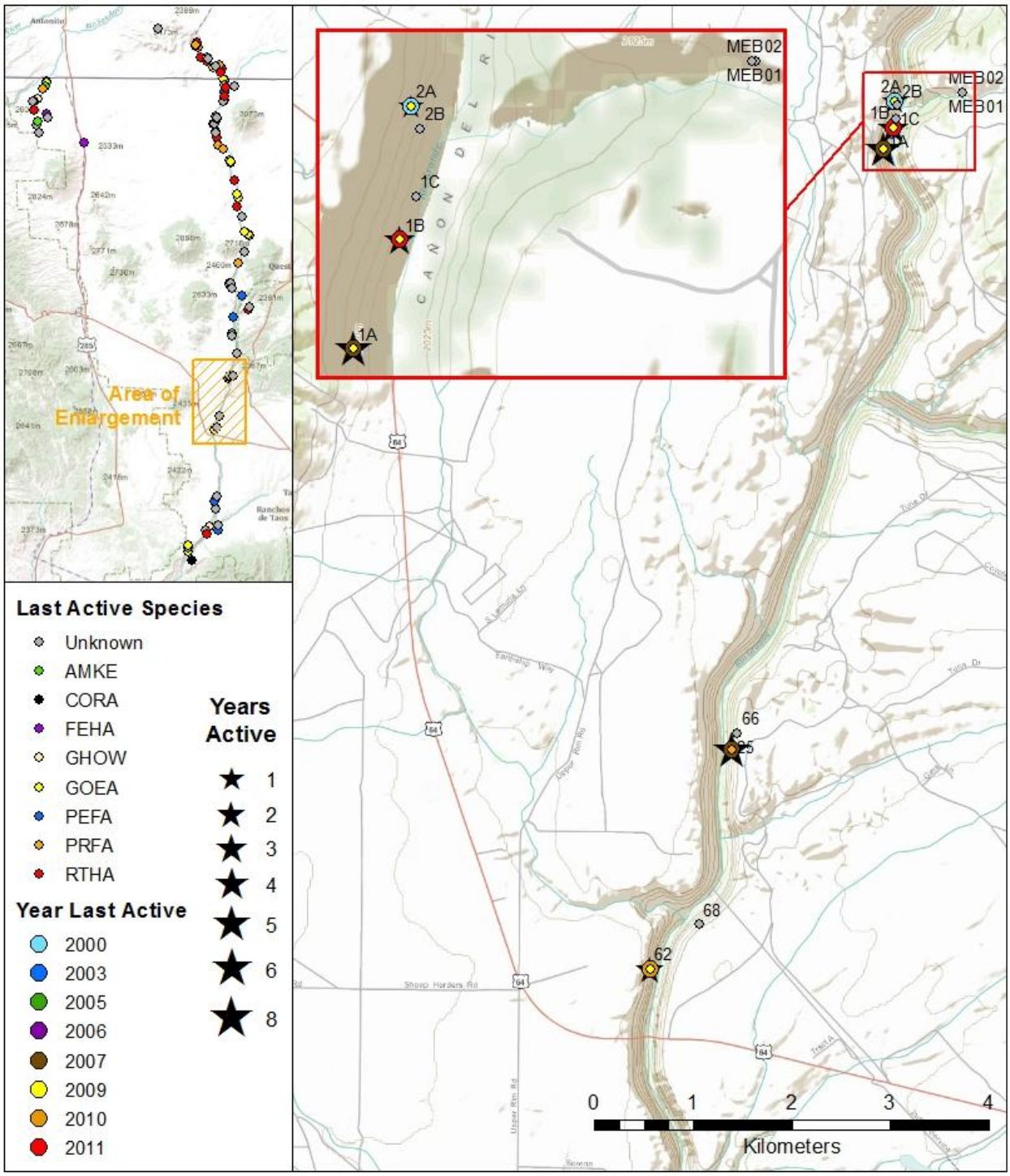

Figure 6. Enlargement (5 of 5, north to south) of the Upper Rio Grande Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

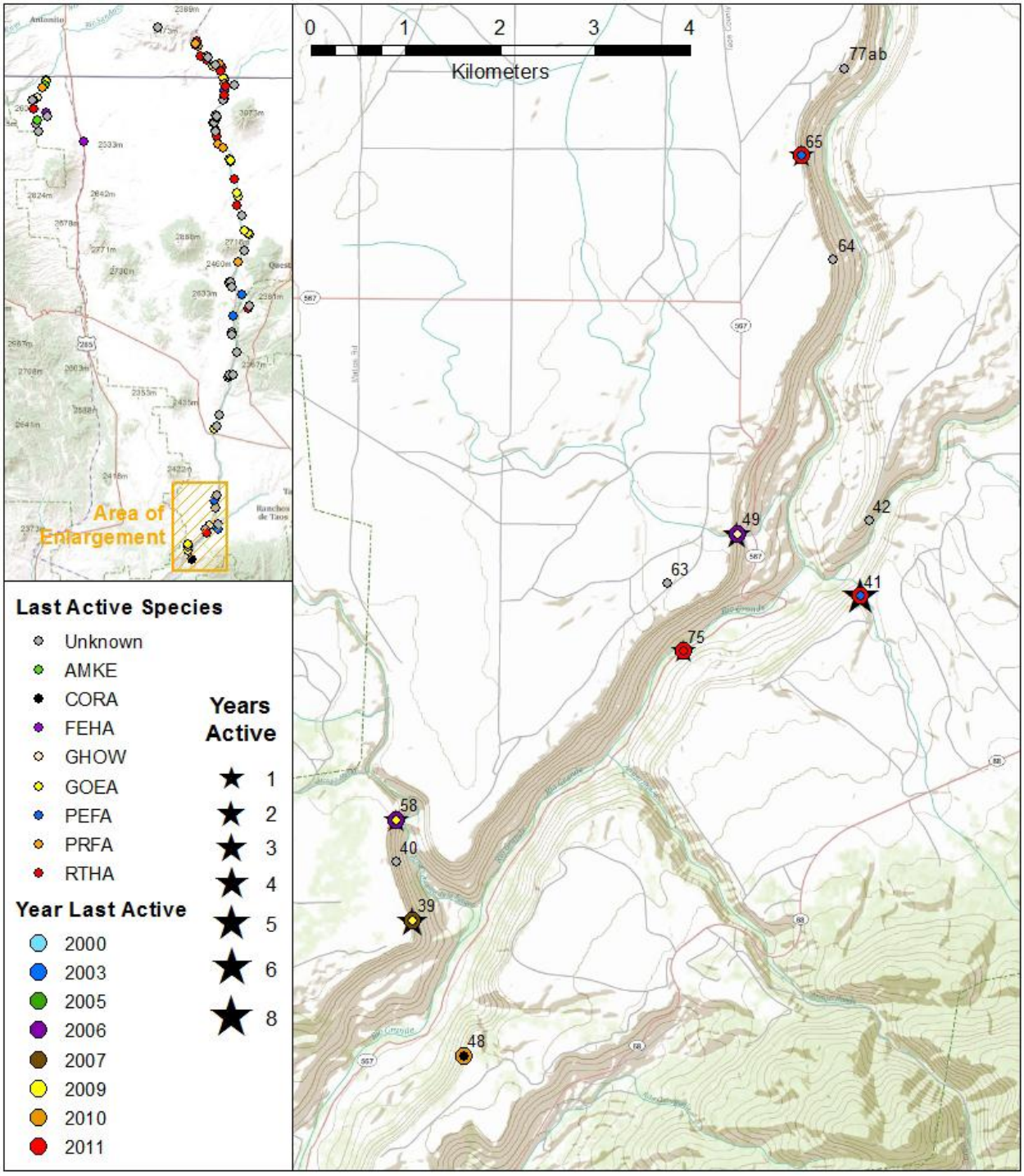

Figure 7. Enlargement of the Orilla Verde Recreation Area section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

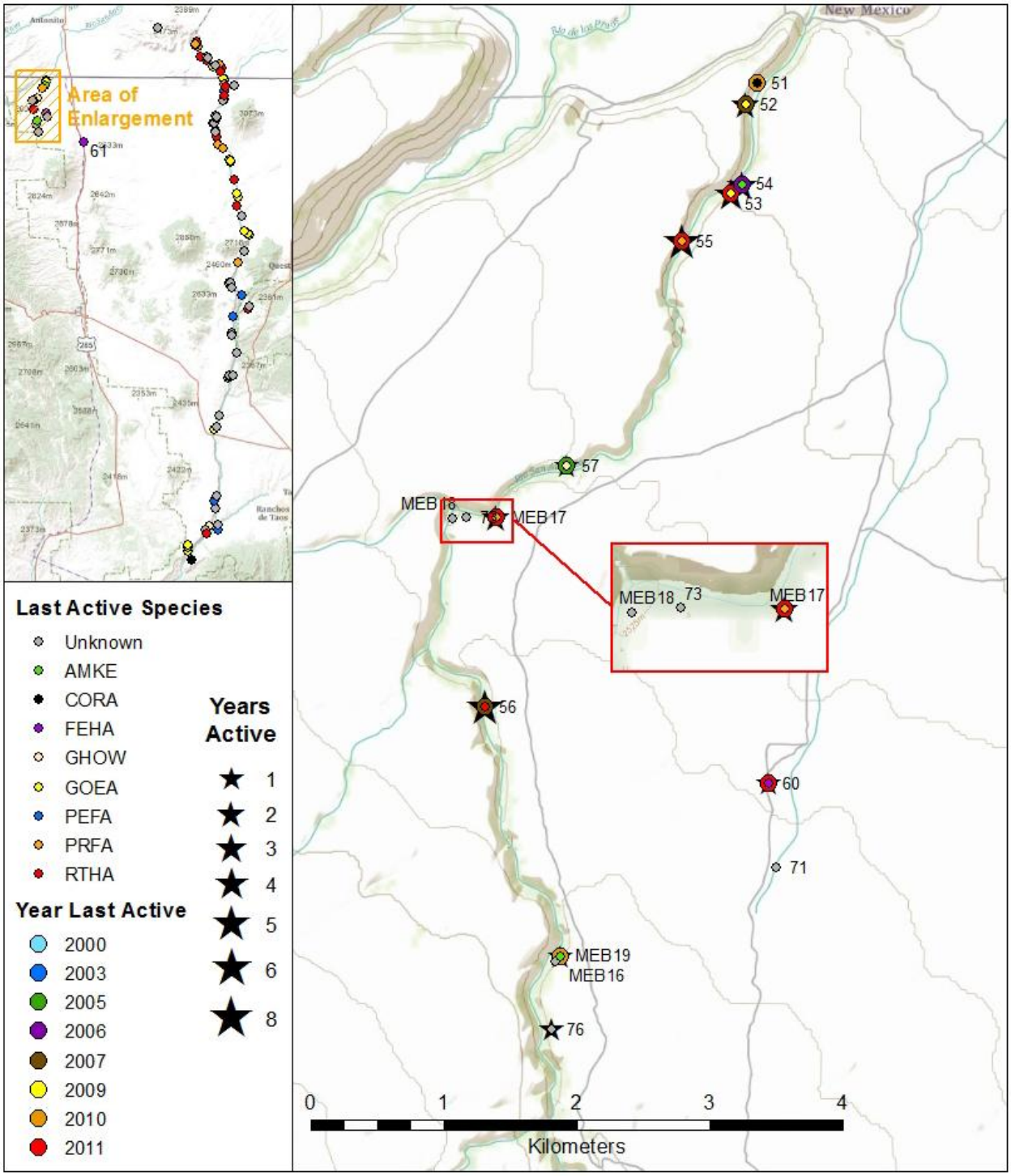

Figure 8. Enlargement of the Rio San Antonio Gorge section of the 2011 BLM Taos breeding raptor survey area. The following species codes are used: AMKE (American Kestrel), CORA (Common Raven), FEHA (Ferruginous Hawk), GHOW (Great Horned Owl), GOEA (Golden Eagle), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

Results of 2011 Surveys

Funding for 2011 was delayed until fairly late in the raptor breeding season. As a result, surveys were not initiated until 1 June 2011, and were conducted on 30 days through 27 July. Due to the late start, any sites that failed or fledged chicks before June were not included in the sample. A total of two occupied territories and 17 active nest sites, representing five raptor species, were documented in 2011 (Table 1). Reproductive success was determined at 16 of 17 active sites. All sites with known fates were successful, and a minimum of 28 chicks were fledged, resulting in an average productivity of 1.75 chicks per site. Productivity was highest for Ferruginous Hawk (3.00, n=1), Prairie Falcon (2.40, n=5) and Peregrine Falcon (2.00, n=2), and lowest for Red-tailed Hawk (1.25, n=4) and Golden Eagle (1.00, n=4). Activity and productivity statuses at individual nest sites in 2011, as well as statuses reported from previous survey years, are presented in Appendix 2.

Table 1. Productivity parameters by species for 2011, BLM Taos raptor survey area. Productivity is the number of chicks fledged divided by the number of sites with known fates.

Species	Occupied Territories	Active Sites	Known Fates	Failed Sites	Successful Sites	Chicks Fledged	Productivity
Ferruginous Hawk	0	1	1	0	1	3	3.00
Golden Eagle	0	4	4	0	4	4	1.00
Peregrine Falcon	0	2	2	0	2	4	2.00
Prairie Falcon	1	5	5	0	5	12	2.40
Red-tailed Hawk	1	5	4	0	4	5	1.25
Total	2	17	16	0	16	28	1.75

Overview of Results from All Survey Years

Of the 92 sites that have been identified since 2000, 31 have not been active or occupied during survey years. Two sites have never been active, but were designated as occupied territories on at least one occasion. Of the remaining 59 sites that have been active during at least one survey year, 23 were active during only one year, 14 during two years, six during three years, seven during four years, six during five years, one during seven years, and two during eight years. A total of 34 site-years of occupied territories and 150 site-years of active nest sites have been documented during all survey years. Of these, 12 were considered unknown fates (e.g. reproductive status could not be determined), 22 were determined to have failed, and 116 were considered successful. This results in an overall nest success rate of 0.84 for the survey area.

Productivity parameters for all raptor species by year are presented in Figure 9 and Table 2. Because monitoring period, effort, survey area, and protocol have varied among years, inter-year comparisons of productivity are difficult. For years when all raptor species were monitored, the number of active nests has ranged from 11 to 25 with a mean of 18.4. During this period, nest success has ranged from 0.67 to 1.00, with a mean of 0.84. Because the monitoring period, area surveyed and protocol followed were fairly constant, the years 2003 to 2007 are most useful for inter-year comparisons. Total nest success rates were fairly consistent during that period. From 2003 to 2005 the number of occupied territories decreased while the number of active sites increased; the number of successful and failed sites remained fairly consistent for the following two years (2006 and 2007). Comparisons of productivity between recent survey years and the 2003 to 2007 period are not valid because of late start dates (2010 and 2011), insufficient survey effort and weak protocol adherence (2010), and different focal species and survey area (2009).

Despite the late start date, 2011 marks the first survey year where effort, survey area, species surveyed, and protocol adherence matched the 2003 to 2007 period. Assuming that an earlier start date would have increased the number of known active sites and breeding failures, results from 2011 indicate that productivity parameters in 2011 were likely similar to the 2003 to 2007 survey period.

Table 2. Productivity parameters for all raptor species by year, BLM Taos raptor survey area. Nest success is the number of nests that fledged at least one chick (e.g. Successful) divided by the number of sites with known fates.

Year	Start	Occupied Territory	Active	Known Fate	Successful	Failed	Nest Success
2011	1-Jun	2	17	16	16	0	1.00
2010[1]	15-Jun	4	11	5	5	0	1.00
2009[2]	24-Apr	3	3	3	2	1	0.67
2007	15-Mar	2	25	22	18	4	0.82
2006	12-Mar	6	21	21	17	4	0.81
2005	24-Mar	4	24	24	18	6	0.75
2004	19-Mar	5	18	17	14	3	0.82
2003	28-Mar	6	13	12	8	4	0.67
2000[3]	24-Mar	2	18	18	18	0	1.00
Total		34	150	138	116	22	0.84

[1] surveys were not conducted by Hawks Aloft, Inc. and different protocol were followed
[2] only Golden Eagle sites in the Upper Rio Grande Gorge were monitored
[3] only the Upper Rio Grande Gorge was surveyed

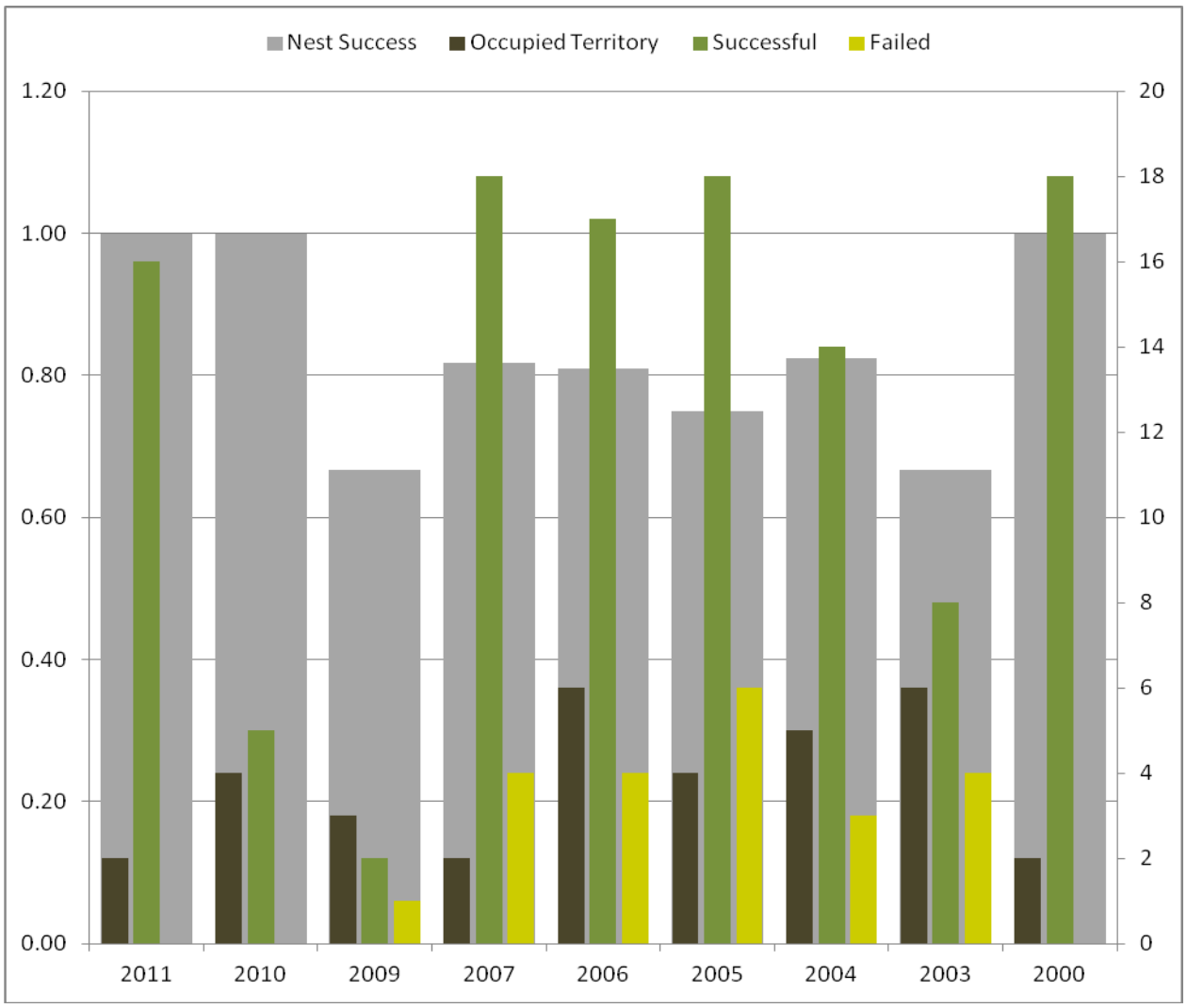

Figure 9. Raptor productivity parameters, by year, BLM Taos raptor study area. The right axis refers to numbers of occupied territories and sites that failed or were successful (fledged at least one chick). The left axis refers to nest success (the number of successful nests divided by the number of nests with known fates. In 2000 and 2009, surveys were not conducted at the Rio San Antonio Gorge or the Orilla Verde Recreation Area; only Golden Eagle sites were monitored in 2009. Late start dates in 2010 and 2011 bias results towards success.

Results by Species

For all survey years, breeding attempts in the survey area have been documented for seven raptor species. Reported activity and productivity statuses by species during all survey years are presented in Table 3. The highest numbers of active nests were documented for Golden Eagle (49) and Red-tailed Hawk (44). Although these findings indicate that Golden Eagle is the most common breeding raptor in the study site, it should be noted that only sites utilized by this species were monitored in 2009; if data from that year were removed, the number of Red-tailed Hawk sites is very similar to Golden Eagle sites. Slightly less numerous over the survey period were Prairie Falcon sites (38), followed by Peregrine Falcon sites (11). Only three active nest sites were documented for American Kestrel and Great Horned Owl. Ferruginous Hawk sites were monitored in 2007 and 2011, and although reported during these years, the nests were located outside of the survey area. Because ideal Ferruginous Hawk nesting habitat is located only outside of the gorges where surveys are concentrated, it is likely that the species was excluded from monitoring during many survey years and more nests were likely present than the three sites (although never active, site 71 is a nest characteristic of the species) that were monitored during 2007 and 2011.

For species with at least ten site-years where fate was determined, nest success has been highest for Prairie Falcon (0.89), slightly lower for Golden Eagle (0.85) and Red-tailed Hawk (0.85), and much lower for Peregrine Falcon (0.55). For species with higher sample sizes, the ratio of occupied territories to active nest sites is higher for Peregrine Falcon (0.36) and Prairie Falcon (0.31), and lower for Golden Eagle (0.20) and Red-tailed Hawk (0.14). The number of active nest sites by species and year are presented in Table 4 and Figure 11, and the number of

occupied territories by species and year are presented in Table 5 and Figure 12. Differences among years in survey area, protocol, and species monitored make comparisons difficult, but in several cases, years with a higher numbers of active sites (relative to other years with similar survey effort) show lower numbers of occupied territories during the same year. Table 6 and Figure 13 present the cumulative number of occupied territories and active nest sites by species and year. The summation of these parameters provides an estimate of the total number of raptor sites with attending individuals each year.

Table 3. Productivity parameters by species for all survey years, BLM Taos raptor survey area. Nest success is the number of nests that fledged at least one chick (e.g. Successful) divided by the number of sites with known fates.

Species	Occupied Territory	Active	Known Fate	Failed	Successful	Nest Success
American Kestrel	1	3	1	0	1	1.00
Ferruginous Hawk	0	2	2	0	2	1.00
Golden Eagle	10	49	47	7	40	0.85
Great Horned Owl	1	3	2	0	2	1.00
Peregrine Falcon	4	11	11	5	6	0.55
Prairie Falcon	12	38	36	4	32	0.89
Red-tailed Hawk	6	44	39	6	33	0.85
Total	34	150	138	22	116	0.84

Table 4. Number of active nest sites reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

Species	2011[1]	2010[2]	2009[3]	2007	2006	2005	2004	2003	2000[4]
AMKE	0	1	-	0	0	0	1	1	0
FEHA	1	0	-	1	0	0	0	0	0
GOEA	4	3	3	8	8	8	6	3	6
GHOW	0	1	-	0	0	2	0	0	0
PEFA	2	0	-	2	0	3	2	2	0
PRFA	5	2	-	6	6	5	4	3	7
RTHA	5	4	-	8	7	6	5	4	5
Total	17	11	3	25	21	24	18	13	18

[1] delayed start date likely resulted in a low count of active sites
[2] surveys not conducted by Hawks Aloft and different protocol were followed; delayed start date
[3] only Golden Eagle sites in the Upper Rio Grande Gorge were monitored
[4] only the Upper Rio Grande Gorge was surveyed

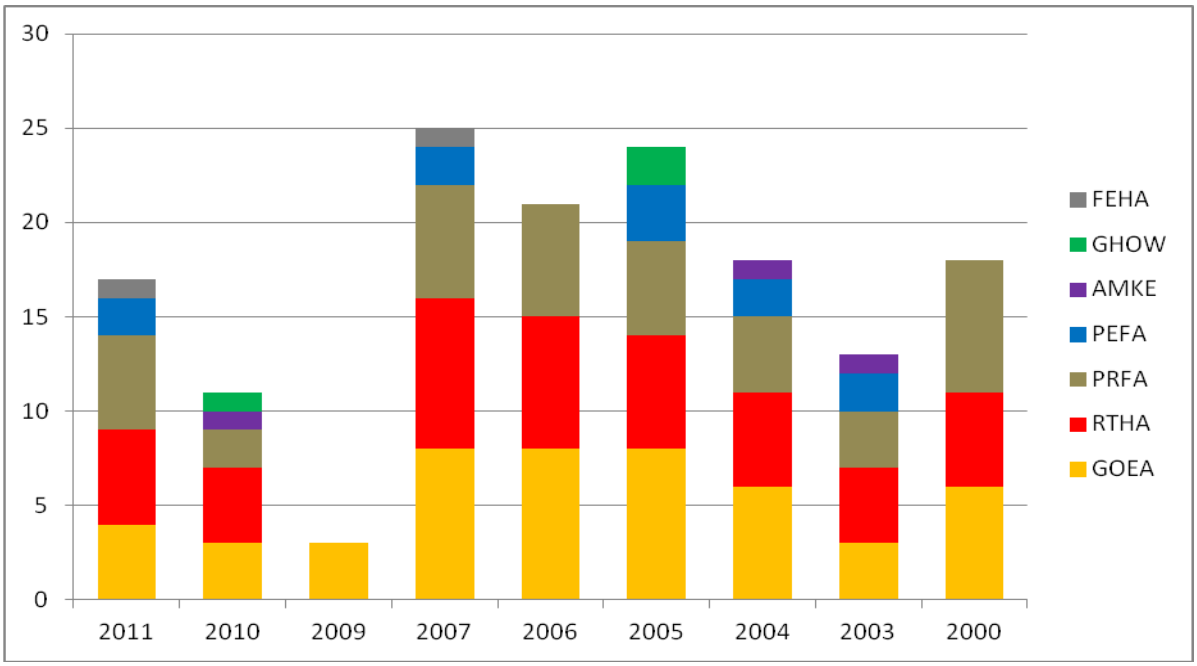

Figure 10. Number of active nest sites reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk). Survey area, protocol, and species monitored varied among years.

Table 5. Number of occupied territories reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

Species	2011[1]	2010[2]	2009[3]	2007	2006	2005	2004	2003	2000[4]
AMKE	0	0	-	0	1	0	0	0	0
FEHA	0	0	-	0	0	0	0	0	0
GOEA	0	0	3	1	1	0	2	4	1
GHOW	0	0	-	0	1	0	0	0	0
PEFA	0	1	-	0	1	0	1	0	0
PRFA	1	3	-	1	1	2	2	1	0
RTHA	1	0	-	0	1	2	0	1	1
Total	2	4	3	2	6	4	5	6	2

[1] delayed start date likely resulted in a low count of occupied territories
[2] surveys not conducted by Hawks Aloft and different protocol were followed; delayed start date
[3] only Golden Eagle sites in the Upper Rio Grande Gorge were monitored
[4] only the Upper Rio Grande Gorge was surveyed

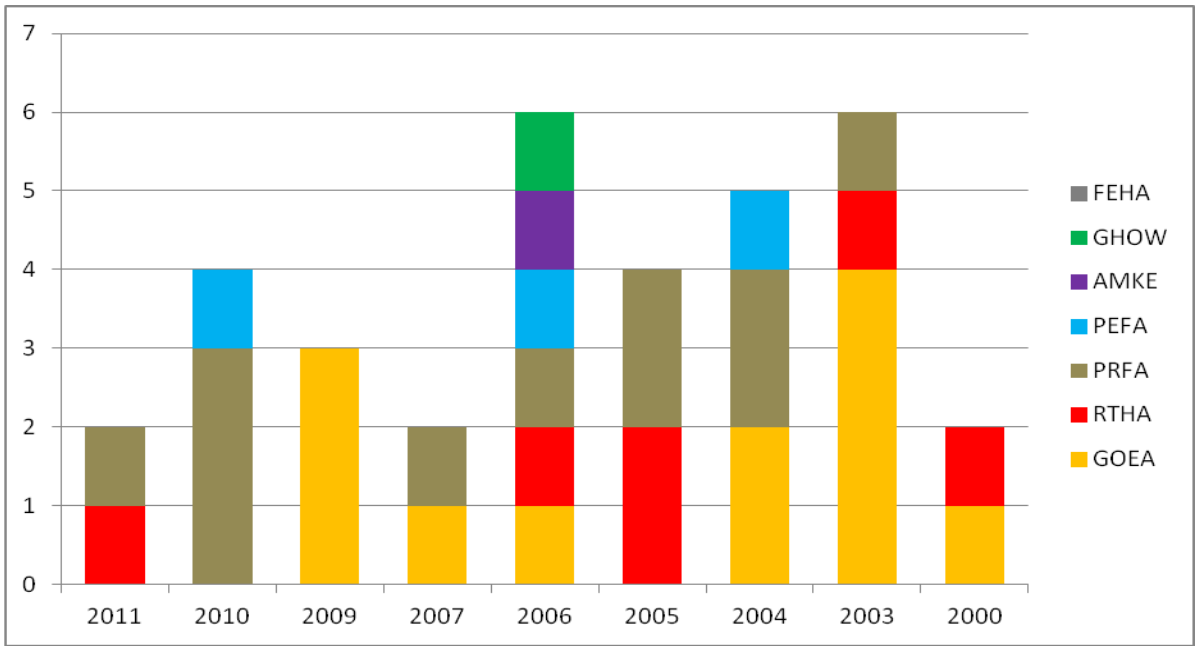

Figure 11. Number of occupied territories reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk). Survey area, protocol, and species monitored varied among years.

Table 6. Total number of occupied territories and active nest sites reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk).

Species	2011[1]	2010[2]	2009[3]	2007	2006	2005	2004	2003	2000[4]
AMKE	0	1	-	0	1	0	1	1	0
FEHA	1	0	-	1	0	0	0	0	0
GOEA	4	3	6	9	9	8	8	7	7
GHOW	0	1	-	0	1	2	0	0	0
PEFA	2	1	-	2	1	3	3	2	0
PRFA	6	5	-	7	7	7	6	4	7
RTHA	6	4	-	8	8	8	5	5	6
Total	19	15	6	27	27	28	23	19	20

[1] delayed start date likely resulted in a low count of active sites and occupied territories
[2] surveys not conducted by Hawks Aloft and different protocol were followed; delayed start date
[3] only Golden Eagle sites in the Upper Rio Grande Gorge were monitored
[4] only the Upper Rio Grande Gorge was surveyed

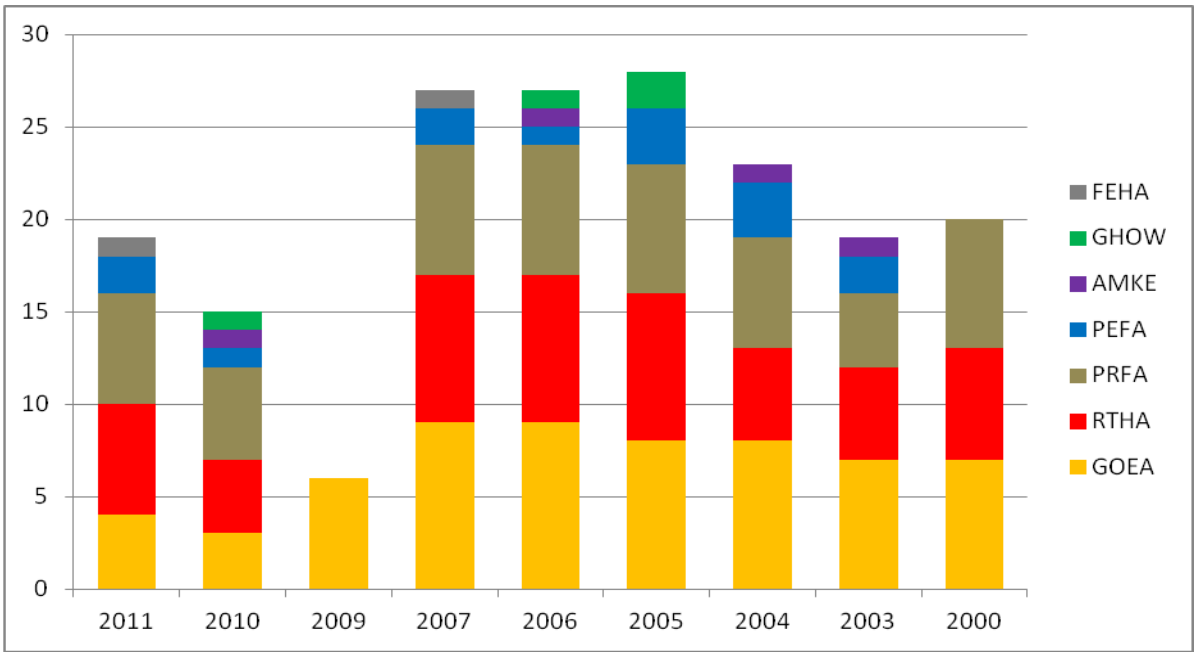

Figure 12. Total number of occupied territories and active nest sites reported by species, per year, BLM Taos raptor survey area. The following codes are used: AMKE (American Kestrel), FEHA (Ferruginous Hawk), GOEA (Golden Eagle), GHOW (Great Horned Owl), PEFA (Peregrine Falcon), PRFA (Prairie Falcon), and RTHA (Red-tailed Hawk). Survey area, protocol, and species monitored varied among years.

Results by Survey Area

For all survey years, productivity parameters for the Upper Rio Grande Gorge, Orilla Verde Recreation Area, and the Rio San Antonio Gorge are presented in Table 7. Eighty-two percent of documented occupied territories and 78% of active sites occurred in the much larger Upper Rio Grande Gorge section of the study site. Nest success was highest in the Rio San Antonio Gorge, where all 21 sites with known fates were successful. Success was lower in the Upper Rio Grande Gorge (0.81) than in the Orilla Verde Recreation Area (0.89); however, only nine sites with known fates have been monitored in the latter area.

Table 7. Productivity parameters for all raptor species by survey area for all survey years, BLM Taos raptor survey area. Nest success is the number of nests that fledged at least one chick (e.g. Successful) divided by the number of sites with known fates.

Area	Occupied Territories	Active	Known Fate	Failed	Successful	Nest Success
Upper Rio Grande	28	117	108	21	87	0.81
Orilla Verde	3	10	9	1	8	0.89
San Antonio	3	23	21	0	21	1.00
Total	34	150	138	22	116	0.84

Discussion

Factors Affecting Survey Findings

Determining reproductive success in breeding raptors is dependent on accurately estimating the fledging success of chicks. Intensive monitoring allows observers to better estimate early stage chronological events (i.e. laying and hatching dates) which can assist with the timing of future visits to maximize the probability of determining nest success. For example, if the hatch date at a nest is accurately determined, the fledge date can be estimated by adding the average chick-rearing period for the species to the hatch date. This allows observers to time their final monitoring visit to within a few days of the expected fledge date. If fully feathered chicks are visible during this visit, the probability of a successful fledge is high. However, if an early stage chronology date is not estimated accurately, the timing of later visits is more difficult and observers may find an empty nest where it is impossible to determine with confidence whether the chick fledged or died. These unknown fates lower the sample size of sites used in success analyses, and can lead to an underestimation of nest failure. The number of unknown fates reported from this project is low; yet, in many years, the monitoring schedule involved a very limited number of visits. This indicates that observers may have tended to categorize sites as failed or successful without adequate evidence.

The bias towards success can also be exacerbated by a delay in the onset of monitoring, which can cause nesting attempts that fail early in the season to be missed. In order to provide the most complete and accurate estimates of raptor productivity, we stress the importance of an intensive monitoring schedule that begins early in the breeding season. The late initiation of surveys

during the past two survey seasons (1 June in 2011 and 15 June in 2010) likely accounts for the absence of documented nest failures during these two years.

Perhaps most significantly, the time span of monitoring is very important when measuring breeding success. Nest failure is a function of time, where decreased monitoring periods result in a decreased number of observed losses (Mayfield 1961, Ricklefs 1969). For this reason, the success of each development stage (i.e. laying, hatching, fledging) should not be calculated for sites where the previous stage was not observed. For example, sites discovered with chicks already present should not be used in estimating fledging success because if that site was empty at the time of discovery, there would be no way of knowing whether a nesting attempt occurred. However, the span of nest observation has not been factored into calculations of success for this project, and reported rates are likely higher than true outcomes.

Further, we feel that the standards used to determine nest fate have been variable among survey years, and limited resources have led to less than ideal survey effort in all years. A site is considered to be successful if a surveyor observes chicks that are 90% feathered and estimated to be within 1-2 weeks of fledging. Basing success on chick appearance is a standard procedure for measuring raptor productivity, but chick development can be difficult to accurately gauge and can be highly subjective when estimated by different observers. A better means of estimating fledging success in by utilizing known chick ages. When monitoring intervals are regular and small, the midpoint between events can be used to age chicks. For example, if an adult Golden Eagle was incubating on 1 April and a chick was observed on 15 April, 7 April can be used as a hatch date. If the chick disappeared from the nest between visits on 1 and 15 June, 7 June can be

used as a disappearance date and the nestling stage can be estimated at 61 days. Every raptor species would have a minimum age requirement (based on known ages at fledging) to be considered fledged. If that number was 61 or less—which it certainly would be for a Golden Eagle since mean age at fledging is approximately 64 days with a range of 45 to 84 (Kochert et al. 2002)—the hypothetical eagle would be counted as fledged. If the minimum nestling age was greater than 61, the site would be considered to have failed. If the chronology events needed to estimate age were not clearly observed (i.e. incubating on 1 April, unknown status on 15 April, chick on 29 April), the site would be excluded from analysis. When the date of a chronology event has been determined, visits to the site can be suspended until the period near the nest expected event (i.e. if a Golden Eagle hatch date was known and chicks older than 50 days were considered fledged, the next visit would not need to occur until ~45 days after the hatch date). This methodology does not rely on the ability of an observer to accurately estimate chick age from appearance, and also removes subjectivity, reduces bias, and can standardize analysis among survey years. However, a shorter monitoring interval would be required, and resources likely preclude adopting this protocol.

Results from this study reliably document the species composition and distribution of breeding raptors in the study area. However, for reasons discussed above, productivity results are less reliable, and inter-year comparisons should be viewed with these factors in mind. In summary, it should be stressed that:

1. Productivity parameters are likely inaccurate when sites were not visited with adequate effort during the appropriate periods. Current protocol does not ensure adequate survey effort, and effort likely varied among years. Gauging monitoring adequacy for past years

is difficult and, therefore, the validity of inter-year comparisons is also difficult to gauge. Modifying survey protocol to ensure adequate monitoring effort, however, would require resources that are unlikely to become allocated to this project.

2. Numbers of successful sites may be inflated because of the tendency of observers to overestimate the age of nestlings. Even if nestling age is accurately estimated, chicks that are at least 90% feathered could remain at the nest site for one to two weeks (depending on species) before fledging. Although the probability of successful fledging increases with development, the possibility of chick mortality remains. For sites where fledglings are not observed and success is based on nestling stage before disappearance (which is the case for the majority of site-years), results should be viewed as the maximum possible number of successful sites.
3. On many occasions during the course of this project, fledglings were observed and considered associated with sites where nestlings were not previously detected. Assuming that the fledglings were attributed to the correct nest site, these birds should be included in the overall count of successful sites. However, because they represent sites that did not have a chance to fail (because they were not discovered until already successful), they should not realistically be included in measurements of nest success or productivity. When estimating the success rate of a development stage (i.e. laying, hatching, fledging), sites discovered after the earliest evidence of that chronology event should be excluded from analysis. True measures of nest success and productivity should only be calculated for sites that were monitored from the egg laying period until the conclusion, but this has not been the case for this study, and all reported success rates should be viewed as maximums that could be much higher than the true rates for raptors in the study area.

Discussion of Survey Results

Although the number and quality of nesting sites may limit the number of raptors that breed in the survey area, the abundance of cliff faces leads us to believe that other factors are likely more important in influencing the number and success of breeding raptors. Prey abundance and weather are often the most significant factors affecting raptor breeding success (Steenhof et al. 1997, Smith and Murphy 1979, Bates and Moretti 1994). Jackrabbits (*Lepus* spp.), cottontails (*Sylvilagus* spp.), ground squirrels (*Spermophilus* spp.), and possibly prairie dogs (*Cynomys* spp.) likely comprise the vast majority of the prey taken during the breeding season by the three most common raptor species (Golden Eagle, Red-tailed Hawk, Prairie Falcon) in the survey area. Black-tailed jackrabbits *(L. californicus*) and cottontails have been documented as the primary prey species for Golden Eagles in Great Basin Desert Shrub habitats (Kochert et al. 2002). At the eagle nest sites we have been able to access and visually inspect during previous years, we have found cottontail rabbits to be the only identifiable prey. For Red-tailed Hawks, Gatto et al. (2005) reported that *Sylvilagus* rabbits were the most common prey item taken on the Kaibab Plateau, Arizona, and Smith and Murphy (1973) reported that jackrabbits were nearly the exclusive prey item taken in the Great Basin Desert region of Utah. Ground squirrels are the dominant prey item taken by Prairie Falcons during the breeding season throughout most of their range (Steenhof 1998). All of these mammals appear numerous in the survey area, but likely vary in abundance among years. Future study of small mammal populations would likely lead to a better understanding of the factors affecting raptor abundance and breeding success in the survey area.

Although the number of successful raptor sites in 2011 was similar to other years of high nest success, the especially late initiation of surveys makes it difficult to estimate success rates because the majority of nest failures would have occurred prior to the onset of surveys. Raptor productivity in 2011 may have been impacted by the drought conditions that prevailed throughout the breeding season and previous winter. According to the National Oceanographic and Atmospheric Administration (NOAA) weather service, the water year (October 2010 to September 2011) which encompassed the 2011 raptor breeding season was the second driest on record for New Mexico. The precipitation average for the state was 60% of normal, and rates in the survey area were in the range of 40-80% of normal. Drought conditions result in reduced plant growth, which can reduce populations of raptor prey species (Newton 1979, Olsen and Olsen 1989).

The lack of survey standardization among years creates difficulties with inter-year productivity comparisons. The strongest component of this project is the multi-year dataset that tracks the distribution and species composition of breeding raptors in the survey area. Additionally, for years with early start dates (2000, 2003-2007), the total number of active sites and occupied territories provides strong population estimates for raptor species utilizing the survey area. Limited survey effort may cause confusion when categorizing sites as active or occupied territories; for purposes of tracking population changes, the summation of the two classifications (referred to here as "total sites"), as presented in Table 6 and Figure 12, may provide the strongest means of inter-year comparison. During this period, the three most common species, Golden Eagle, Red-tailed Hawk, and Prairie Falcon, all show a drop in total sites and active sites from 2000 to 2003 (despite the increased survey area in the latter year) followed by an increase

or stabilization between subsequent years. This trend correlates with precipitation levels during the period. Weather stations in Cerro and Tres Piedras, New Mexico, which are located close to the eastern and western edges of the study area, reported especially low precipitation in 2002, followed by an increase to near normal levels in the following years. The drop in active and total raptor sites from 2000 to 2003, followed by a gradual increase as precipitation levels returned to normal, is likely linked to this climatic trend. Although the late initiation of surveys in 2011 may have caused the count of active and total sites to be underestimated, the lower number of sites in 2011 compared to the previous post-drought period (2005-2007) may be largely attributable to the 2010-2011 water year drought. The relatively high number of successful sites in 2011, however, does not support this explanation.

The higher rate of occupied territories to active sites noted for the two large falcon species compared to Red-tailed Hawk and Golden Eagle for all survey years could be caused by several possible factors: 1) in the survey area, the two falcon species may be more likely to skip breeding in some years; 2) falcon nest sites may be missed by the observer (falcons do not build nests, and the presence of eyries, unlike the stick nests of hawks and eagles, are impossible to verify when birds are not present); 3) young falcons may be less likely than Red-tailed Hawks and Golden Eagles to disperse from the study area, and the presence of adult-plumaged birds that are not of breeding age in subsequent years could inflate the number of documented occupied territories; 4) the falcon species may be more likely to fail early in the nesting season before the sites are documented by observers.

All raptor species are susceptible to human disturbance during the breeding season, but of the species that breed in the study area, Golden Eagle and Ferruginous Hawk are likely the most sensitive. This sensitivity is most pronounced during the incubation and early nestling periods when the potential for nest abandonment is the highest (Fyfe and Olendorff 1976, Watson and Dennis 1992, Olendorff 1993). Human activity that occurs in close proximity to active nest sites has the potential to adversely affect nest success. The Golden Eagle nest sites that are potentially the most susceptible to human disturbance (e.g. low cliff height, close proximity to river, roads, and trails, narrow gorge width) are sites 8-13, 17, 18, 22, 43, 51, and 52. Ferruginous Hawk nests, which are often highly visible because of their large size and location in isolated junipers, are also at risk of disturbance. This may be especially true at site 61 which is located less than 200 yards from Highway 285 and is visible from the road. If recreational use of the study area continues to increase, the need for effective nest protection measures during the breeding season will become more critical.

For all survey years, nest success was highest in the Rio San Antonio Gorge, the region of the survey area that is likely subjected to the least amount of human disturbance. Contradictorily, nesting success in the Orilla Verde Recreation area was higher than in the Upper Rio Grande Gorge, despite the likelihood that the former area is subjected to more human disturbance than the latter. Figures for human utilization of these areas were not available to us, and our speculations on the probability of disturbance are based only on our own observations. If our impressions of human disturbance by general area are correct, evidence of decreased raptor nesting success with increased human utilization is likely not reflected in the data. However, many factors impact raptor breeding success, and in order to more accurately study the

correlation between human resource use and raptor success, large scale data on human utilization of the study site are needed.

The number of active Golden Eagle sites has varied among survey years (from 3 to 8), but average annual productivity was reported as at least 1.0 for all survey years since 2004. When previous years with lower success rates are factored, productivity appears to be similar to that reported in other areas of the western United States (Thompson et al. 1982, Phillips et al. 1990, Bates and Moretti 1994, Steenhof et al. 1997). As described above, however, more intensive monitoring efforts are needed to ensure valid productivity results.

Average nest success for Red-tailed Hawks in the survey area is the same as for Golden Eagles (0.85), but productivity is likely slightly higher. Although nesting success is relatively high compared to other nesting species, there is evidence that the breeding Red-tailed Hawk population in the study area has declined. A one-year study in the Upper Rio Grande Gorge by Ponton (1980) documented 12 active Red-tailed Hawk nests. Since Hawks Aloft began monitoring in 2000, the number of active Red-tailed Hawk nests documented in that section of the survey area has ranged from three to seven. Although our knowledge of populations prior to 2000 is based on only one survey year, it seems possible that far fewer Red-tailed Hawks have nested in the Upper Rio Grande Gorge during the past decade than during earlier periods.

Breeding trends for Prairie Falcons are similar to those of Golden Eagles and Red-tailed Hawks. The number of active sites and occupied territories has ranged from four to seven during survey years. At the Snake River Birds of Prey Area (SRBPA) near Boise, Idaho, the amount of cliff area present per 10 km stretch of survey route explained 91% of the variation in nesting density

(Steenhof et al. 1999). This suggests that the number of breeding Prairie Falcons is limited by the availability of nest sites. Because the Rio Grande Gorge has a similar cliff structure and surrounding habitat to that of the SRBPA, we initially expected to find a similar correlation in nesting density relative to the amount of cliff area. However, on the upper Rio Grande Gorge, Prairie Falcons nest in higher densities in the northern portion of the survey area (over 80% of sites are located in the Rio San Antonio Gorge and northern quarter of the Upper Rio Grande Gorge), where the cliff area is substantially lower than in the southern portion. Overall, the Upper Rio Grande Gorge appears to contain a myriad of potential nest sites. Many of these sites showed signs of previous use, such as thick accumulations of old whitewash indicating that these sites were once heavily used, and that the Prairie Falcon populations may well have been significantly larger in the past. We believe that nesting Prairie Falcons in the Rio Grande Gorge are most likely limited by prey availability, and not by a lack of suitable nest sites. Average productivity in the survey area appears to be near the median replacement standard of 2.0 calculated by Runde (1987) as necessary for population maintenance, but further analysis and study are needed.

Among species with at least ten site-years of known fates, nest success is lowest for Peregrine Falcons. Since 2000, we have documented a total of eleven breeding attempts by the species, resulting in an average nest success rate of 0.55. This rate was greatly increased in 2011 when at least four chicks were fledged from two successful nests. Prior to 2011, nest success was reported at 0.37 and productivity at 0.63. The multi-year productivity rate certainly falls below the estimated recruitment standard of at least 1.45 young per nest site required to maintain a stable population (Johnson 1999). Although the much lower breeding success of Peregrine

Falcons compared to Golden Eagles, Red-tailed Hawks, and Prairie Falcons could be influenced by many factors, it seems likely that diet is the most significant. Peregrine Falcons prey primarily on birds, while the other three most common raptor species prey primarily on small and medium-sized mammals. Investigations of Peregrine Falcon prey items and populations in the survey area merit further study.

Acknowledgments

This report was prepared by Erik Andersen, and reviewed by Trevor Fetz, Lead Avian Biologist, and Gail Garber, Executive Director of Hawks Aloft. Field studies were conducted by Brian Long with limited assistance from Erik Andersen. Cover photo by Erik Andersen.

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Appendix 1. UTM coordinates (zone 13S, NAD27) of all documented raptor nest site locations from 2000-2011 survey years, Upper Rio Grande Gorge, San Antonio Gorge, and Orilla Verde Recreation Area. The Site or Vantage column indicates whether the coordinates refer to a nest site or a vantage point from which to view the site. Previous Names refers to names used in previous reports (report year in parenthesis); in some instances, the site was not given a unique name in the report, in others, the site was erroneously treated as a new site.

Site	Easting	Northing	Site or Vantage	Previous Names
1a	436783	4045837	Site	-
1b	436877	4046054	Site	-
1c	436908	4046140	Site	-
2a	436900	4046320	Site	-
2b	436916	4046275	Site	-
3	437410	4053320	Site	-
4	438100	4050050	Site	-
5	437430	4052880	Site	-
6a	439950	4057100	Site	-
6b	440147	4057398	Site	-
7	439010	4059270	Site	-
8	438360	4075240	Site	-
9a,b,c	438170	4075780	Site	-
10	437065	4080740	Site	-
11a	436980	4081269	Site	-
11b	437070	4081053	Site	NewMEB05 (2010)
12a	436100	4094170	Site	-
12b	436094	4094103	Site	-
13	435980	4094480	Site	-
14	431450	4099660	Site	-
15	437450	4055930	Site	-
16a	437140	4061238	Site	-
16b	436901	4061275	Site	-
16c	436871	4061209	Site	-
16d	437170	4061321	Site	-
17	440260	4069121	Site	-
18	440010	4069330	Site	-
19	439410	4069590	Site	-
20	435972	4083108	Site	-
21	434970	4084943	Site	-
22a,b	434230	4096300	Site	-
23	433260	4097300	Site	-
24	432300	4097800	Site	-

Site	Easting	Northing	Site or Vantage	Previous Names
25	435250	4039750	Site	-
26	434680	4088410	Site	-
27	434250	4087080	Site	-
28	435550	4096300	Site	-
29a	431908	4099457	Site	-
29b	431536	4099643	Site	-
30	438112	4073730	Site	-
31	435692	4096092	Site	-
32	435130	4083700	Site	-
33	436058	4092210	Site	-
36	438420	4064513	Site	-
37a	434600	4085900	Site	-
37b	434622	4085764	Site	-
38a	435948	4090703	Site	-
38b	436037	4090981	Site	-
38c	436007	4090864	Site	-
39	430327	4017865	Site	-
40	430143	4018481	Site	-
41	435050	4021288	Site	-
42	435140	4022083	Site	-
43	437219	4081026	Site	-
44	436040	4092483	Site	-
45	436126	4093414	Site	-
46	435889	4082989	Site	-
47	437702	4078047	Vantage	NewMEB04 (2010)
48	430860	4016433	Site	-
49	433756	4021941	Site	-
50	435315	4096593	Site	-
51	407301	4094022	Site	-
52	407211	4093860	Site	-
53	407105	4093192	Site	-
54	407189	4093265	Site	-
55	406731	4092837	Site	-
56	405256	4089345	Site	-
57	405873	4091150	Site	-
58	430146	4018924	Site	-
59	431678	4100271	Site	NewX (2010), New (2007)
60	407388	4088771	Site	New (2007)
61	413312	4083991	Site	New (2007)
62	434420	4037532	Site	New (2007)

Site	Easting	Northing	Site or Vantage	Previous Names
63	433009	4021421	Site	-
64	434762	4024835	Vantage	-
65	434423	4025936	Site	-
66	435299	4039919	Vantage	-
68	434914	4037980	Vantage	-
69	437290	4060606	Vantage	-
70	406077	4085713	Vantage	-
71	407441	4088136	Vantage	-
72	425445	4102634	Vantage	-
73	405117	4090766	Vantage	-
74	436314	4093031	Vantage	-
75	433184	4020707	Vantage	-
76	405759	4086924	Vantage	-
77a,b	434874	4026852	Vantage	-
78	437730	4093291	Site	-
NewMEB01	437586	4046409	Site	-
NewMEB02	437577	4046409	Site	-
NewMEB03	438918	4072104	Site	-
NewMEB06	434479	4087152	Site	-
NewMEB07	434966	4088035	Site	-
NewMEB08	434977	4088062	Site	-
NewMEB09	436186	4091624	Site	-
NewMEB10	439312	4066328	Vantage	-
NewMEB11	431457	4099872	Site	-
NewMEB12	433326	4097852	Site	-
NewMEB13	433388	4097691	Site	-
NewMEB14	434788	4096489	Site	-
NewMEB15	435474	4095506	Site	-
NewMEB16	405781	4087430	Site	-
NewMEB17	405345	4090763	Site	-
NewMEB18	405010	4090757	Site	-
NewMEB19	405825	4087474	Site	-

Appendix 2. Productivity status reported at nest sites during survey years from 2000-2011. The following codes are used: "O" indicates an occupied territory where no breeding attempt was documented, "U" indicates an active site where the productivity status was not confirmed, "F" indicates a failed breeding attempt, "S" indicates a successful breeding attempt where the number of fledglings was not reported, and numbers (1,2,3) indicate the minimum number of successful fledglings reported from the site.

Site	Species	2011	2010[1]	2009[2]	2007	2006	2005	2004	2003	2000[3]
1a,b,c	GOEA	1	S	2	1	S	2	F	F	-
2a,b	GOEA	-	-	-	-	-	-	-	-	S
3	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-
6a,b	RTHA	-	-	-	1	O	-	-	-	O
7	PRFA	-	O	-	-	-	O	-	F	S
8	GOEA	-	-	-	2	-	-	-	-	-
9a,b,c	GOEA	1	U	-	-	O	-	S	O	-
10	GOEA	-	-	O	-	-	-	-	-	-
11a,b	GOEA	-	-	-	O	S	1	O	O	S
12a,b	GOEA	-	-	O	F	F	1	-	S	S
13	GOEA	-	-	-	-	-	-	-	-	S
14	-	-	-	-	-	-	-	-	-	-
15	PEFA[4]	-	-	-	2	-	-	-	-	O
16a,b,c,d	GOEA	-	-	F	-	S	1	S	O	-
17	GOEA	-	-	-	-	S	-	-	-	-
18	GOEA	-	-	-	-	-	1	S	-	-
19	GOEA	-	-	1	1	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
21	RTHA	-	-	-	2	F	O	-	-	S
22a,b	GOEA	1	-	O	F	S	1	S	F	S
23	RTHA	O	-	-	-	-	-	-	-	S
24	RTHA	1	1	-	1	S	1	S	S	S
25	PRFA	-	-	-	5	S	2	S	-	S
26	PRFA	-	-	-	-	-	F	-	-	S
27	PRFA	-	O	-	2	S	-	O	F	S
28	PRFA	O	O	-	-	-	-	-	-	-
29a,b	PRFA	-	-	-	1	-	-	-	-	S
30	RTHA	-	-	-	-	-	O	-	-	S
31	RTHA	-	-	-	-	F	1	S	O	S
32	PRFA	-	-	-	-	-	O	-	-	S
33	PRFA	-	-	-	-	O	1	S	O	S

Site	Species	2011	2010[1]	2009[2]	2007	2006	2005	2004	2003	2000[3]
36	PEFA	-	-	-	-	-	F	F	S	-
37a,b	RTHA	-	-	-	F	S	2	-	S	-
38a,b,c	RTHA	-	-	-	U	F	2	S	S	-
39	GOEA	-	-	-	2	-	1	O	-	-
40	-	-	-	-	-	-	-	-	-	-
41	PEFA	2	-	-	1	-	F	O	S	-
42	-	-	-	-	-	-	-	-	-	-
43	GOEA	-	-	-	-	-	-	-	-	S
44	PEFA	-	-	-	-	O	F	F	-	-
45	PRFA	1	-	-	U	S	F	O	-	-
46	PRFA	3	O	-	4	S	1	S	-	-
47	RTHA	-	U	-	2	S	F	S	-	-
48	-	-	-	-	-	-	-	-	-	-
49	GHOW	-	-	-	-	O	2	-	-	-
50	PRFA	-	-	-	U	1	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-
52	GOEA	-	-	-	2	-	S	-	-	-
53	GOEA	1	-	-	-	S	-	S	O	-
54	AMKE	-	-	-	-	O	-	U	U	-
55	PRFA	3	-	-	O	S	-	S	S	-
56	RTHA	-	-	-	3	S	S	S	S	-
57	GHOW	-	-	-	-	-	S	-	-	-
58	GOEA	-	-	-	-	S	-	-	-	-
59	RTHA	-	-	-	F	-	-	-	-	-
60	FEHA	3	-	-	-	-	-	-	-	-
61	FEHA	-	-	-	2	-	-	-	-	-
62	GOEA	-	U	-	1	-	-	-	-	-
63	-	-	-	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-	-	-	-
65	PEFA	2	-	-	-	-	-	-	-	-
66	-	-	-	-	-	-	-	-	-	-
68	-	-	-	-	-	-	-	-	-	-
69	-	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-
74	RTHA	2	-	-	-	-	-	-	-	-
75	RTHA	U	-	-	-	-	-	-	-	-

Site	Species	2011	2010[1]	2009[2]	2007	2006	2005	2004	2003	2000[3]
76	RTHA	1	-	-	-	-	-	-	-	-
77a,b	-	-	-	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-
MEB01	-	-	-	-	-	-	-	-	-	-
MEB02	-	-	-	-	-	-	-	-	-	-
MEB03	-	-	-	-	-	-	-	-	-	-
MEB06	-	-	-	-	-	-	-	-	-	-
MEB07	-	-	-	-	-	-	-	-	-	-
MEB08	-	-	-	-	-	-	-	-	-	-
MEB09	RTHA	-	U	-	-	-	-	-	-	-
MEB10	-	-	-	-	-	-	-	-	-	-
MEB11	PRFA	2	S	-	-	-	-	-	-	-
MEB12	GHOW	-	U	-	-	-	-	-	-	-
MEB13	-	-	-	-	-	-	-	-	-	-
MEB14	-	-	-	-	-	-	-	-	-	-
MEB15	RTHA	1	U	-	-	-	-	-	-	-
MEB16	-	-	-	-	-	-	-	-	-	-
MEB17	PRFA	3	S	-	-	-	-	-	-	-
MEB18	-	-	-	-	-	-	-	-	-	-
MEB19	AMKE	-	S	-	-	-	-	-	-	-
Occupied		2	4	3	2	6	4	5	6	2
Active		17	11	3	25	21	24	18	13	18
Successful		16	5	2	18	17	18	14	8	18
Failed		0	0	1	4	4	6	3	4	0
Unknown		1	6	0	3	0	0	1	1	0

[1] surveys were not conducted by Hawks Aloft, Inc. and different protocol were followed
[2] only Golden Eagle sites in the Upper Rio Grande Gorge were monitored
[3] only the Upper Rio Grande Gorge was surveyed
[4] site used by Golden Eagle in 2000