



Prairie and Peregrine Falcon Occupancy and Productivity Monitoring at Pinnacles National Park

2013 Annual Report

Natural Resource Technical Report NPS/SFAN/NRTR—2014/892



ON THE COVER

Prairie falcon fledgling, Discovery Wall, Pinnacles National Park, California.

Photograph by: Gavin Emmons, San Francisco Bay Area Network Inventory and Monitoring Program.

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Gavin Emmons

National Park Service
Pinnacles National Park
5000 Highway 146
Paicines, California 95043

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Executive Summary

Pinnacles National Park (“Pinnacles”) provides a diverse habitat for numerous cliff-nesting raptors, including prairie falcons (*Falco mexicanus*) and peregrine falcons (*F. peregrinus*), as well as a spectacular array of summits and cliff-wall routes for rock-climbers. This monitoring program was established to determine long-term trends in the number of occupied territories and productivity of nesting prairie and peregrine falcons. Ancillary data on presence and diversity of other nesting raptors are also collected and documented for this season in the Breeding Raptor Distribution and Nesting Phenology at Pinnacles National Park – 2013 Annual Report (Emmons in review). The monitoring program grew out of a need to reduce potential disturbance that climbers and off-trail hikers may have on cliff-nesting raptors. This report summarizes the results from the 2013 breeding season and represents the 28th year of monitoring at the park, consistent with the standardized methods and procedures detailed in the Prairie Falcon Monitoring Protocol for Pinnacles National Monument (Emmons et al. 2011).

To monitor falcons, field technicians surveyed all potential nest sites three times per breeding season spaced 21–28 days apart. Nests determined to be active were revisited to confirm rearing of nestlings and fledging of young. In 2013, monitoring was conducted from 1 January 2013 until 22 July 2013, with a total of over 150 possible and active nest sites monitored during 728 observation hours.

Fourteen territorial falcon pairs were documented this year with 12 pairs actively nesting. Eleven nests successfully hatched and fledged 46 young; one nest failed.

Acknowledgments

This program would not be as successful as it is without the eyes and ears of helpful Pinnacles employees. Therefore, I would like to thank the National Park Service employees for their help, encouragement, and passion for the raptors and wildlife diversity at Pinnacles. The many local climbers involved with Friends of Pinnacles also deserve my thanks for their ongoing support of resource protection and breeding raptors at the park and particularly their efforts to publicize and honor advisories in effect. I would also like to extend my appreciation to the park visitors, for their reports and observations on raptor sightings and for their appreciation and value of the importance of monitoring, managing, and protecting the nesting sites and breeding productivity of raptors in the park.

I would like to thank B. Johnson, P. Johnson, J. Belli, R. Neidhardt, S. Scherbinski, J. Jones, A. Punzalan, D. Powell, L. Regan, D. Ryan, and A. Welch for contributing valuable observations on raptor territories and pair behavior in the park. I greatly appreciated efforts by N. Melling for his superb monitoring efforts this season. I am also grateful for D. Louie's and P. Johnson's support and efforts, in tandem with D. George as the manager of the Inventory and Monitoring (I&M) Program, to keep the Pinnacles raptor monitoring program funded annually and on a permanent basis. D. Adams, D. George, P. Johnson, and A. Welch also provided recommendations and reviewer suggestions for the 2013 annual report, contributing greatly to a concise and efficient document consistent with I&M standards.

The following staff also shared their experience, excitement, and observations of raptors with me throughout the season, granting me a more complete picture of raptor breeding and diversity at the park, and assisted in the effective management of raptor advisory areas: G. Frusetta, G. Ellson, M. LaShell, and D. Simmons.

Introduction

Pinnacles National Park (“Pinnacles”) is a National Park Service (NPS) unit located in the Gabilan Mountains of central California, and was legislatively converted from a national monument to a national park in January 2013. Pinnacles provides a diverse habitat for cliff-nesting raptor species, including sensitive species such as prairie falcons (*Falco mexicanus*), peregrine falcons (*F. peregrinus*), and golden eagles (*Aquila chrysaetos*). The dramatic landscapes, extensive trails, arrays of summits, and cliff-wall routes at Pinnacles are also used intensively for recreation by rock-climbers and hikers. Because prairie falcons nest in the Pinnacles cliffs and in sufficient density to track trends in reproduction over time, this species is the central focus of the monitoring program. Additionally, peregrine falcons are documented in this report because they occupy the same nest habitat and are direct competitors to prairie falcons. Other raptor species in the park either nest in forested habitats or do not nest in sufficient densities within the park to warrant a similar level of monitoring effort.

Many scientific studies have documented the negative impacts of human disturbance of raptor nest and roost sites, and the resulting nest failures and territorial abandonment associated with these disturbances. Nesting raptor species at Pinnacles sensitive to human disturbance include prairie falcons (Fyfe and Olendorff 1976, Ogden and Hornocker 1977, Harmata et al. 1978, Sitter 1983, Steenhof 1998), peregrine falcons (particularly in remote locations: see Hickey 1942, 1969, Bond 1946, Steenhof 1998), golden eagles (Newton 1979, 1990, Scott 1985, Steidl et al. 1993, Watson 1997, Steenhof et al. 1997, Kochert et al. 1999), sharp-shinned hawks (*Accipiter striatus*; Delannoy and Cruz 1988), and long-eared owls (*Asio otus*; Marks 1986, Marti and Marks 1989, Bloom 1994).

Studies of prairie and peregrine falcon nest occupancy and productivity have also shown the species to be especially sensitive to human disturbance from mining (Becker and Ball 1981, Bednarz 1984), recreation (Boyce 1982), agriculture (USDI 1979), habitat destruction and nest site limitation (Becker and Ball 1981, Steenhof et al. 1997), and proximity to major roadways (Platt 1974, Boyce 1982).

The main sources of human disturbance of nesting falcons at Pinnacles are visitors who are rock-climbing and hiking on- and off-trail in the park. Scientific studies have consistently suggested that these recreational activities can be balanced against raptor nesting by establishing closure or advisory areas that act as buffers between human activity and raptor nesting during the breeding season (Fyfe et al. 1976, Olsen and Olsen 1978, Becker and Ball 1981, Suter and Jones 1981, Porter et al. 1987, Holthuijzen et al. 1990, Cade et al. 1996, White et al. 2002). Raptor monitoring program survey data collected at Pinnacles justifies the establishment of climbing/hiking advisories in core areas (high visitor-use areas) each breeding season as a way to protect cliff-nesting raptor species from human disturbance.

The Prairie Falcon Monitoring Protocol for Pinnacles National Monument (Emmons et al. 2011) provides standardized methods and procedures for prairie and peregrine falcon monitoring at Pinnacles and further details the program specifics. The program established two long-term monitoring objectives to:

- Track changes in the total numbers of territorial falcon pairs in core areas and non-core areas.
- Track changes in average annual productivity (young of year hatched/pair, young of year at banding age/pair, young of year fledged/pair) in core areas and non-core areas.

Core areas are locations at Pinnacles suitable for prairie and peregrine falcon cliff-nesting where climbing impacts could occur, based on the presence of historic climbing routes accessible to visitors. Non-core areas refer to all other areas within Pinnacles suitable for cliff-nesting. The core vs. non-core sampling design is detailed further in the Methods section.

A secondary benefit of the monitoring program is that a substantial amount of information can also be gathered on other raptor species at Pinnacles, particularly sensitive California species that may be impacted by human presence and disturbance in riparian habitats such as: golden eagles, Cooper's hawks (*Ac. cooperii*), sharp-shinned hawks, white-tailed kites (*Elanus leucurus*), and long-eared owls. Breeding data collected on other raptor species during the 2013 season will be documented in the Breeding Raptor Distribution and Nesting Phenology at Pinnacles National Park – 2013 Annual Report (Emmons in review).

Study Area and Field Methods

Pinnacles is located in the Gabilan Mountains of the central Coast Range of California. The national park encompasses 10,694 hectares (26,425 acres) with elevation ranging from 244 to 1007 meters (800 to 3304 feet). The climate is Mediterranean with hot, dry summers and cool, damp winters. Temperatures range from a mean of 5.2°C in December to 25.2°C in August (41.4° to 77.4°F). The average yearly rainfall is 42.3 cm (16.6 inches), with the majority of rainfall occurring from November to April (WRCC 2013).

Pinnacles provides a diverse range of habitat types for birds and other species. These habitats include volcanic rock formations and outcroppings, California mixed chaparral, pine-oak woodlands, grasslands, and riparian creek corridors.

Sample Design

The prairie and peregrine falcon monitoring is focused on core areas and non-core areas. Each core and non-core area is a potential nesting territory, and in this context the terms “area” and “territory” can be used interchangeably. Within a given year, prairie or peregrine falcons may actively defend one or more of these areas or territories. Core areas (Figure 1) are locations in Pinnacles that can support falcon cliff nesting, and where impacts to raptors due to rock climbing activities can occur based on historic rock-climbing use and access. Core area monitoring surveys are conducted through a census, because the area is sufficiently small to allow for complete coverage.

Non-core areas refer to all other areas within the park that can support prairie and peregrine falcon cliff nesting. The Prairie Falcon Monitoring Protocol for Pinnacles National Monument (Emmons et al. 2011) calls for sampling non-core areas on a rotating basis. For 2003–2013, non-core area sampling has been conducted through a census along with core area censuses. This park-wide censusing of core and non-core areas has been possible because of comprehensive historical data on prairie and peregrine falcon nest sites gathered over the past 28 years, extensive monitoring experience of the raptor biologist, and supplemental raptor monitoring efforts by interns, volunteers, and other Pinnacles employees. In addition, GIS modeling completed in 2008 confirmed that all potential prairie and peregrine falcon nesting areas in the park have been surveyed annually during the past 11 years.

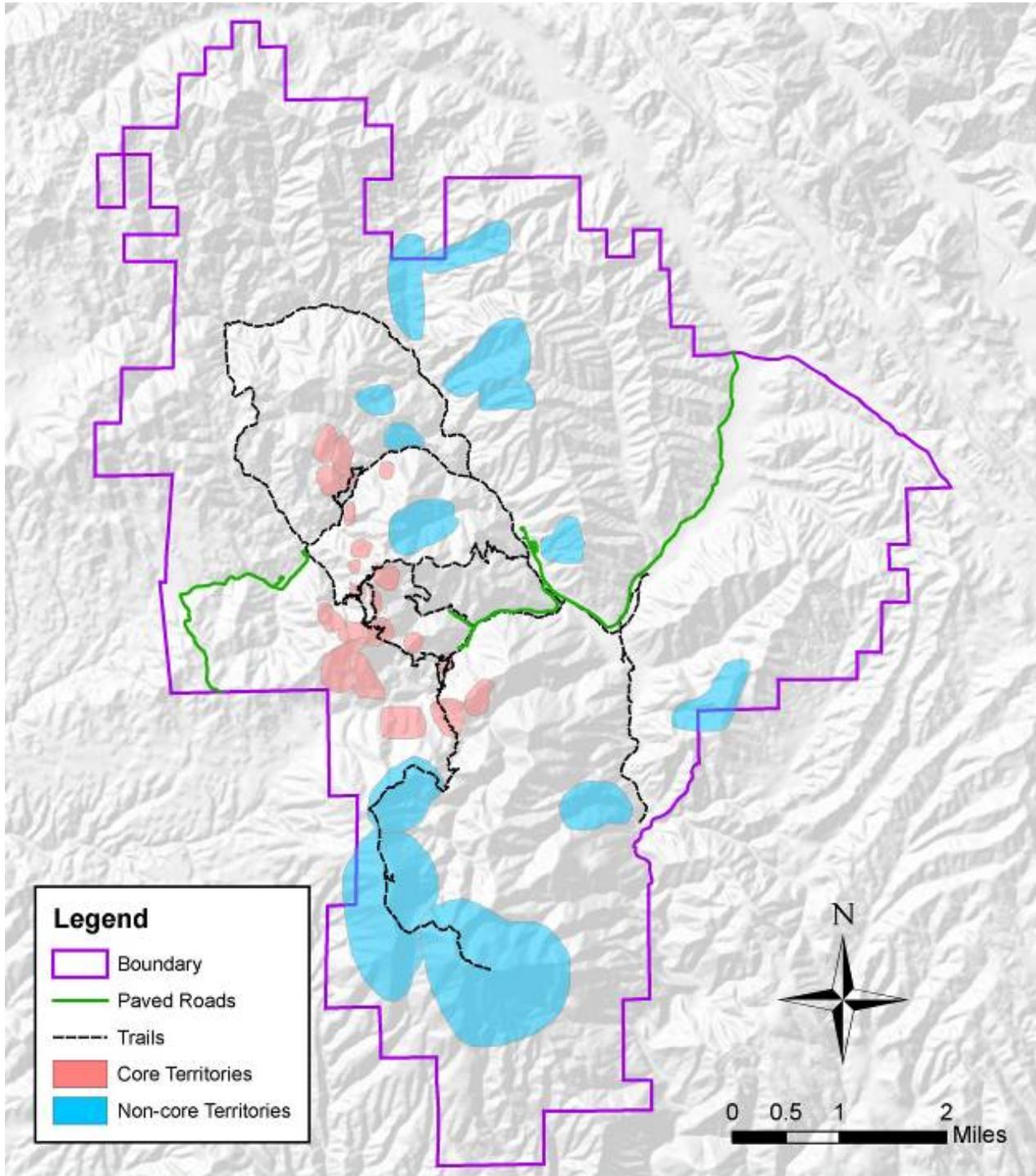


Figure 1. Core and non-core areas at Pinnacles National Park.

Field Methods

Survey methods followed the standard operating procedures detailed in the Prairie Falcon Monitoring Protocol for Pinnacles National Monument (Emmons et al. 2011).

Potential and established prairie and peregrine falcon territories in core and non-core areas were surveyed using Swarovski HD STS-80 and ATS-65 20–60x spotting scopes and Zeiss Victory FL 10x42 binoculars. Observations were made from the locations that provided the best view of an eyrie or a territory. Magellan Triton 500 and DeLorme Earthmate PN-60 GPS units were used to plot every observation point. Field data were documented with standardized datasheets and field notebooks and the data were entered into a Microsoft Access database (Appendix D).

Three- to five-hour observation periods are commonly recommended to document territorial occupancy of peregrine falcons and prairie falcons (USFWS 1984, Cade et al. 1996, Smith and Hutchins 2006). Steenhof et al. (1999) employed two-hour observation periods during point surveys to document territory occupancy of prairie and peregrine falcons in the Snake River region of Idaho. For a potential falcon territory to be classified as unoccupied at Pinnacles, we adopted a conservative standard of visiting potential nest sites at least three times per breeding season spaced 21–28 days apart to confirm territorial occupancy, courtship, and incubation of eggs within a breeding season (Fuller and Mosher 1981, Fraser et al. 1983, Steenhof 1998). Survey duration was ultimately dependent upon visibility, but at least three 4-hour surveys (12 hours total) were required to verify that “no birds” were present. Nests determined to be active were revisited to confirm rearing of nestlings and fledging of young. Nests in core areas were monitored more frequently and during weekend days when climbers were more likely to be present.

While other monitoring programs infer fledging success at 90% fledge age (Steenhof and Kochert 1982, Anderson and Squires 1997, Steenhof 1998), our protocol continues surveys until all young falcons are confirmed as fledged.

During the falcon breeding season status was asserted as follows:

Territories: Territorial behavior included perching, flying, territorial disputes and defense, stooping and scold calling, and roosting locations.

Courtship: Courtship behavior included copulation, food drops and swapping, and potential nest site inspections and preparation.

Incubation: Incubation status was determined by observing prairie falcons flying into a nest hole and not re-emerging for extended periods of time. During this time, egg counts were made whenever possible (e.g., when lighting conditions allowed and when incubating falcons temporarily left the nest during food drops and/or nest switches). Soft incubation – the onset of incubation – was determined by a small number of eggs laid and the female incubating for short durations (15–75 minutes of incubation and 20 minutes or more not incubating the eggs). Hard incubation was characterized by the adult falcons – primarily the females – incubating a full clutch of eggs for hours in duration.

Nestlings: Hatched young prairie and peregrine falcons were aged by physical features using an aging guide (Moritsch 1983). Hatch dates were determined by counting backwards from at least two (preferably three or more) independent aging estimates.

Fledging: Fledging was confirmed by seeing young perched and/or in flight away from the nest site. Fledging dates were estimated by the coordination and strength of flight, the size of perches, and the amount of vocalization during flight.

Monitoring Schedule

The prairie and peregrine falcon monitoring season started on 1 January and continued through the end of the nesting season, 26 July (Table 1).

Table 1. Timing of nesting behavior of prairie falcons at Pinnacles National Park.

| Behavior | January | February | March | April | May | June | July |
|---------------------|---------|----------|-------|-------|-----|------|------|
| Territorial Falcons | | | | | | | |
| Courtship Behavior | | | | | | | |
| Nesting | | | | | | | |
| Fledging | | | | | | | |

Weather was always an important factor. During temperature extremes, heavy fog, or rain, most birds of prey are generally inactive and therefore monitoring was not done during these periods.

Data Management

Data are entered into a Microsoft (MS) Access database designed by the network data manager for the San Francisco Bay Area Network Inventory and Monitoring Program. Original data sheets are archived with Pinnacles Resource Management. An annual (static) copy of the Access database is archived on the Golden Gate National Recreation Area computer network drive. Nest data are also submitted to the California Department of Fish and Wildlife (previously California Department of Fish and Game) California National Diversity Database and the Santa Cruz Predatory Bird Research Group.

Tabular data in the Results section of this report are derived from queries to the Breeding Raptors and Raptor Observations tables in the MS Access database.

Climbing Advisories

Climbing advisories went into effect by mid-January.

Informational signs were established near territories occupied by prairie and peregrine falcons at least once during the preceding three years. Visitors were advised to avoid these areas but compliance was voluntary. Advisory areas with posted signs (Figure 2) included the Balconies, Hawkins, Scout Peak, and Little Pinnacles territories.



Figure 2. Setting up advisory sign. Photo by Gavin Emmons, 2006.

Results

During the 2013 field season, Pinnacles staff spent 708 hours in the field surveying for prairie and peregrine falcons and volunteers contributed 20 hours of time. Results for prairie falcon monitoring in core and non-core areas are detailed below. Results for peregrine falcon monitoring – and tabular data for combined prairie and peregrine falcon productivity – are detailed in Appendix B. Currently, the monitoring protocol (Emmons et al. 2011) focuses specifically on monitoring prairie falcons as a target species. However, both prairie and peregrine falcons have nested at Pinnacles historically, are sensitive to human disturbance, are obligate cliff-nesters, and have identical nest phenology patterns. Results for peregrine falcon monitoring are included in Appendix B with the expectation that the monitoring protocol (Emmons et al. 2011) will be updated to focus on both prairie and peregrine falcon monitoring in the future.

Prairie Falcons

Eleven prairie falcon pairs attempted to nest this year and 10 successful nests produced 47 nestlings and 43 fledglings (Figure 3), compared to 27-year averages of 9.9 nesting pairs, 7.8 successful nests, 28.5 nestlings, and 26.7 fledglings (Table 2).

Occupied Territories

Through the 2013 season, 12 territorial pairs of prairie falcons were confirmed over the course of the breeding season. This number is comparable to the average territorial occupancy of 11.9 pairs from 1984-2012 (Table 2). Of these, one pair did not nest or produce young this year.

Core Areas: In 2013, there were 6 territorial prairie falcon pairs within the core areas. The average number of territorial falcon pairs in the core areas over the previous 27 years was 7.4.

Non-Core Areas: In 2013 there were 6 territorial prairie falcon pairs within the non-core areas. The average number of territorial falcon pairs in the non-core areas over the last 27 years was 4.5.



Figure 3. Prairie falcon fledgling at South Balconies. Photo by Gavin Emmons, 2009.

Table 2. 1984–2013 Pinnacles prairie falcon nesting productivity – core and non-core areas combined.

| Year | Territorial Pairs | Nesting Pairs | Successful Nests | # Nestlings | # Nestlings / Nest | # Fledglings | # Fledglings / Nest |
|-----------------------------|-------------------|---------------|------------------|-------------|--------------------|--------------|---------------------|
| 1984 | 10 | 9 | 8 | 30 | 3.8 | 27 | 3.4 |
| 1987 | 6 | 4 | 4 | 13 | 3.3 | 10 | 2.5 |
| 1988 | 12 | 9 | 8 | 24 | 3.0 | 24 | 3.0 |
| 1989 | 12 | 12 | 9 | 24 | 2.7 | 21 | 2.3 |
| 1990 | 14 | 10 | 8 | 31 | 3.9 | 29 | 3.6 |
| 1991 | 14 | 11 | 10 | 34 | 3.4 | 34 | 3.4 |
| 1992 | 13 | 11 | 10 | 38 | 3.8 | 34 | 3.4 |
| 1993 | 13 | 12 | 10 | 39 | 3.9 | 35 | 3.5 |
| 1994 | 13 | 13 | 12 | 45 | 3.8 | 42 | 3.5 |
| 1995 | 13 | 11 | 8 | 24 | 3.0 | 24 | 3.0 |
| 1996 | 12 | 10 | 9 | 35 | 3.9 | 34 | 3.8 |
| 1997 | 12 | 8 | 6 | 26 | 4.3 | 26 | 4.3 |
| 1998 | 10 | 7 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 10 | 8 | 6 | 25 | 4.2 | 25 | 4.2 |
| 2000 | 8 | 8 | 7 | 22 | 3.1 | 22 | 3.1 |
| 2001 | 10 | 10 | 7 | 24 | 3.4 | 24 | 3.4 |
| 2002 | 11 | 9 | 7 | 26 | 3.7 | 22 | 3.1 |
| 2003 | 12 | 9 | 8 | 33 | 4.1 | 32 | 4.0 |
| 2004 | 12 | 11 | 9 | 36 | 4.0 | 33 | 3.7 |
| 2005 | 13 | 10 | 9 | 29 | 3.2 | 24 | 2.7 |
| 2006 | 15 | 14 | 10 | 35 | 3.5 | 30 | 3.0 |
| 2007 | 14 | 12 | 9 | 35 | 3.9 | 33 | 3.7 |
| 2008 | 12 | 5 | 4 | 12 | 3.0 | 12 | 3.0 |
| 2009 | 12 | 11 | 10 | 41 | 4.1 | 37 | 3.7 |
| 2010 | 13 | 11 | 7 | 27 | 3.9 | 27 | 3.9 |
| 2011 | 13 | 12 | 8 | 33 | 4.1 | 33 | 4.1 |
| 2012 | 12 | 11 | 8 | 28 | 3.5 | 27 | 3.4 |
| 2013 | 12 | 11 | 10 | 47 | 4.7 | 43 | 4.3 |
| Averages (1984– 2012) | 11.9 | 9.9 | 7.8 | 28.5 | 3.5 | 26.7 | 3.3 |

Annual Productivity

Eleven of the 12 prairie falcon pairs nested. For the 11 nesting pairs, ten successful nesting attempts fledged a total of 43 young (Tables 2, 3). One nest failed during the 2013 season, after all four nestlings hatched.

Total nesting falcon pairs and successful nests within core and non-core areas this season were higher than the 27-year averages. Productivity of nestlings and fledglings (in total and per nest) was higher than in any of the previous 27 years (Table 2, Figure 4).

Table 3. 2013 Pinnacles prairie falcon breeding summary.

| Territory | Nest Used/ Last Year Used | # Eggs Laid | # Young Hatched | # Young Known/ Fledged |
|---------------------|--------------------------------------|--------------------|------------------------|-----------------------------------|
| Citadel* | CI-1/2012 | | 4 | 4/4 |
| Crowley Towers* | CT-2/2004 | | 4 | 4/4 |
| Drywall | DRY-11/2011 | | 4 | 4/4 |
| Egg* | EGG-1/2012 | 5 | 5 | 5/5 |
| Little Pinnacles* | LP-2/2005 | 4 | 4 | 0 |
| NE Section 15 | NE-2/2007 | | 5 | 5/5 |
| North Chalone | NC-1/2012 | | 5 | 5/5 |
| Pig Canyon | PIG-9/2012 | | 3 | 3/3 |
| Resurrection Wall* | RW-2/1993 | 5 | 5 | 5/5 |
| South Balconies* | SGB-4/2003 | | 3 | 3/3 |
| Willow Spring Slide | WSS-2/2007 | 5 | 5 | 5/5 |

*nests within the core area.

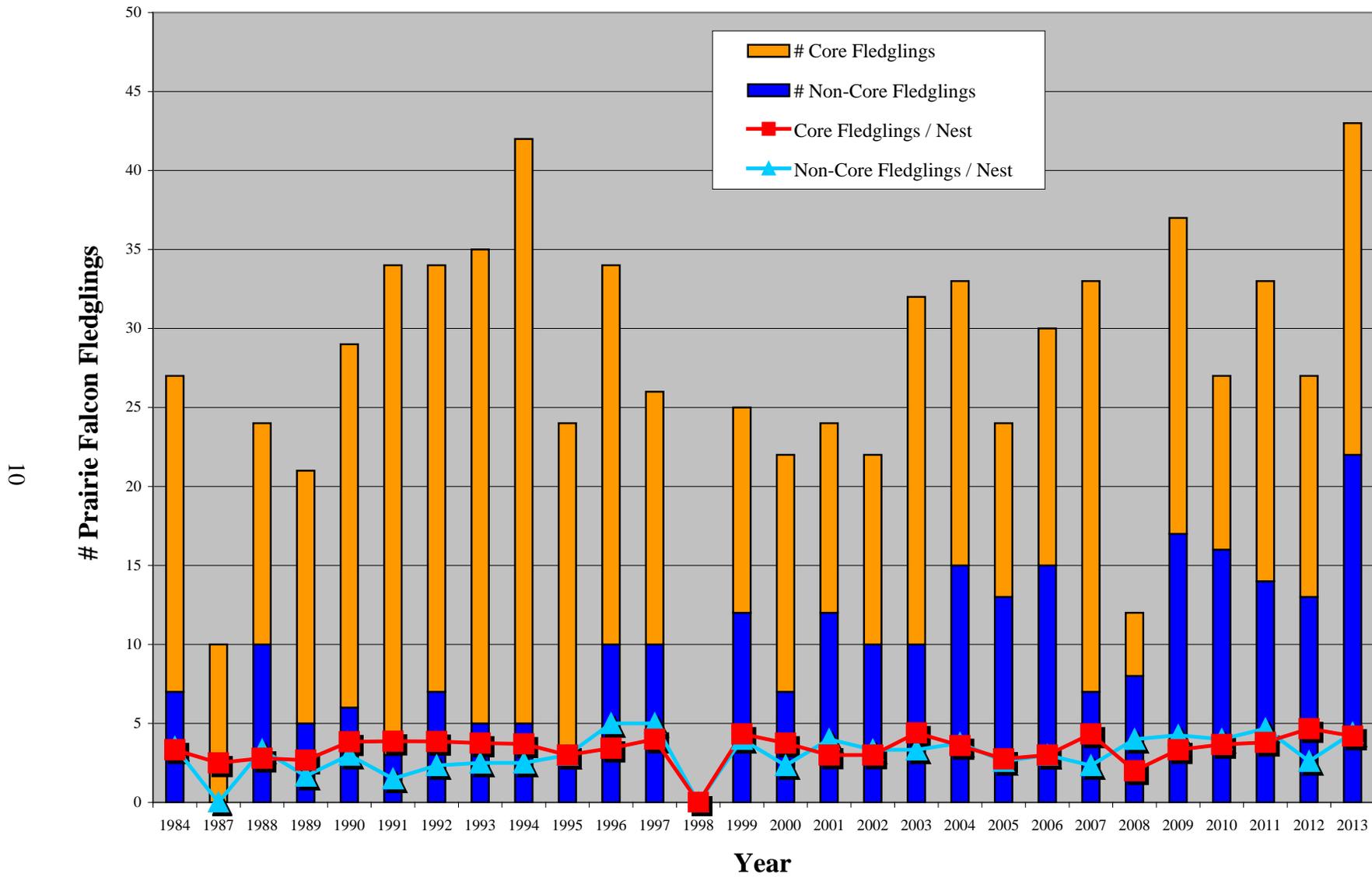


Figure 4. Core vs. non-core Pinnacles prairie falcon fledgling productivity, 1984–2013.

Core Areas: Of the 6 territorial falcon pairs in the core areas in 2013, five nested successfully, producing 21 total fledglings and 4.2 fledglings per nest (Table 4). Productivity numbers are comparable to the 1984–2012 averages of 5.1 successful nests per season and higher than the 27-year averages of 17.8 total fledglings and 3.3 fledglings per nest.

Table 4. 1984–2013 Pinnacles prairie falcon nesting productivity – core areas only.

| Year | Territorial Pairs | Nesting Pairs | Successful Nests | # Nestlings | # Nestlings / Nest | # Fledglings | # Fledglings / Nest |
|----------------------|-------------------|---------------|------------------|-------------|--------------------|--------------|---------------------|
| 1984 | 7 | 6 | 6 | 22 | 3.7 | 20 | 3.3 |
| 1987 | 5 | 4 | 4 | 13 | 3.3 | 10 | 2.5 |
| 1988 | 8 | 6 | 5 | 14 | 2.8 | 14 | 2.8 |
| 1989 | 8 | 8 | 6 | 16 | 2.7 | 16 | 2.7 |
| 1990 | 9 | 7 | 6 | 23 | 3.8 | 23 | 3.8 |
| 1991 | 9 | 8 | 8 | 31 | 3.9 | 31 | 3.9 |
| 1992 | 9 | 7 | 7 | 29 | 4.1 | 27 | 3.9 |
| 1993 | 10 | 9 | 8 | 34 | 4.3 | 30 | 3.8 |
| 1994 | 10 | 10 | 10 | 38 | 3.8 | 37 | 3.7 |
| 1995 | 10 | 9 | 7 | 21 | 3.0 | 21 | 3.0 |
| 1996 | 9 | 8 | 7 | 28 | 4.0 | 24 | 3.4 |
| 1997 | 8 | 6 | 4 | 16 | 4.0 | 16 | 4.0 |
| 1998 | 7 | 5 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 6 | 5 | 3 | 13 | 4.3 | 13 | 4.3 |
| 2000 | 5 | 5 | 4 | 15 | 3.8 | 15 | 3.8 |
| 2001 | 7 | 6 | 4 | 12 | 3.0 | 12 | 3.0 |
| 2002 | 5 | 5 | 4 | 12 | 3.0 | 12 | 3.0 |
| 2003 | 5 | 5 | 5 | 22 | 4.4 | 22 | 4.4 |
| 2004 | 7 | 7 | 5 | 21 | 4.2 | 18 | 3.6 |
| 2005 | 6 | 5 | 4 | 12 | 3.0 | 11 | 2.8 |
| 2006 | 7 | 6 | 5 | 17 | 3.4 | 15 | 3.0 |
| 2007 | 6 | 6 | 6 | 26 | 4.3 | 26 | 4.3 |
| 2008 | 7 | 3 | 2 | 4 | 2.0 | 4 | 2.0 |
| 2009 | 7 | 7 | 6 | 24 | 4.0 | 20 | 3.3 |
| 2010 | 8 | 6 | 3 | 11 | 3.7 | 11 | 3.7 |
| 2011 | 8 | 7 | 5 | 19 | 3.8 | 19 | 3.8 |
| 2012 | 7 | 6 | 3 | 14 | 4.7 | 14 | 4.7 |
| 2013 | 6 | 6 | 5 | 25 | 5.0 | 21 | 4.2 |
| Averages (1984–2012) | 7.4 | 6.4 | 5.1 | 18.8 | 3.5 | 17.8 | 3.3 |

Non-Core Areas: Of the 6 territorial falcon pairs in the non-core areas in 2013, five nested successfully, producing 22 total fledglings and 4.4 fledglings per nest (Table 5). These numbers are higher than the 1984–2012 average of 2.7 successful nests per season, 8.9 total fledglings and 3.0 fledglings per nest.

Table 5. 1984–2013 Pinnacles prairie falcon nesting productivity – non-core areas only.

| Year | Territorial Pairs | Nesting Pairs | Successful Nests | # Nestlings | # Nestlings / Nest | # Fledglings | # Fledglings / Nest |
|----------------------|-------------------|---------------|------------------|-------------|--------------------|--------------|---------------------|
| 1984 | 3 | 3 | 2 | 8 | 4.0 | 7 | 3.5 |
| 1987 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 4 | 3 | 3 | 10 | 3.3 | 10 | 3.3 |
| 1989 | 4 | 4 | 3 | 8 | 2.7 | 5 | 1.7 |
| 1990 | 5 | 3 | 2 | 8 | 4.0 | 6 | 3.0 |
| 1991 | 5 | 3 | 2 | 3 | 1.5 | 3 | 1.5 |
| 1992 | 4 | 4 | 3 | 9 | 3.0 | 7 | 2.3 |
| 1993 | 3 | 3 | 2 | 5 | 2.5 | 5 | 2.5 |
| 1994 | 3 | 3 | 2 | 7 | 3.5 | 5 | 2.5 |
| 1995 | 3 | 2 | 1 | 3 | 3.0 | 3 | 3.0 |
| 1996 | 3 | 2 | 2 | 7 | 3.5 | 10 | 5.0 |
| 1997 | 4 | 2 | 2 | 10 | 5.0 | 10 | 5.0 |
| 1998 | 3 | 2 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 4 | 3 | 3 | 12 | 4.0 | 12 | 4.0 |
| 2000 | 3 | 3 | 3 | 7 | 2.3 | 7 | 2.3 |
| 2001 | 3 | 4 | 3 | 12 | 4.0 | 12 | 4.0 |
| 2002 | 6 | 4 | 3 | 14 | 4.7 | 10 | 3.3 |
| 2003 | 7 | 4 | 3 | 11 | 3.7 | 10 | 3.3 |
| 2004 | 5 | 4 | 4 | 15 | 3.8 | 15 | 3.8 |
| 2005 | 7 | 5 | 5 | 17 | 3.4 | 13 | 2.6 |
| 2006 | 8 | 8 | 5 | 18 | 3.6 | 15 | 3.0 |
| 2007 | 8 | 6 | 3 | 9 | 3.0 | 7 | 2.3 |
| 2008 | 5 | 2 | 2 | 8 | 4.0 | 8 | 4.0 |
| 2009 | 5 | 4 | 4 | 17 | 4.3 | 17 | 4.3 |
| 2010 | 5 | 5 | 4 | 16 | 4.0 | 16 | 4.0 |
| 2011 | 5 | 5 | 3 | 14 | 4.7 | 14 | 4.7 |
| 2012 | 5 | 5 | 5 | 14 | 2.8 | 13 | 2.6 |
| 2013 | 6 | 5 | 5 | 22 | 4.4 | 22 | 4.4 |
| Averages (1984–2012) | 4.5 | 3.6 | 2.7 | 9.7 | 3.3 | 8.9 | 3.0 |

Phenology

The first prairie falcon pairs were observed at Egg (a named rock formation) on 1 January 2013 (Appendix A). Incubation was first observed at Pig Canyon on 3 March. The first hatching occurred between 8-11 April at the North Chalone nest. The first fledging took place from 20–23 May at the North Chalone nest. The last fledging took place at Willow Spring Slide on 11-13 June.

Other Notes

All 11 eyries chosen by prairie falcons were used in previous years. All prairie falcon eyries were within historically documented territories. One nesting attempt failed this year. Four territories occupied by prairie falcon pairs in the past five years – D. Soto Canyon, Pipsqueak Pinnacles, Narrows, and Marion Canyon – were vacant this year.

Discussion

Eleven prairie falcon pairs attempted to nest this year and 10 successful nests produced 47 nestlings and 43 fledglings, compared to 27-year averages of 9.9 nesting pairs, 7.8 successful nests, 28.5 nestlings, and 26.7 fledglings (Table 2). In core areas, numbers for total successful nests, nestlings, and fledglings were higher than average in 2013 (Table 4). In non-core areas, respective numbers were also above average in 2013 (Table 5). One nest failure was documented, at a core area nest site during development of nestlings. Four nestlings at the Little Pinnacles nest site failed to fledge. Nest failure was likely due to heat exposure, given the advanced age of the nestlings and confirmation of nest failure after consecutive days marked by extreme high temperatures. However, given the lack of constant monitoring at the site (e.g., through remote video surveillance), nest failure due to predation or human disturbance cannot be entirely ruled out.

Prairie falcon productivity numbers for the 2013 season were the highest documented during the 28 years of the Pinnacles raptor monitoring program. In past years, nest predation by great horned owls has been suspected (but not confirmed) as a primary factor in prairie falcon nest failures at Pinnacles due to nest failures of multiple falcon nests in close proximity to known great horned owl activity (Pinnacle unpublished data). Prairie falcon nestlings and fledglings are vulnerable to predation by great horned owls in other areas (Olendorff and Stoddart 1974, McFadzen and Marzluff 1996). Great horned owl nesting data for core and non-core areas in Pinnacles are collected through the Breeding Raptor Distribution and Nesting Phenology at Pinnacles National Park – 2013 Annual Report (Emmons, in review). For the 2013 season, no great horned owl nests were documented at Pinnacles, and great horned owl territorial pairs were confirmed in fewer areas than in previous years. Future data analyses should examine the possible inverse relationship between falcon and great horned owl productivity.

Conclusions, Management Implications and Recommendations

Climbing management actions, outreach, and recommendations for further management and research are listed below. Refer to Appendix D for further information on public interest highlights for the 2013 season.

Prairie Falcons: Climbing Advisories

Climbing advisories were put in place in January in areas with historic climber usage to protect nesting raptors from disturbance. In March and April, advisories were updated and lifted in territories that were confirmed unoccupied by prairie and peregrine falcon pairs. Signs detailing climbing advisories were posted at Little Pinnacles, Balconies, Hawkins, Scout Peak, Crowley Towers, Egg, Tunnel, Teapot Dome, and Goat Rock / Resurrection Wall territories.

Due to the large size and climber popularity of Machete Ridge, a partial advisory was instituted at this territory. A partial advisory was also instituted at Balconies after a nest site was confirmed at South Balconies. Machete Ridge and North Balconies were opened to climber use after the Balconies falcon pair had shifted to focus territorial and nesting efforts at the South Balconies nest site.

All regular advisory signs were affixed to metal brackets and cement foundations to prevent theft and none were vandalized in 2013.

In 2013, two incidents of off-trail hikers in advisory areas were documented. No incidents involving climbers were documented. No territorial defense behavior by prairie falcons was observed during the off-trail hiker incidents.

Human / Falcon Interactions and Nest Failures

Prairie and peregrine falcon adults in the North Chalone Peak, NE Section 15, Pig Canyon, Hawkins, and Balconies territories responded to the presence of on-trail hikers and raptor biologists with agitated behavior by circling and wailing above their respective territories.

Prairie falcon nest entries were conducted at the North Chalone Peak, NE Section 15, and Pig Canyon nests by the NPS raptor biologist, with additional assistance from the wildlife intern (N. Melling) and condor crew biologists (see Public Interest Highlights below for further details). All nestlings at the North Chalone Peak, NE Section 15, and Pig Canyon eyries fledged successfully.

One prairie falcon nest failure was documented at the Little Pinnacles territory. The Little Pinnacles nest failed when the nestlings at the sites were five weeks old. Although causes of the falcon nest failure in 2013 were not confirmed, heat exposure was suspected due to successive days of extremely high temperatures recorded immediately prior to confirmation of nest failure. However, given the lack of constant monitoring at the site (e.g., through remote video surveillance), nest failure due to human disturbance or nest predation cannot be entirely ruled out.

Education Opportunities

Throughout the year, the raptor biologist and park staff participated in public outreach opportunities to inform visitors about raptor conservation. Educational opportunities included participation in formal events (e.g., Rockpile Rendezvous on April 20-21, Climber Appreciation Days on October 24-26, and scheduled PowerPoint presentations for visitors at the West Side Visitor Contact Station) and informal events (e.g., visitor contact in high-use areas such as High Peaks, Balconies Cliff Trail, and the Bear Gulch Reservoir).

Management Recommendations

- Continue to establish climbing/hiking advisories in core areas (high visitor-use areas) each breeding season to protect cliff-nesting raptor species from human disturbance.
- Increase information opportunities for visitor use assistants and park rangers to educate park visitors about advisories. Prior to the 2004 season, park rangers and interpreters made more attempts to speak with climbers and hikers at trailheads and to regularly rove on trails to provide interpretation and enforcement of resources. Renewing this strategy of interfacing with visitors at trailheads and on trails would help to preserve compliance with climbing advisories as annual visitation increases at the park.
- Enforce advisories with law enforcement rangers. Although advisories are voluntary, disturbing wildlife is a citable offense that law enforcement rangers should continue to employ to discourage visitors from willfully threatening nesting efforts of breeding raptors at Pinnacles.
- Increase use of staff and visitors to observe raptor activity in the field. This can be achieved through regular communication with NPS staff and visitors, continued use of monthly monitoring updates on raptor status at the park, and reminders about filling out wildlife observation cards.

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Appendix A. 2013 nest phenology and success for prairie and peregrine falcons (continued).

| Nest Species | Territory Occupied | Nest Code | Arrival Date | Begin Incub | Hatch Date | Fledge Date | Abandon Date | Failed Date | # of Eggs | # of Nestlings | Known Fledglings | Possible Fledglings | Occup. Status |
|--------------|------------------------|-----------|--------------|-------------|------------|-------------|--------------|-------------|-----------|----------------|------------------|---------------------|---------------|
| PRFA | North Chalone | NC-1 | 1/9-29 | <3/28 | 4/8-11 | 5/20-23 | | | | 5 | 5 | 5 | 5 |
| PRFA | North Wilderness Rock | | | | | | | | | | | | Not Occ. |
| PRFA | Pig Canyon | PIG-9 | 1/12-31 | 3/3-29 | 5/1-3 | 6/10-11 | | | | 3 | 3 | 3 | 3 |
| PRFA | Pipsqueak Pinnacles | | | | | | | | | | | | Not Occ. |
| PRFA | Prescribed Burn Cliffs | | | | | | | | | | | | Not Occ. |
| PRFA | Resurrection Wall | RW-2 | <1/22 | <3/27 | 4/17-20 | 5/30-6/1 | | | 5 | 5 | 5 | 5 | 5 |
| PRFA | Scout Peak | | | | | | | | | | | | Not Occ. |
| PRFA | South Balconies | SGB-4 | <1/7 | <4/10 | 4/24-26 | 6/3-5 | | | | 3 | 3 | 3 | 3 |
| PRFA | South Chalone | | <2/28 | | | | | | | | | | Occupied |
| PRFA | S. Wilderness Rock | | | | | | | | | | | | Not Occ. |
| PRFA | Teapot Dome | *EGG-1 | <1/1 | | | | | | | | | | Occupied |
| PRFA | Tugboat | | | | | | | | | | | | Not Occ. |
| PRFA | Tunnel | *EGG-1 | <1/1 | | | | | | | | | | Occupied |
| PRFA | Upper Bear Gulch | | | | | | | | | | | | Not Occ. |
| PRFA | Upper Condor Gulch | | | | | | | | | | | | Not Occ. |
| PRFA | Western Front | | | | | | | | | | | | Not Occ. |
| PRFA | Willow Spring Slide | WSS-2 | <1/17 | <4/6 | 4/27-30 | 6/11-13 | | | 5 | 5 | 5 | 5 | 5 |
| PEFA | Hawkins Peak | HP-1 | <1/1 | 3/15-27 | 4/28-5/1 | 6/9-11 | | | 5 | 4 | 3 | 3 | 3 |
| PEFA | Central High Peaks | *HP-1 | <1/1 | | | | | | | | | | Occupied |
| PEFA | Crowley Towers | *NB | <4/10 | | | | | | | | | | Occupied |
| PEFA | North Balconies | *CT | <4/10 | | | | | | | | | | Occupied |

Note: for the "Occup. Status" column, # refers to possible fledglings, "Occupied" = territorial occupation, "Not Occ." = no occupation, "Failed" = failed nest, "Abandon" = territory abandoned after confirmed occupancy, "Unknown" = breeding confirmed (see nest code) or likely, but nest status unknown. For the "Nest Code" column, * refers to territorial links for raptor pairs occupying more than 1 territory

Appendix B. 2013 results and discussion for peregrine falcon occupancy and productivity.

Results: Peregrine Falcons

Two peregrine falcon pairs occupied territories at Pinnacles in 2013. One pair nested at the territory of Hawkins Peak (Table APP B.1). The second peregrine falcon pair was non-nesting but occupied the Crowley and North Balconies territories. This marked the ninth consecutive year that a peregrine falcon pair has nested at Pinnacles, and the first year of the 28-year monitoring program that two peregrine falcon pairs have been confirmed occupying territories at the park. Prior to 2004, peregrine falcon occupancy or nesting had not been confirmed at Pinnacles for 48 years. The Hawkins peregrine falcon pair successfully nested this year and produced four nestlings and three fledglings (Figure APP B.1), compared to nine-year averages (since 2004) of 0.9 nesting pairs, 0.8 successful nests, 2.2 nestlings, and 2.2 fledglings (Table APP B.2).

Occupied Territories

Core Areas: In 2013 there were two territorial peregrine falcon pairs within the core areas. This number is higher than the average number of territorial falcon pairs (1.0) in the core areas over the last nine years.

Non-Core Areas: In 2013 there were no territorial peregrine falcon pairs within the non-core areas. This number is consistent with the lack of peregrine falcon presence or occupancy in the non-core areas over the last 27 years.



Figure APP B.1. Peregrine falcon fledgling at Hawkins Peak. Photo by Gavin Emmons, 2012.

Phenology and Productivity

The peregrine falcon pair at Hawkins Peak was first observed this year on 1 January 2013 (Appendix A), but was also documented occupying and defending the territory throughout the fall and winter of 2012. The peregrine falcon pair at Crowley and North Balconies was first observed defending the territories on 10 April 2013, but did not commit to nesting this season. Incubation was first observed by the Hawkins peregrine falcon pair on 27 March. Hatching of young occurred between 28 April and 1 May. Fledging took place 9-11 June 2013.

Table APP B.1. 2013 Pinnacles peregrine falcon breeding summary.

| Territory | Nest Used/ Last Year Used | # Eggs Laid | # Young Hatched | # Young Known/ Fledged |
|----------------|------------------------------|-------------|-----------------|---------------------------|
| Hawkins Peak * | HP-1/ 2012 | 4 | 4 | 3/3 |

*nests within the core area.

Table APP B.2. 1984–2013 Pinnacles peregrine falcon nesting productivity—core areas only.

| Year | Territorial Pairs | Nesting Pairs | Successful Nests | # Nestlings | # Nestlings / Nest | # Fledglings | # Fledglings / Nest |
|-------------------------|----------------------|------------------|---------------------|----------------|-----------------------|-----------------|------------------------|
| 1984 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| 2006 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| 2007 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| 2008 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| 2009 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| 2010 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2011 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 1 | 1 | 1 | 4 | 4 | 4 | 4 |
| 2013 | 2 | 1 | 1 | 4 | 4 | 3 | 3 |
| Averages (2004–2012) | 1.0 | 0.9 | 0.8 | 2.2 | 2.2 | 2.2 | 2.2 |

Discussion: Combined Prairie and Peregrine Falcon Occupancy and Productivity

Given the small sample size and brief period of years that peregrine falcon pairs have occupied and produced young at a breeding territory at Pinnacles, we cannot currently assign any statistical relevance or trend analyses specifically to peregrine falcon breeding results at the park. However, we have combined prairie and peregrine falcon results over the 28 years of monitoring efforts (Table APP B.3 and Figure APP B.2) to represent overall large falcon occupancy and productivity numbers at Pinnacles.

Combined large falcon occupancy and productivity in core and non-core areas this year were higher than the 27-year running average rates. Twelve falcon pairs attempted to nest this year and 11 successful nests produced 51 nestlings and 46 fledglings, compared to 27-year averages of 10.12 nesting pairs, 8.1 successful nests, 29.2 nestlings, and 27.4 fledglings (Table APP B.3).

In comparing prairie falcon results (Table 2 and Figure 4) with combined prairie and peregrine falcon results (Table APP B.3 and Figure APP B.2), peregrine falcon breeding efforts appear to be supplementing overall large falcon productivity to yield more stable numbers over the 28 years of falcon monitoring at Pinnacles. A prairie falcon pair consistently nested at Hawkins Peak before a peregrine pair began occupying the territory 9 years ago; since 2004 no prairie falcons have nested at Hawkins Peak. This may suggest that – in certain instances – prairie and peregrine falcons compete for territorial occupancy of limited cliff-nest habitat at Pinnacles, with total large falcon productivity unaffected but lower total productivity for prairie falcons in the future, particularly if additional peregrine falcon pairs re-occupy more historical territories in the future. However, at Crowley Towers and North Balconies a prairie falcon pair was already occupying the territories when the non-nesting peregrine falcon pair arrived later in the season. Both falcon pairs defended the Crowley Towers and North Balconies territories and only limited confrontations between the falcon pairs were observed. The prairie falcon pair successfully hatched and fledged young at a historical nest at Crowley Towers. At present, limited peregrine nesting efforts and data are inconclusive in regard to competition for cliff-nest habitat between the two species.

Table APP B.3. 1984–2013 Pinnacles prairie and peregrine falcon nesting productivity – core and non-core areas combined.

| Year | Territorial Pairs | Nesting Pairs | Successful Nests | # Nestlings | # Nestlings / Nest | # Fledglings | # Fledglings / Nest |
|-----------------------------|--------------------------|----------------------|-------------------------|--------------------|---------------------------|---------------------|----------------------------|
| 1984 | 10 | 9 | 8 | 30 | 3.8 | 27 | 3.4 |
| 1987 | 6 | 4 | 4 | 13 | 3.3 | 10 | 2.5 |
| 1988 | 12 | 9 | 8 | 24 | 3.0 | 24 | 3.0 |
| 1989 | 12 | 12 | 9 | 24 | 2.7 | 21 | 2.3 |
| 1990 | 14 | 10 | 8 | 31 | 3.9 | 29 | 3.6 |
| 1991 | 14 | 11 | 10 | 34 | 3.4 | 34 | 3.4 |
| 1992 | 13 | 11 | 10 | 38 | 3.8 | 34 | 3.4 |
| 1993 | 13 | 12 | 10 | 39 | 3.9 | 35 | 3.5 |
| 1994 | 13 | 13 | 12 | 45 | 3.8 | 42 | 3.5 |
| 1995 | 13 | 11 | 8 | 24 | 3.0 | 24 | 3.0 |
| 1996 | 12 | 10 | 9 | 35 | 3.9 | 34 | 3.8 |
| 1997 | 12 | 8 | 6 | 26 | 4.3 | 26 | 4.3 |
| 1998 | 10 | 7 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 10 | 8 | 6 | 25 | 4.2 | 25 | 4.2 |
| 2000 | 8 | 8 | 7 | 22 | 3.1 | 22 | 3.1 |
| 2001 | 10 | 10 | 7 | 24 | 3.4 | 24 | 3.4 |
| 2002 | 11 | 9 | 7 | 26 | 3.7 | 22 | 3.1 |
| 2003 | 12 | 9 | 8 | 33 | 4.1 | 32 | 4.0 |
| 2004 | 13 | 11 | 9 | 36 | 4.0 | 33 | 3.7 |
| 2005 | 14 | 11 | 10 | 32 | 3.2 | 27 | 2.7 |
| 2006 | 16 | 15 | 11 | 38 | 3.5 | 33 | 3.0 |
| 2007 | 15 | 13 | 10 | 38 | 3.8 | 36 | 3.6 |
| 2008 | 13 | 6 | 5 | 15 | 3.0 | 15 | 3.0 |
| 2009 | 13 | 12 | 11 | 44 | 4.0 | 40 | 3.6 |
| 2010 | 14 | 12 | 8 | 28 | 3.5 | 28 | 3.5 |
| 2011 | 14 | 13 | 8 | 33 | 4.1 | 33 | 4.1 |
| 2012 | 13 | 12 | 9 | 32 | 3.6 | 31 | 3.4 |
| 2013 | 14 | 12 | 11 | 51 | 4.6 | 46 | 4.2 |
| Averages (1984– 2012) | 12.2 | 10.2 | 8.1 | 29.2 | 3.5 | 27.4 | 3.3 |

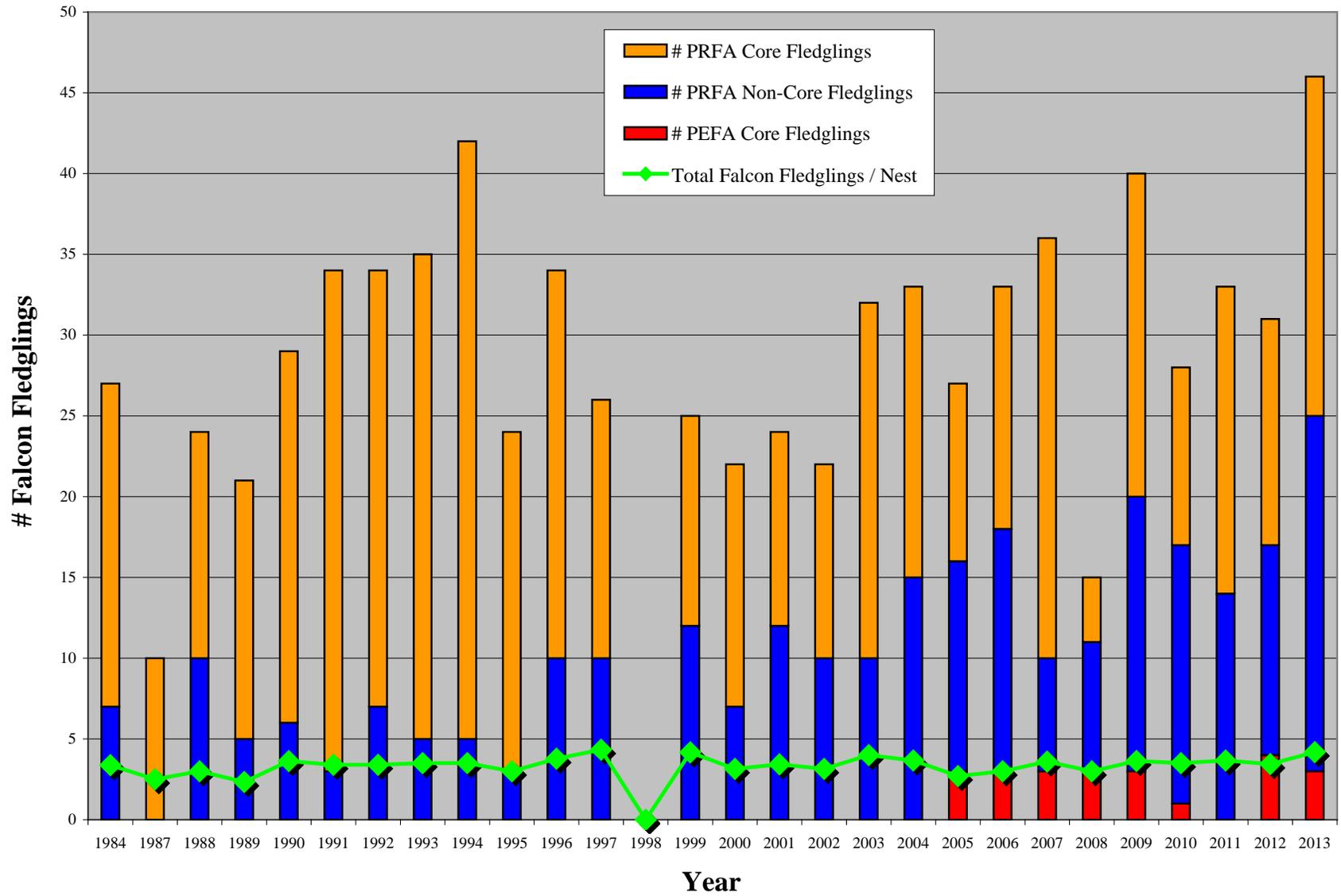


Figure APP B.2. Combined core and non-core Pinnacles PRFA and PEFA fledgling productivity, 1984–2013.

Appendix C. Documentation of changes in data collection methods.

No changes were made to data collection methods for the Pinnacles raptor monitoring program through the course of the 2013 season. In 2010, several changes were made to procedures for entering observations into raptor monitoring databases, and relevant sections in the Raptor Monitoring Protocol were revised accordingly. Primarily these changes were put in place to address inventory and monitoring standards for data management and storage, and the development of a more efficient workflow and structuring of existing MS Access databases. These changes were detailed in the 2010 annual report and are briefly reviewed below.

Through the 2010 season raptor observations and breeding summaries were entered into the “Breeding Raptors” Access database, after development was finalized in 2007–2008. To increase efficient statistical analysis of prairie falcon occupancy and productivity, additional fields were created in the database “Data Entry” form, including fields detailing detection purpose, survey intention, confirmation of territorial behavior, and prairie falcon detection. The SFAN I&M staff is currently completing raptor database revisions to include end-of-season breeding summary queries for number of territories occupied, territorial pairs, nesting pairs, successful nests, total nestlings, nestlings per nest, possible fledglings, and fledglings per nest. The revised raptor database will be used for data collection and management in upcoming seasons.

The 2011 Prairie Falcon Monitoring Protocol was peer reviewed via a blind review process through the task agreement with the University of Washington (UW). Dr. James Agee of UW and Dr. Penelope Latham, Pacific West Region I&M program manager, coordinated and evaluated responses to all peer review comments, successfully completing a five-year process of protocol design and revisions.

Appendix D. Public interest highlights.

The 2013 breeding season was the 28th year of raptor monitoring at Pinnacles. Field observations began 1 January 2013 and ended 22 July 2013, with a total of over 150 possible and active nest sites monitored during 722 observation hours. Climbing advisories were put into effect in January to reduce nest disturbance by visitors, updated to reflect unoccupied territories in March, and lifted in July at the end of the raptor breeding season.

- During the 2013 season, the NPS raptor biologist independently conducted prairie falcon nest entries at three Pinnacles prairie falcon eyries after gaining Bird Banding Lab sub-permittee status under the master banding permit of raptor researcher Dr. Doug Bell from East Bay Regional Park District. All falcon nestlings at the North Chalone Peak, NE Section 15, and Pig Canyon nests were briefly handled, banded, and blood samples were obtained. All nestlings from the three eyries fledged successfully. Banding and blood sample information collected in 2009–2013 will be used to ascertain genetic insularity and pair fidelity in the Pinnacles prairie falcon population.
- For the ninth consecutive year a peregrine falcon pair was documented nesting at the park. The site hatched four young and fledged three young. A second territorial pair of peregrine falcons was also confirmed at Pinnacles, representing the first time more than one pair of peregrine falcons has been confirmed at the park during the history of the raptor monitoring program. Prior to 2004, the last previously confirmed peregrine falcon territorial occupancy or nest effort at Pinnacles was documented in 1957.
- An ArcMap project was updated to visually display GPS and GIS information relating to the raptor monitoring program, including historical nest sites, monitoring watch spots, nest distribution by geologic and habitat layers, and locations of advisory signs posted at Pinnacles.
- PowerPoint presentations focused on raptor monitoring and falcon nesting were given to incoming Pinnacles interpretive staff and volunteers, and later to visitors as part of the Speaker Series at the West Side Visitor Contact Station.
- The First Annual Climber Appreciation Days, organized by James Bouknight (the Pinnacles trails foreman), Larry Arthur (the owner of Mountain Tools and a local climber), and the Pinnacles raptor biologist, was a 3-day event focused on local climbers volunteering to restore and maintain climber access trails at popular climbing formations in Bear Gulch. The raptor biologist also used informal interpretive opportunities to discuss resource management, falcon cliff-nesting, and climbing advisories with the 50+ volunteers.
- The Fifth Annual Rockpile Rendezvous, an event to emphasize climber contributions, history, and management at Pinnacles over the past 60 years, was organized by the raptor biologist and the local climbing community, providing visitors with information on historical resource and recreation management at the park.

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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Natural Resource Stewardship and Science
1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525

www.nature.nps.gov

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