

PEREGRINE FALCON NEST SITE MONITORING IN ARIZONA

2009 BREEDING-SEASON RESULTS

Final Report

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Photo by Jarrod McFarlin, AGFD

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SENSITIVE INFORMATION STATEMENT

This document does not contain peregrine falcon (*Falco peregrinus*) nest location descriptions. The Arizona Game and Fish Department (AGFD) considers this information sensitive and confidential. Interested parties can, with appropriate justification, obtain this information through written request to AGFD (c/o Heritage Data Management System, 5000 West Carefree Highway, Phoenix, Arizona, 85086-5000).

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Peregrine Falcon Nest Site Monitoring In Arizona: 2009 Breeding-Season Results

Introduction

The U.S. Fish and Wildlife Service (FWS) is mandated by the Endangered Species Act to monitor the American peregrine falcon (*Falco peregrinus anatum*; PEFA) for a minimum of five years after delisting. In cooperation with States, other agencies, recovery team members and individual cooperators, a "post-delisting monitoring plan" (plan) was developed to assess population status and provide a system to detect declines in territory occupancy, nest success and productivity throughout the United States (U.S. Fish and Wildlife Service 2003). Monitoring frequency was established at 3 year intervals. The Arizona Game and Fish Department (Department) and its cooperators completed the second round of formal monitoring effort under the plan during the 2009 breeding season. The primary objectives remain constant for each monitoring period and include: 1) determine territory occupancy status, 2) assess nest success and 3) document productivity. This report summarizes monitoring results in Arizona during the 2009 breeding season.

Methods

Territory Selection

A random sample of sixty historic PEFA territories in Arizona were selected by the FWS and provided to AGFD for monitoring during the initial monitoring year in 2006 (Abbate 2006), and these locations remained the same in 2009 (Fig. 1). Breeding areas and specific nest sites were identified from the Heritage Data Management System and records from cooperating agencies and individuals. Activity areas were eligible for inclusion in the random selection of sites in Arizona if they had been occupied at least once from 1997 to 2002 (U.S. Fish and Wildlife Service 2003). A preliminary statewide survey was conducted in 2005 to evaluate occupancy and accessibility (Bayless et. al. 2005). Due to poor access and limited visibility, several sites were removed from the initial list and replaced with alternates in 2006. No changes were made in 2009.

Monitoring Protocol

The monitoring protocol utilized in Arizona was adapted from the *Monitoring Plan for the American Peregrine Falcon: A Species Recovered Under the Endangered Species Act* (U.S. Fish and Wildlife Service 2003). We visited each targeted breeding area a minimum of 2 times to assess occupancy, and most sites were surveyed on 3 or more occasions to identify successful nests and estimate productivity. Monitoring sessions were conducted by one or two observers in 4-hour blocks, mostly during early morning (30 minutes before sunrise to 3.5 to 4 hours post sunrise) or evening (3.5 to 4 hours before sunset to 30 minutes post sunset). Observation times were shortened when objectives were completed in less than 4 hours. Some remote sites with difficult access or lengthy hiking times were monitored during 2 successive sessions. This strategy involved one evening observation, camping overnight, and completing the session during the early morning of the following day. Though observations were recorded on separate

data forms, these back-to-back sessions were considered part of the same visit. When no PEFA activity was detected during a monitoring session, observers were instructed to conduct a "reasonable" search for an alternate eyrie location within the area. Recommendations for this additional survey effort included a time limit equal to a monitoring session of 4-hours covering a search area of approximately 800m from the known eyrie, or investigating a nearby area with landscape features that could serve as an alternate nesting site.

Definitions

- An "occupied territory" was defined as a territory where either a pair of peregrines is present (two adults or an adult/sub-adult mixed pair), or there is evidence of reproduction such as one adult sitting low in the nest for an extended time (incubation), eggs or young are observed, or food is delivered into the suspected nest site (eyrie or scrape).
- A "successful nest" was defined as an occupied territory where one or more young is observed at ≥ 28 days of age. Offspring age was determined using age-photographs from Cade et al. (1996) and direct observation of fledglings or older nestlings.
- "Nest Productivity" was defined as the total number of young observed ≥ 28 days within a territory.

Monitoring protocol requirements and recommendations are summarized in the 2009 Peregrine Falcon Monitoring Protocol: Occupancy, Nest Success, Productivity (Appendix 1). All observations were documented on the 2009 Peregrine Falcon Occupancy, Nest Success, Productivity Data Form (Appendix 2).

Arizona Study Area

Monitored breeding areas in Arizona were distributed across a large geographic region with the southern most locations near the international boundary with Mexico and the northern most site located approximately 16km from the Utah border (a linear distance of 626km). The monitored sites furthest to the west were along the Colorado River below the Hoover Dam and the furthest east site was approximately 4km from the New Mexico border. Territory elevations ranged from a low of 122m (400 ft) at the Colorado River in western Arizona to 2500m (8200 ft) in the Rincon Mountains in the south central part of the state. Monitored territories occurred within 12 of 15 state counties with none in Navajo and Apache Counties in the far northwest, or in Yuma County in the far southwest part of the state (Table 1). This widespread distribution encompassed a range of topographic characteristics from highly complex canyons and mountain ranges to more open landscapes with occasional geologic uplifts and volcanic formations. A variety of biotic communities were also represented from low elevation semi-desert grasslands and desertscrub environments to middle and higher elevation communities of conifer forests and woodlands up to montane forests (Brown 1994). While many territories were located in very dry regions with limited or no surface water features, a number of nest sites were located on cliffs above river and stream systems, and several territories were adjacent to larger reservoirs such as Alamo Lake, Saguaro Lake and Lake Havasu. All monitored territory locations were characterized as rural or "wilderness" sites with one exception. This territory is located in Camelback Mountain Park within the Phoenix metropolitan area. While not strictly urban due to the open space park environment in the immediate vicinity of the eyrie, the park itself is

surrounded by residential development. Ownership and land management for specific nest site locations were distributed among 4 agencies and 2 local governments including the U.S. Forest Service (USFS), Bureau of Land Management (BLM), National Park Service (NPS), FWS, the State of Arizona and the City of Phoenix, with the majority (38) within the National Forests (Table 2). The distribution of all monitored PEFA nest sites across the state are shown in Figure 1.

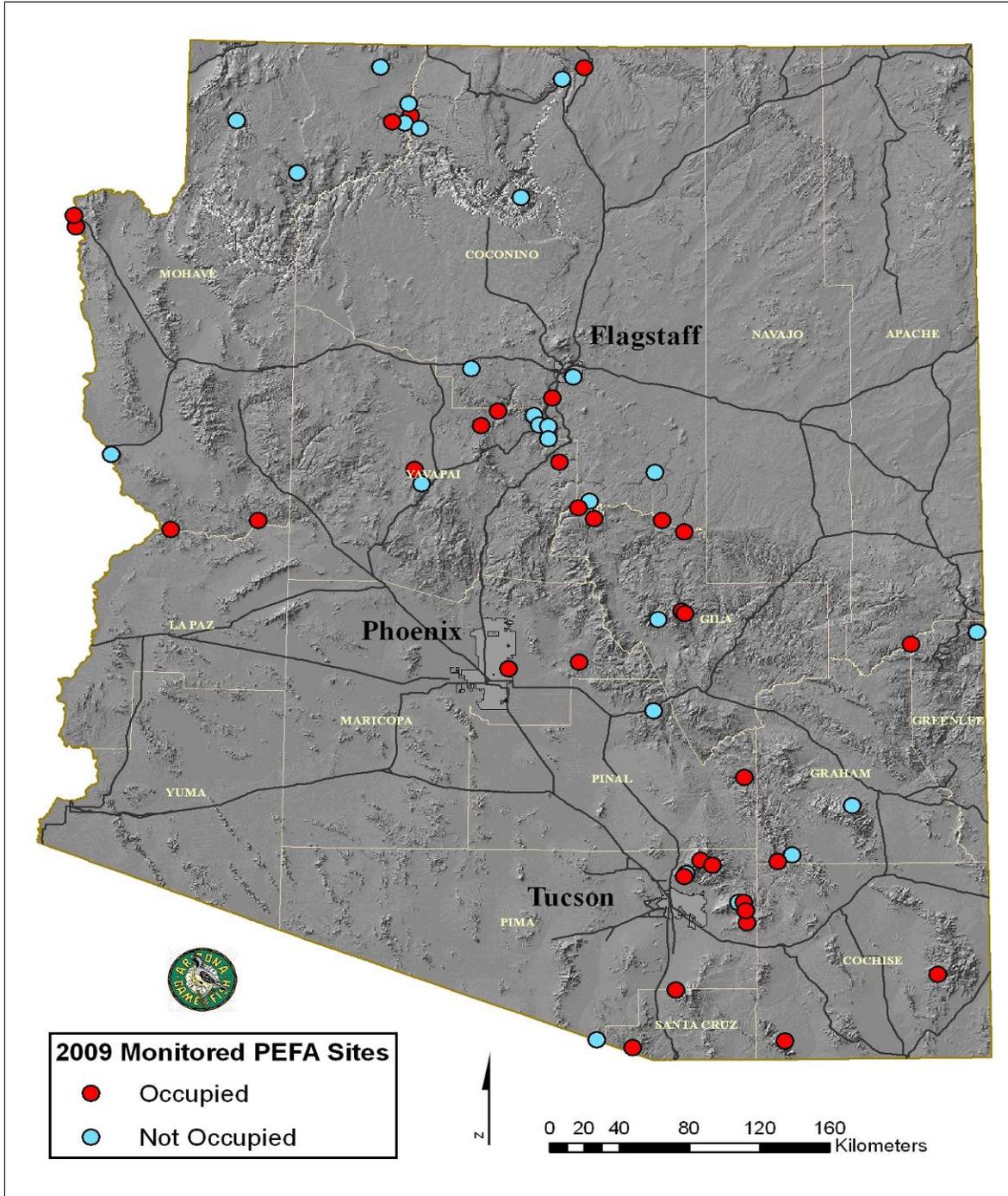


Figure 1. Monitored PEFA Nest Locations 2009

2009 Monitoring Results

We observed 34 (57%) occupied nest sites from our sample of 60 historic eyries (Table 3). Eighteen (30%) of the occupied sites were confirmed as successful, with the outcome of 11 additional occupied locations undetermined (no eggs or young detected). While 26 (43%) breeding areas were considered unoccupied, we observed single territorial adults at 10 of these sites (17% of all sites monitored). We observed a total of 29 young that successfully fledged from all monitored breeding areas, resulting in estimates of 0.85 young per occupied site and 1.61 young per successful site. When we grouped monitored breeding areas by county, occupancy rates ranged from 20 to 100%. In those Arizona counties where we monitored 3 or more breeding areas (6 counties in all), 4 counties had lower occupancy rates in 2009 than 2006 (Table 1). We also grouped monitored breeding locations by land management area resulting in occupancy rates ranging from 0 to 100%. In those management areas where we monitored at least 3 breeding sites (7 areas in all), 5 locations had lower occupancy rates in 2009 than 2006 (Table 2). Monitoring results of each PEFA breeding area are summarized in Appendix 3.

Table 1. Occupancy at monitored PEFA breeding areas in Arizona counties 2006 and 2009.

Arizona County	Total Monitored Breeding Areas 2006 & 2009	Number of Occupied Breeding Areas		Breeding Area Occupancy Rate (%)	
		2006	2009	2006	2009
Mohave	12	7	5	58	42
Coconino	10	4	2	40	20
Pima	9	7	7	78	78
Gila	8	6	6	75	75
Yavapai	7	7	4	100	57
Graham	3	2	1	67	33
Cochise	2	1	2	50	100
Greenlee	2	2	1	100	50
Maricopa	2	2	2	100	100
Pinal	2	2	1	100	50
Santa Cruz	2	2	2	100	100
La Paz	1	1	1	100	100
TOTALS	60	43	34	72%	57%

Table 2. Occupancy of monitored PEFA breeding locations by management area in 2006 and 2009.

Agency	Management Area	No. of AGFD Monitored Breeding Areas	Occupied Breeding Areas		Occupancy Rate (%)	
			2006	2009	2006	2009
USFS	Coconino National Forest	9	6	3	67	33
USFS	Apache-Sitgreaves Natl. Forest	2	2	1	100	50
USFS	Coronado National Forest	12	9	8	75	67
USFS	Prescott National Forest	4	4	3	100	75
USFS	Kaibab National Forest	3	2	1	67	33
USFS	Tonto National Forest	8	6	6	75	75
BLM	Arizona Strip Field Office	7	3	1	43	14
BLM	Kingman Field Office	2	1	2	50	100
BLM	Safford Field Office	1	1	1	100	100
State Trust	Graham and Yavapai Counties	2	2	1	100	50
USFWS	Bill Williams Refuge	1	1	1	100	100
USFWS	Havasu Natl. Wildlife Refuge	1	0	0	0	0
NPS	Glen Canyon Natl. Rec. Area	1	1	1	100	100
NPS	Grand Canyon Natl. Park	1	0	0	0	0
NPS	Lake Mead Natl. Rec. Area	2	2	2	100	100
NPS	Saguaro Natl. Park	3	2	2	67	67
Phoenix	Maricopa County	1	1	1	100	100
Total		60	43	34	72%	57%

Discussion

PEFA territory occupancy at monitored sites in Arizona was lower in 2009 than 2006. However, the methods used do not allow us to determine if this reduction in PEFA activity is an early indication of population decline or sample bias. A preliminary survey of PEFA breeding areas completed by AGFD in 2005 included 56 of the 60 sites currently part of our sample of territories (Bayless et al. 2005). Results from this survey indicated an occupancy rate of 66%. When compared to occupancy at 72% in 2006 and 57% in 2009, population fluctuations during 3 monitoring seasons (over 5 years), have shown both positive and negative changes. While it is possible that all 11 occupied sites with unknown outcomes in 2009 could have failed during the incubation or nestling stages, we were unable to confirm this since the scrape sites could not be viewed to detect eggs or young nestlings. It is also possible that the visitation schedule at some sites could have missed early fledglings that did not survive until the next visit. In addition, determination of nesting status from adult behavior was inconclusive at some sites, and we suspect that some pairs simply did not attempt to nest. Even so, if all 11 territories were successful, this would only increase our success rate to 48%, still far below previously reported (1999-2002) nationwide nest success ranging from 61% to 73% (U.S. Fish and Wildlife Service 2003).

While most nest sites we monitored were in remote locations with small likelihood of human disturbance, one site was impacted by the expansion of an access road directly beneath the historic eyrie. This location (Cerro Del Fresnal) is on the Arizona border with Mexico and is subject to increasing law enforcement activities related to border patrol. Several other sites may have been influenced by competition from other raptor species nesting or active in the immediate vicinity of the historic eyries. These included nesting or active prairie falcons near the Powell Monument, Gooseneck, and Sunshine Point sites, and gray hawks near the Sycamore Canyon eyrie.

Adult PEFA were detected briefly in the vicinity of 3 other sites during one monitoring session (2 sites with single birds and 1 site with 2). However, these birds flew by - showing no signs of attachment or territorial behavior as they departed the historic nesting area quickly, or the activity was detected a long distance away from the historic site. In addition, we recognized that some breeding locations are within very complex topographic areas containing many suitable nesting cliffs. Some of these breeding areas may have alternate nest sites that are difficult to detect. Thus, a few sites we considered unoccupied in 2009, may have actually been active, but located at an obscure alternate site. Nonetheless, evidence of occupancy was not detected during monitoring and simple search efforts, and extensive searches were outside the scope and funding of the project.

Conclusion

The 2009 PEFA nest site monitoring in Arizona resulted in occupancy, nest success and productivity levels that were lower than those in 2006, and well below target values for the Southwest Region. While these population measures must rely only on those data that could be confirmed in the field, we would caution how they are interpreted for the specific territories that were sampled and the overall PEFA population status for the state or region. We suspect indices from our sample are under-estimated as evidenced by the presence of multiple pairs where eyries were hidden from view and final outcomes were undetermined. There were also a number of other sites where pairs or individuals were initially detected near historic eyries, but were not found during follow-up visits – a possible indication of alternate site use. The addition of this PEFA activity at alternate sites that went undetected during the monitoring period in 2009, may also suggest that actual values for population measures were higher than our observations could confirm. Even so, we expect any missed PEFA activity to be limited, and lowered population indices remain a concern.

LITERATURE CITED

- Abbate, D. 2006. Peregrine falcon nest site monitoring in Arizona: 2006 breeding-season results. Arizona Game and Fish Department, Research Branch, Phoenix, Arizona.
- Bayless, M. L., M.F. Ingraldi and K. Signor. 2005. Arizona peregrine falcon statewide occupancy survey. Arizona Game and Fish Department, Research Branch, Arizona.
- Brown, D.E. (ed.) 1994. Biotic Communities: southwestern United States and northwestern Mexico. Univ. of Utah Press, Salt Lake City.
- Cade, T.J., J.H. Enderson and J. Linthicum. 1996. Guide to Management of Peregrine Falcons at the Eyrie. The Peregrine Fund, Boise Idaho.
- U.S. Fish and Wildlife Service 2003. Monitoring Plan for the American Peregrine Falcon: A Species Recovered Under the Endangered Species Act. U.S. Fish and Wildlife Service, Divisions of Endangered Species and Migratory Birds and State Programs, Pacific Region, Portland OR. 53pp.

APPENDIX 1: Arizona Game and Fish Department - Peregrine Falcon Monitoring Protocol, Occupancy, Nest Success, Productivity - January 2009.

Adapted from: *Monitoring Plan for the American Peregrine Falcon: A Species Recovered Under the Endangered Species Act (U.S. Fish and Wildlife Service 2003)*

ARIZONA GAME AND FISH DEPARTMENT
PEREGRINE FALCON MONITORING PROTOCOL
OCCUPANCY, NEST SUCCESS, PRODUCTIVITY
January 2009

Introduction

The U.S. Fish and Wildlife Service (FWS) is mandated to monitor Peregrine Falcons (PEFA) for no less than five years after delisting in cooperation with States, other agencies and individuals. It has developed the "Post De-listing Monitoring Plan" with the primary objective of detecting declines in territory occupancy, nest success and productivity (indices of population health) throughout the United States. In support of this monitoring plan, and to fulfill the Arizona Game and Fish Department's (Department) commitment to the conservation of this species in Arizona, the Department will conduct monitoring surveys of selected territories (*a random sample of known sites*) based on territory information collected during the 2005 preliminary cliff survey effort (Bayless et al. 2005). This protocol and the accompanying field data form are adaptations from the FWS protocol and sample form (U.S. Fish and Wildlife Service 2003), as well as samples and recommendations submitted by various Department personnel.

Observation Season

PEFA territory observations will be conducted during the breeding season from February to August. In Arizona, there may be some variation in nesting chronology and breeding activity due to differences in elevation, and between different regions of the state. In general, *lower elevations begin breeding earlier and higher elevations are later*. To prevent missing sign of occupancy from early nest failures, every effort should be made to conduct at least one visit during the early breeding (courtship) period (mid-February to mid-April). Earlier observations (prior to incubation) also increase the chances of determining occupancy status, since incubating birds are more secretive.

Recommended Visitation Schedule

Description	Visit 1 Occupancy check	Visit 2 Occupancy check	Visit 3 Success & Productivity check	Visit 4 Success & Productivity check
South Regions and Lower elevations	February 15 th - April 1 st	March 15 th - April 30 th	April 15 th - May 30 th	June 1 st - July 15 th
North Regions and Higher Elevations	March 15 th - April 30 th	April 16 th - May 30 th	May 15 th - June 30 th	July 1 st - Aug 15 th

Monitoring Objectives

Objective 1: Determine Occupancy Status.

The FWS defines an "Occupied Territory" as:

- a territory where either a pair of Peregrines are present (two adults or an adult/sub-adult mixed pair), or
- there is evidence of reproduction (e.g. one adult is observed sitting low in the nest, eggs or young are seen, or food is delivered into eyrie (nest site)).

Your task: *Confirm the presence of a PEFA pair by seeing both birds at the same time, or documenting evidence of reproduction described above.*

Objective 2: Determine Nest Success.

The FWS defines "Nest Success" as:

- the proportion of occupied territories in a monitoring region in which one or more young ≥ 28 days old is observed.
- Age is determined by following the guidelines in Cade et al. (1996).

Your Task: *Confirm the presence of at least 1 nestling (or fledgling if necessary) that is ≥ 28 days old.* You will need to have an observation point looking down into or across from the eyrie. When this is not possible, you may have to time your visit late enough in the season to confirm the presence of older young (e.g., when they begin moving around enough for detection from below).

Objective 3: Determine Productivity.

The FWS defines "Productivity" as:

- the number of young observed at ≥ 28 days old per territory, averaged across a monitoring region.

Your Task: *Confirm the number of young produced and living until the age of 28 days or greater.*

In most cases, determining the number of young will be the most difficult task and may require several visits. It is understood that some young may go undetected and the actual number of young produced at a particular site may be underestimated. Your goal is to count as many young as possible up until the last visit.

Protocol Requirements and Recommendations

Duration, Timing and Number of Observation Sessions

- *Duration* - Observation sessions are to be scheduled in 4-hour blocks. Visits to determine occupancy status, eyrie location, success, or number of young can be shortened, if the observer can confirm the presence of 2 PEFA, evidence of reproduction, or productivity information in less than 4 hours. Be prepared to spend the most time assessing success and productivity. Plan ahead and know your abilities to access the observation area in plenty of time to conduct 4 hour observations during the one of the high activity periods.
- *Time of Day* – All observations need to be scheduled during early morning or evening to maximize detection of PEFA activity. The early morning period is *30 minutes before sunrise to 3.5 to 4 hours post sunrise*. The evening period is *3.5 to 4 hours before sunset to 30 minutes post sunset*. Visibility will be variable depending on your equipment, shade and topography. Use your best judgment in low light conditions when determining

exact starting and ending observation times. Sunrise/Sunset Tables for your general work area are available on-line to help you determine the best schedule.

- *Number of Sessions* – Experienced observers with detailed knowledge of their assigned territories and a lot of luck, may be able to document all occupancy and reproductive information during a minimum number of visits. Do not depend on this good fortune! Observers should plan a minimum of 3 visits and allow for 4 or more visits in your schedule.

- *Monitoring Session Protocol:*
 - A minimum of two visits must be conducted if occupancy is not confirmed during the first observation session. The first session is completed during the courtship period and when necessary, extended to early incubation. If no evidence of occupancy is found during the first 4-hour visit, a second 4-hour visit is required (see Time between Visits below).
 - Occupied sites will be visited a second time during the estimated early nestling stage to determine the actual age of the nest (incubation, nestling) and estimate an appropriate time for the next visit.
 - A third visit to occupied territories will be made during the late nestling stage (when young are 28 – 42 days of age) to determine nest success and productivity. Additional visits may be necessary to confirm reproductive information when early observations do not allow detection and aging of all surviving young.

- *Remote Sites and Time between Visits:*
 - For remote sites, observers should consider two successive 4-hour sessions, one evening, camping overnight, and then one morning on the following day to make the most efficient use of observer time and energy.
 - When this occurs, complete a separate data form for each 4-hour session. However, this overnight effort will still only be considered 1 visit, since FWS recommends 3 to 4 weeks between visits, and an extended visitation interval will provide a more reliable assessment of occupancy status.
 - Sites with easier access should space observation sessions with 3 to 4 weeks between visits (see visitation schedule above).

- *Occupancy Status and Alternate Nest Sites:*
 - PEFA sometimes have alternate nest sites within the same territory and the pair may be using a location that is several hundred meters away or more and out of sight. If the known eyrie does not appear to be occupied, the FWS recommends "some realistic survey effort should be expended to try and locate potential alternate nest sites within the territory".
 - This extended search should not be overdone. Monitor all potential sites from your original observation point first. Then expand your search covering logical sites – cracks, ledges, overhangs and holes within approximately 800 meters (0.5 miles). A reasonable search period is 4 hours. Be alert to vocalizations and fresh white wash to for clues to an alternate location.

- Possible alternate sites may include:
 - on the same cliff face, but at a different site
 - on the opposite side of a canyon site
 - on the back side of a rock outcrop

Observation Conditions and Things to Avoid

- Observations should be conducted during favorable weather conditions. Snow, rain, strong winds and fog will influence PEFA activity and your ability to detect sign of occupation or reproduction, or hear vocalizations.
- Disturbance of occupied sites during poor weather could influence the outcome of the nesting attempt. Use common sense and check predicted weather conditions prior to departure.
- Avoid flushing incubating PEFA.
- Minimize stress by properly locating your observation point (see below).
- Do not attempt to climb eyrie cliff to collect eggs, feathers or dead young. Please notify Dennis Abbate (Research Branch) (520) 609-2167 regarding possible eggs for collection.

Recommended Observation Equipment

- ✓ quality binoculars
- ✓ spotting scope with tripod
- ✓ GPS unit
- ✓ Data forms and Protocol
- ✓ Field notebook
- ✓ Camera
- ✓ Area topographic maps (*USGS 7.5 minute Quad*)
- ✓ Compass

Equipment Note:

- Subtle signs of occupancy and reproduction can be missed or take longer to detect when using only binoculars. In addition, species verification is essential, and Prairie Falcons or other raptors can sometimes be misidentified when posture, light conditions or brief observations are limiting. A spotting scope will very helpful.
- GPS units leave no doubt about your location and PEFA activity area. Use GPS to identify your observation position and the cliff or eyrie, if conditions permit.
- GPS units should be set to collect locations in UTM's and at NAD 27.

Locating Your Observation Post

- The FWS recommends locating your observation post far enough from the nest "so as not to elicit sustained territorial behavior from either adult". This means you do not want the falcons to be constantly "cacking", patrolling the cliff face, or flying overhead due to your presence.
- The observation distance range indicated ranges from 150 to 1700 meters. This distance will obviously have a lot of variation from site to site and will depend on local conditions.
- Remember - spotting scopes will permit longer observation distances. You may have to try several locations to find the right position for both the observer and the falcons.

Data Form Completion

- Record all occupancy and nesting observations on the *Peregrine Falcon Occupancy, Nest Success, Productivity Data Form*. One form should be used for each visit.
- Bring the form with you to your monitoring location and complete during your observation session. Do not try to remember important information after you have left the observation post.
- Complete all entries and include sketches, notes, photos and maps when possible. Enter "NA" or draw a line through an entry if information is not available.
- Check off one or more signs of occupancy and nest success.
- Enter productivity observations.
- Climbing accessibility notes are important when a nest site contains eggs that have not hatched out, or significant eggshell fragments can be retrieved. These will be retrieved by expert technical climbers and used for analysis of contaminants.
- Record notes on general observations and behavior.
- Record directions or access information to the site.
- Sketch cliff and eyrie location and/or photograph cliff.
- Record additional information in your field notebooks or on the back of forms. If you think it's important, unusual, or interesting write it down. Supplemental notes should be attached to the data form.
- Photocopy forms for your records and send originals to:
 - **Dennis Abbate**
 - **Arizona Game and Fish Department (Region 5)**
 - **555 N. Greasewood Road**
 - **Tucson, Arizona 85745.**

References

- Abbate, D. 2006. Peregrine Falcon Nest Site Monitoring in Arizona: 2006 Breeding Season Results. Arizona Game and Fish Department, Research Branch, Phoenix, Arizona.
- Bayless, M.L., M.F. Ingraldi and K. Signor. 2005. Arizona Peregrine Falcon Statewide Occupancy Survey. Arizona Game and Fish Department, Research Branch, Phoenix, Arizona.
- Brown, D.E. (ed.) 1994. Biotic Communities: Southwestern United States and Northwestern Mexico, University of Utah Press, Salt Lake City, Utah.
- Cade, T. J., J. H. Enders, and J. Linthicum. 1996. Guide to management of Peregrine Falcons at the eyrie. The Peregrine Fund, Boise, Idaho.
- Daw, S, S. Ambrose, M. Beer and M. A. Powell. 2004. American Peregrine Falcon Monitoring Protocol for the Park Units in the Northern Colorado Plateau Network. U. S. Department of the Interior, National Park Service, Inventory and Monitoring Program.

- U. S. Fish and Wildlife Service. 2003. Monitoring Plan for the American Peregrine falcons, A Species Recovered Under the Endangered Species Act. U. S. Fish and Wildlife Service, Divisions of Endangered and Migratory Birds and State Programs, Pacific Region, Portland. OR. 53 pp.
- Ward, L.Z. 1994. Peregrine Falcon Survey Methods. Arizona Game and Fish Department, Nongame Branch, Wildlife Management Division, Phoenix, AZ. 12 pp. plus appendices.
- White, C. M., N. J. Clum, T.J. Cade and W.G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/660>.

APPENDIX 2: Arizona Game and Fish Department - Peregrine Falcon Occupancy, Nest Success, Productivity Data Form, 2009.

Adapted from: *Monitoring Plan for the American Peregrine Falcon: A Species Recovered Under the Endangered Species Act (U.S. Fish and Wildlife Service 2003)*

ARIZONA GAME AND FISH DEPARTMENT
 PEREGRINE FALCON OCCUPANCY, NEST SUCCESS, PRODUCTIVITY DATA FORM

Date: _____ 2009 Visit No. _____ (check one): 4-hr. pm _____ 4-hr. am _____
 Location Name: _____ EO #: _____ FWS #: _____ Land Ownership: _____
 Legal (Township, Range, Section) & General Description _____

Directions to Site and Access Information: _____

Cliff UTM:(easting): _____ (northing): _____ NAD(circle): 27 83 Zone: _____
 Observation Pt. UTM:(easting) _____ (northing): _____ NAD(circle): 27 83 Zone: _____
 Estimated Distance to nest cliff from Observation Pt. _____ Bearing to cliff: _____
 County: _____ AGFD Region: _____ USGS 7.5'Quad: _____

Observer(s) _____ Affiliation(s) _____
 Observer contact info (phone or e-mail): _____
 Observation Start Time: _____ Observation End Time: _____ Total (min): _____
 Starting Weather: Temp(c): _____ Wind(mph): _____ Cloud Cover (%): _____
 Ending Weather: Temp(c): _____ Wind(mph): _____ Cloud Cover(%): _____
 General Habitat Type (Brown 1994): _____ Elev.(ft) _____

OCCUPANCY STATUS

Primary Signs Of Occupancy	✓ Check
• Adult feeding young	
• Young or eggs observed with positive species I.D.	
• Adult in low posture (incubating or brooding)	
• 2 Adults / sub-adults interacting (courtship), perched or in flight	
• Adult prey exchange	
• Adult prey delivery to ledge	

Possible to view the nest site well enough to see eggs or young? (yes or no) _____.
 No. Eggs observed: _____. No. Young observed: _____
 If unable to see nest site, please explain: _____
 Stage of reproduction at time of visit (courtship, incubation, nestling, fledgling, unknown): _____

Age, sex & no. of Peregrines present (when known): adult male: _____, adult female: _____
 Adult unknown: _____, subadult male: _____, subadult female: _____, subadult unknown: _____

NEST SUCCESS

Signs Of Nest Success	✓ Check
• Adult feeding young, but young cannot be seen	
• One or more nestlings observed (< 28 days old)	
• One or more nestlings observed (≥ 28 days old)	

PEFA Occupancy, Success, Productivity Data Form (Part 2)

Date: _____ Location: _____ Observer(s): _____

PRODUCTIVITY

Nest Productivity (Young Observed)	Check or Total
• No young detected	
• Number of nestlings observed < 28 days old	
• Number of nestlings observed \geq 28 days old	
• Total Nestlings Observed	

Climbing Accessibility Notes for Egg & Feather Collection

Climbing Information	
• One or more unhatched or broken eggs observed (yes or no).	
• Estimated Cliff Height	
• Estimated Eyrie Height	
• Type of Eyrie (ledge, hole, crack, etc.)	
• Top of cliff accessible for rappel down to eyrie (yes or no)	
• Eyrie only accessible by climbing up from below (yes or no)	

Behavior and General Observation Notes: _____

Sketch of cliff, eyrie location or other details (indicate north and use back if needed):

(check if completed)

- Attached to this form are 8.5 x 11 map and/or cliff sketches indicating location, date, and observer.
- Photograph of cliff site (digital photo preferred) is attached or being sent to designated location.
- Additional Notes attached

Send Completed Forms to Dennis Abbate, AGFD, 555 N. Greasewood Road, Tucson, Arizona 85745
E-mail: dabbate@azgfd.gov