ARIZONA BALD EAGLE MANAGEMENT PROGRAM
2015 SUMMARY REPORT

Kyle M. McCarty, Eagle Field Projects Coordinator
Kurt Licence, Birds and Mammals Technician
Kenneth V. Jacobson, Raptor Management Coordinator
Nongame Wildlife Branch, Wildlife Management Division

Photo by Kurt Licence

Technical Report 299
Nongame and Endangered Wildlife Program
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086

December 2015

Civil Rights and Diversity Compliance

The Arizona Game and Fish Commission receives federal financial assistance in Sport Fish and Wildlife Restoration. Under Title VI of the 1964 Civil Rights Act, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, religion, national origin, age, sex, or disability. If you believe you have been discriminated against in any program, activity, or facility as described above, or if you desire further information please write to:

Arizona Game and Fish Department
Office of the Deputy Director, DOHQ
5000 W. Carefree Highway
Phoenix, Arizona 85086

and

U.S. Department of the Interior
Office for Equal Opportunity
1849 C Street, NW
Washington, D.C. 20240

Americans with Disabilities Act Compliance

The Arizona Game and Fish Department complies with the Americans with Disabilities Act of 1990. This document is available in alternative format by contacting the Arizona Game and Fish Department, Office of the Deputy Director at the address listed above, call (602) 789-3326, or TTY 1-800-367-8939.

Project Funding

Funding for this project was provided by: Arizona Game and Fish Department's Heritage Fund; Arizona Public Service; Fort McDowell Yavapai Nation; Pittman-Robertson Funds; Salt River Pima-Maricopa Indian Community; Salt River Project; U.S. Bureau of Land Management; U.S. Bureau of Reclamation; U.S. Department of Defense (Luke Air Force Base); U.S. Forest Service (Apache-Sitgreaves, Kaibab, and Tonto National Forests); and Verde Canyon Railroad.

Recommended Citation

McCarty, K.M., K.L. Licence, and K.V. Jacobson. 2015. Arizona bald eagle management program 2015 summary report. Nongame and Endangered Wildlife Program Technical Report 299. Arizona Game and Fish Department, Phoenix, Arizona.

ACKNOWLEDGMENTS

The authors acknowledge and appreciate the assistance of the following people: Martin Burdick, Arizona Department of Transportation; Jennifer Cleland Moore, Arizona Public Service; Jay Ream, Arizona State Parks Department; Janet Johnson, Arizona Army National Guard; Daniel Driscoll, American Eagle Research Institute; Mark Frank and Karen Shaw, Ft. McDowell Yavapai Nation; GeoMarine Inc. (U.S. Air Combat Command); Charles Enos, Tudor Montague, and Russell Benford, Gila River Indian Community; The Hopi Tribe; Liberty Wildlife Rehabilitation Foundation; Terry Gerber, David Jordan, and Kyle Randall, Maricopa County Parks and Recreation Department; Arthur Benally and Mike Wrigley, National Park Service; Chad Smith, Navajo Department of Fish and Wildlife; Ann George, Duff Sorrels, Freeport McMoRan; Christopher Horan and Gina Leverette, Salt River Pima-Maricopa Indian Community; Rob Ackerman, Lynn Bredimus, John Knotts, Lesly Swanson, and Ruth Valencia, Salt River Project; Daniel Juan and Jeff McFadden, San Carlos Apache Tribe; Tonto Apache Tribe; John Arnett, U.S. Air Force (Luke Air Force Base); Wade Eakle, U.S. Army Corps of Engineers; Chip Lewis, U.S. Bureau of Indian Affairs; Tim Hughes, U.S. Bureau of Land Management; Carol Evans, Nicole Olsker, and Alex Smith, U.S. Bureau of Reclamation; Greg Beatty, Kathleen Blair, Carrie Marr, and Mary Richardson, U.S. Fish and Wildlife Service; Carol Beardmore, USFWS Sonoran Joint Venture; Janie Agyagos, Deborah Brewster, Charles Denton, Noel Fletcher, Shaula Hedwall, Roger Joos, Kelly Kessler, Amyann Madara, Steve Plunkett, Justin Schofer, David Seery, Linda Whitetrifaro, and Todd Willard, U.S. Forest Service; Robin Brean and Teresa Propeck, Verde Canyon Railroad; Cynthia Dale and Tim Gatewood, White Mountain Apache Tribe; Donna Bailloux, Elisabeth Burgard, James Driscoll, Lynda Lambert, Gloria Morales, and Arlene West, Arizona Game and Fish Department. A special thanks goes out to winter count coordinators and volunteers for their hard work and dedication.

This report, in part, summarizes the results of monitoring by the Arizona Bald Eagle Nestwatch Program using the breeding area reports submitted in 2015. Those include: Olivia DaRugna and Amy Zimmerman, Box Bar Breeding Area (BA); Aaron James and Mary Cole, Cliff and Pinto BAs; Joe Peddie and Marta Peddie, Crescent and Luna BA; Leah Vader and Jen Ottinger, Doka, Rodeo, Sycamore, and Ft. McDowell BAs; Matthew Pierle, Goldfield BA; John Gorey and Emily Pollom, Granite Reef and Orme BAs; Margaret Kennedy, Kerr BA; Rya Rubenthaler and Russell Seeley, Tapco and White Horse BAs; Allison Beard and Lisa Helgren, Tonto BA; Jess Steketee, Frank Mayer, Amy Zimmerman, and Lisa Helgren, Whiskey Spring BA; Sara Eno and Dave Janssen, Woods Canyon BA.

TABLE OF CONTENTS

Introduction 1
Study Area 2
Arizona Bald Eagle Winter Count 3
  Introduction 3
  Methods 4
  Results and Discussion 5
  Management Recommendations 6
Arizona Bald Eagle Occupancy and Reproductive Assessments and Nest Surveys. 7
  Introduction 7
  Methods 7
  Results 8
    New Locations Surveyed 8
    Survey sites with Existing Large Nests 10
    Historical Breeding Areas 12
    Breeding Areas 12
    Overview 16
  Management Recommendations 17
Arizona Bald Eagle Nestwatch Program 18
  Introduction 18
  Methods 18
  Results and Discussion 20
    Box Bar Breeding Area 20
    Cliff Breeding Area 21
    Crescent Breeding Area 22
    Goldfield Breeding Area 22
    Granite Reef Breeding Area 23
    Kerr Breeding Area 24
    Luna Breeding Area 25
    Orme Breeding Area 26
    Pinto Breeding Area 27
    Rodeo Breeding Area 27
    Sycamore Breeding Area 28
    Tapco Breeding Area 29
    Tonto Breeding Area 30
    Whiskey Spring Breeding Area 30
    White Horse Breeding Area 31
    Woods Canyon Breeding Area 32
  Management Considerations 33
Literature Cited 37

List of Tables

Table 1. Summary of the Arizona bald eagle winter count 2015. 5
Table 2. Summary of Arizona bald eagle winter counts 1995-2015. 6
Table 3. Summary of Arizona bald eagle productivity 2015. 8
Table 4. 2015 Arizona bald eagle nest survey summary, new locations. 10
Table 5. 2015 Arizona bald eagle nest survey summary, nest sites. 11
Table 6. 2015 Arizona bald eagle nest survey summary, historic breeding areas. 12
Table 7. 2015 Arizona bald eagle nest survey summary, breeding areas. 14
Table 8. Arizona bald eagle 10-year productivity summary. 16

List of Figures

Figure 1. Location of known bald eagle breeding areas in Arizona, 2015. 2
Figure 2. Box Bar breeding area. Maricopa County, Arizona. 20
Figure 3. Cliff breeding area. Maricopa County, Arizona. 21
Figure 4. Crescent breeding area. Apache County, Arizona. 22
Figure 5. Goldfield breeding area. Maricopa County, Arizona. 23
Figure 6. Granite Reef breeding area. Maricopa County, Arizona. 24
Figure 7. Kerr breeding area. Maricopa County, Arizona. 25
Figure 8. Luna breeding area. Apache County, Arizona. 25
Figure 9. Orme breeding area. Maricopa County, Arizona. 26
Figure 10. Pinto breeding area. Gila County, Arizona 27
Figure 11. Rodeo breeding area. Maricopa County, Arizona 28
Figure 12. Sycamore breeding area. Maricopa County, Arizona. 29
Figure 13. Tapco breeding area. Yavapai County, Arizona. 29
Figure 14. Tonto breeding area. Gila County, Arizona. 30
Figure 15. Whiskey Spring breeding area. Maricopa County, Arizona. 31
Figure 16. White Horse breeding area. Coconino County, Arizona. 32
Figure 17. Woods Canyon breeding area. Coconino County, Arizona. 33

List of Appendices

Appendix A: 2015 Arizona Bald Eagle Winter Count Results 42
Appendix B: Terminology and Raptor Reproductive Status Criteria 46
Appendix C: 2015 Arizona Bald Eagle Productivity 47
Appendix D: Nest Survey Results 49
Appendix E: Box Bar Breeding Area Summary 57
Appendix F: Cliff Breeding Area Summary 60
Appendix G: Crescent Breeding Area Summary 63
Appendix H: Goldfield Breeding Area Summary 65
Appendix I: Granite Reef Breeding Area Summary 68
Appendix J: Kerr Breeding Area Summary 70
Appendix K: Luna Breeding Area Summary 73
Appendix L: Orme Breeding Area Summary 76
Appendix M: Pinto Breeding Area Summary 78
Appendix N: Rodeo Breeding Area Summary 80
Appendix O: Sycamore Breeding Area Summary 82
Appendix P: Tapco Breeding Area Summary 84
Appendix Q: Tonto Breeding Area Summary 87
Appendix R: Whiskey Spring Breeding Area Summary 89
Appendix S: White Horse Breeding Area Summary 91
Appendix T: Woods Canyon Breeding Area Summary 94

ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2015 SUMMARY REPORT

Kyle M. McCarty, Kurt L. Licence, and Kenneth V. Jacobson

INTRODUCTION

In 1978, the U.S. Fish and Wildlife Service (USFWS) listed the bald eagle (*Haliaeetus leucocephalus*) as endangered under the Endangered Species Act (ESA), as amended (1973), in 43 states including Arizona and threatened in five others (USFWS 1982). The species was not listed in Alaska and it does not occur in Hawaii. The USFWS downlisted the bald eagle to threatened in 1995 and delisted the species in 2007 (USFWS 1995, 2007a).

Bald eagles in central Arizona were temporarily designated as a Distinct Population Segment (DPS) and listed as threatened in 2008 due to a court order requiring a 12-month status review of the Sonoran Desert Area population (USFWS 2008). As a result of the status review, the USFWS determined the population did not satisfy the definition of a DPS and was therefore not eligible for listing (USFWS 2010). Bald eagles in the Sonoran Desert Area were removed from the list of endangered and threatened species in 2011 (USFWS 2011). Further legal challenges resulted in a subsequent 12-month finding which supported the previous conclusions (USFWS 2012).

The bald eagle remains protected in the state under Arizona Revised Statute Title 17 and nationally under the Bald and Golden Eagle Protection Act (Eagle Act), Migratory Bird Treaty Act, Lacey Act, Airborne Hunting Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna. Along with delisting from the ESA, the USFWS revised the Eagle Act to codify the definition of "disturb" (USFWS 2007b) and finalize regulations to provide a mechanism to authorize take of eagles and eagle nests under limited circumstances (USFWS 2009). For implementation of take permits to be compatible with the Eagle Act, take must be "consistent with the goal of stable or increasing breeding populations." In the Southwest, take thresholds are extremely limited.

The Southwestern Bald Eagle Management Committee (SWBEMC) was formed in 1984 by land and wildlife management agencies to enhance coordination, increase communication, and provide oversight for Arizona bald eagle management. In 2007 and again in 2014, some members of the SWBEMC signed the Conservation Assessment and Strategy for Bald Eagles in Arizona (CAS), which described strategies for continuing management post-delisting (Driscoll et al. 2006). The CAS also specified threats facing bald eagles in Arizona and identified actions necessary to maintain their distribution and abundance in the state. Today, the SWBEMC consists of 26 members, with the Arizona Game and Fish Department (Department) as the lead implementation agency for bald eagle management projects. This report covers the 2015 results for the following projects: Bald Eagle Winter Count, Occupancy and Reproductive Assessment, Nest Survey, and Arizona Bald Eagle Nestwatch Program.

STUDY AREA

Statewide monitoring and surveys were conducted primarily within six biotic communities (Brown 1994): Rocky Mountain (Petran) and Madrean Montane Conifer Forest, Great Basin Conifer Woodland, Plains and Great Basin Grasslands, Sonoran Desertscrub-Arizona Upland Subdivision, Interior Chaparral, and Sonoran Riparian Deciduous Forest and Woodlands. Other biotic communities visited included Chihuahuan Desertscrub, Mohave Desertscrub, Great Basin Desertscrub, Semidesert Grassland, Subalpine Grassland, Madrean Evergreen Woodland, and Sonoran Desertscrub-Lower Colorado River Valley Subdivision.

Many bald eagle breeding areas (BAs) are in central Arizona between elevations of 262 m (859 ft) and 1,341 m (4,400 ft), where they are found within the riparian areas of the Sonoran Riparian Scrubland and Sonoran Interior Strands as described in Brown (1994) (Figure 1). Representative riparian vegetation includes Fremont cottonwood (*Populus fremonti*), Goodding willow (*Salix gooddingii*), Arizona sycamore (*Platanus wrightii*), and nonnative salt cedar (*Tamarix* spp.). Surrounding uplands include the Sonoran Desertscrub biome-Arizona Upland subdivision, Interior Chaparral biome, and Great Basin Conifer Woodland biome. These areas are commonly vegetated with blue palo verde (*Parkinsonia florida*), mesquite (*Prosopis* spp.), ironwood (*Olneya tesota*), saguaro (*Carnegiea gigantea*), teddy bear cholla (*Opuntia bigelovii*), juniper (*Juniperus* spp.), and pinyon pine (*Pinus edulis*). The Gilbert BA is located in the Phoenix metropolitan area of central Arizona but includes no natural riparian communities, with only artificial water formations such as recharge basins, urban ponds, and canals.

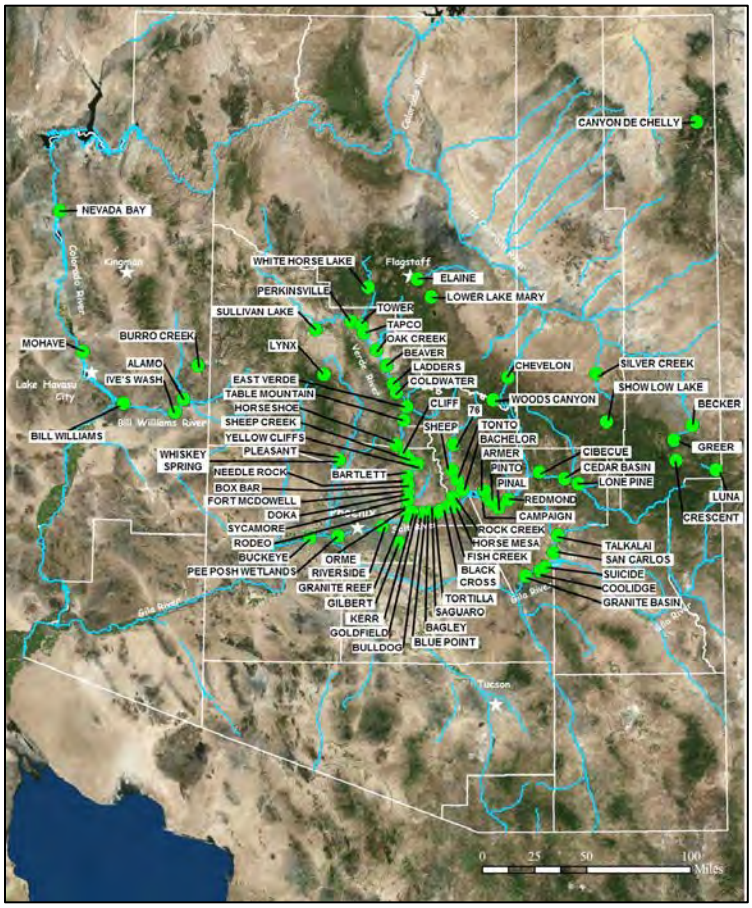


Figure 1. Location of known bald eagle breeding areas in Arizona, 2015.

In northwestern Arizona, two bald eagle BAs (Black Canyon and Nevada Bay) are located within Mohave desertscrub adjacent to the Colorado River. However at the Black Canyon BA, the eagle pair has only built a nest on the Nevada side of the river.

At middle and higher elevations, many other BAs are located outside of or do not include Sonoran Riparian Scrubland areas (Brown 1994). The Becker, Silver Creek, and Sullivan Lake

BAs are in the Plains and Great Basin Grassland biome and contain isolated stands of Fremont cottonwoods. Chevelon, Crescent, Elaine, Greer Lakes, Lower Lake Mary, Luna, Lynx, Show Low Lake, White Horse, and Woods Canyon BAs are in Rocky Mountain and Madrean Montane Conifer Forest, where riparian vegetation includes narrow-leaf cottonwood (*Populus angustifolia*), thin-leaf alder (*Alnus tenuifolia*), Bebb's willow (*Salix bebbiana*), and coyote willow (*S. exigua*) (Brown 1994). Rock Creek BA includes Interior Chaparral consisting of pinyon-juniper woodland, shrub live oak (*Quercus turbinella*), and pointed (*Arctostaphylos pungens*) and pringle manzanita (*A. pringlei*). Canyon De Chelly BA includes components of Rocky Mountain Conifer forest and Great Basin Conifer Woodland and Desertscrub, consisting of big sagebrush (*Artemisia tridentata*), blackbrush (*Coleogyne ramosissima*), and shadscale (*Atriplex confertifolia*).

With a few exceptions, the majority of bald eagles in Arizona nested within a mile of water sources providing sufficient foraging opportunities for fish or waterfowl. However, distance to water within some BAs may vary between years depending on fluctuating creek and lake levels (e.g., Alamo Lake and Roosevelt Lake), and the distance of alternate nests. BAs were located along: Burro, Cibecue, Oak, Pinal, Silver, Tangle, Tonto, and Walnut creeks; Alamo, Apache, Bartlett, Canyon, Chevelon Canyon, Crescent, Greer, Horseshoe, Lower Lake Mary, Luna, Lynx, Pleasant, Roosevelt, Saguaro, San Carlos, Show Low, Talkalai, White Horse, and Woods Canyon lakes or reservoirs; and the Agua Fria, Bill Williams, Colorado, Little Colorado, Gila, Salt, San Carlos, San Francisco, and Verde rivers. Nests within these drainages are usually on cliff ledges, rock pinnacles, and in cottonwood trees. However they also have been found in ponderosa pine (*Pinus ponderosa*), sycamore, snags, juniper, pinyon pine, willow, eucalyptus (*Eucalyptus sp.*), and artificial structures (Horseshoe BA, Orme BA, Sheep BA, and White Horse BA) (Grubb 1980, McCarty and Jacobson 2012). Additionally, terrestrial prey comprises a substantial dietary proportion at some BAs, most notably prairie dogs at Canyon de Chelly and Silver Creek.

ARIZONA BALD EAGLE WINTER COUNT

INTRODUCTION

National winter surveys are an effective tool to monitor bald eagles throughout their range (Millsap 1986, Stalmaster 1987, Eakle et al. 2015), and the knowledge of wintering bald eagle habitat use allows for the consideration and implementation of management to protect important wintering areas. Even though the USFWS delisted the species nationwide in 2007, the importance of the national winter count persists. Through each state's consistent efforts, the winter count will continue to provide post-delisting data on national population trends and help to ensure implementation of Eagle Act permits remain compatible with stable or increasing populations (Steenhof et al. 2002, 2008; Eakle et al. 2015).

The National Wildlife Federation (NWF) initiated and organized the national midwinter bald eagle count from 1979-1992. From 1992-2007, coordination shifted among the Bureau of Land Management (BLM), the National Biological Survey, and then the U.S. Geological Survey

(USGS). Since 2008, the U.S. Army Corps of Engineers (ACE) has coordinated the national winter count effort. Arizona participated in the program from the 1970s to the early 1980s (Todd 1981). However, in 1986 the national coordinators changed the survey protocol to only count areas of high bald eagle concentrations (routes with more than 15 bald eagles observed in two or more years). Due to Arizona's lack of "concentrations", minimal information was contributed in 1986 and 1987, and surveys only occurred in specific management areas in 1989-1991 such as Roosevelt Lake and Nankoweap Creek (Brown and Stevens 1992).

Arizona's statewide winter counts resumed in 1992 using a combination of terrestrial (foot, snowmobile, vehicle), boat, and aircraft surveys (e.g. McCarty et al. 2014). In 1995, the Department and NWF established 115 standardized routes for Arizona's bald eagle winter count. In 2005, after 10 years of surveying the 115 established routes, we analyzed the data to eliminate those routes that did not meet USGS standards and to include new routes for future surveys. If a route produced three or fewer birds during the previous 10 years of surveys, the route was dropped per USGS protocol. As a result, in 2006 we removed 23 and added 12 new routes to the survey for a net result of 104 standardized routes. Additionally, in order to simplify reporting of data to ACE we dropped two more routes in 2008, Lake Mead and Lake Mohave, for a total of 102 standardized routes. These routes covered areas along the Colorado River both in Arizona and Nevada, and are reported by the state coordinators of the Nevada winter count.

METHODS

We continued to use, and strived to complete, the established 102 standardized survey routes for the 2015 Arizona bald eagle winter count. Additionally, four non-standard routes were completed and integrated into this document for management purposes, but were not included in the results submitted to the ACE. We scheduled the winter count for January 5 to 11, 2015, which included weekdays for agency personnel and a weekend for volunteers. The short survey period minimized the chance for any large-scale bald eagle movements between survey routes and related duplicate counts.

We used a variety of survey methods due to the diverse habitats in Arizona and our desire to maximize (but not duplicate) statewide coverage in a narrow period with minimal effort. The best method to survey Arizona's remote terrain and the deep canyons of linear drainages was by helicopter. The U.S. Bureau of Reclamation (USBR) and Salt River Project (SRP) contributed a total of four days of helicopter time for 2-3 biologists and a pilot to fly 25 of the winter count routes. While the helicopter's altitude and speed were dependent upon terrain, height and density of power lines, and wind speed, a height of 31-61 m (100-200 ft) above ground level and 55-65 knots (63-75 mph) was typical for surveys. Highways, large lakes, and point counts were surveyed by boats, vehicles, and on foot. We solicited surveyors from cooperating agencies and volunteers from private groups, supplied survey forms from ACE, and instructed participants on the National Survey Protocol.

We classified bald eagle sightings into adult and immature age classes. In addition, we included sightings of unknown-age bald eagles and unidentified eagles in our totals to maintain consistency with the national count. We advised the volunteers to be aware of the various near-

adult plumages as they may be easily mistaken for full adult bald eagles. Sightings of golden eagles (*Aquila chrysaetos*) were also recorded during the survey, but were not reported in this document. We divided the data presented below into two sections for comparison: 1) the terrestrial and boat survey by county and 2) the helicopter survey by drainage or lake (Appendix A).

Due to our refinement of the statewide winter count routes in 2005, four counties are no longer surveyed by ground methods for wintering bald eagles, including Greenlee, Maricopa, Pima, and Pinal counties. However, portions of Greenlee, Maricopa, and Pinal counties were covered by the helicopter flights.

RESULTS AND DISCUSSION

The 2015 Arizona bald eagle winter count tallied 204 bald eagles, including 141 adults (69%), 53 subadults (26%), and 10 unknown eagles (5%) (Tables 1 and 2). Participants covered 93 of 102 standardized routes (91%) with a total survey effort of 8,989 minutes (150 hours) (Table 2).

Table 1. Summary of the Arizona bald eagle winter count 2015.

County	Routes	Minutes	Adult	Subadult	Unknown[1]	Total	Total/ Hr.
Apache	10	680	9	1	4	14	1.2
Cochise	2	210	0	1	0	1	0.3
Coconino	33	4,634	36	14	6	56	0.7
Graham	Not surveyed.						
Mohave	1	144	4	0	0	4	1.7
Navajo	16	767	18	12	0	30	2.3
Santa Cruz	1	60	0	0	0	0	0.0
Yavapai	5	1,450	3	3	0	6	0.2
Yuma and La Paz	1	360	4	2	0	6	1.0
Verde River drainage	3	197	13	4	0	17	5.2
Salt River drainage	8	284	42	13	0	55	11.7
Gila River drainage	8	174	10	3	0	13	4.5
Various helicopter	5	29	2	0	0	2	4.2
Totals	93	8,989	141	53	10	204	1.4

[1] Unknown age bald eagles and unidentified eagles.

The highest total number of bald eagles observed during ground surveys occurred in Coconino County (n=56), and the largest concentration on a single ground survey occurred along Interstate-17 south of Flagstaff (n=12) (Appendix A). Also, a large number of bald eagles were observed by helicopter along the lower Salt River (n=25). An additional three bald eagles were counted on four non-standard routes (Appendix A).

The total of 204 bald eagles counted in 2015 was well below the average of 251 birds counted annually during standardized counts, 1995-2014. However, some of the difference can be attributed to a very low number of eagles on the Verde River this year, only about half the total usually counted. Also, due to time constraints we were only able to survey half of the Black River route (Salt River drainage) which usually has a high number of bald eagles. The age

composition of this year's count (69% adult, 27% subadult) approximated the average ratio of adults to subadults in Arizona's winter counts since 2005 (Table 2).

Table 2. Summary of Arizona bald eagle winter counts 2005-2015.

Year	Survey time (min)	Surveys completed	Birds/hour	Adults	Subadults	Unknown[1]	Total
2005	8,910	97	1.5	153 (68%)	56 (25%)	15 (7%)	224
2006[2]	10,074	104	1.9	239 (74%)	77 (24%)	7 (2%)	323
2007	11,632*	100	1.4	192 (68%)	81 (29%)	8 (3%)	281
2008	9,362	96	1.2	152 (82%)	29 (16%)	4 (2%)	185
2009	9,357	94	1.3	139 (68%)	62 (30%)	3 (2%)	204
2010	9,138*	96	1.7	159 (63%)	81 (32%)	12 (5%)	252
2011	8,713*	93	1.5	157 (71%)	57 (26%)	8 (4%)	222
2012	10,320	100	1.7	189 (63%)	94 (32%)	15 (5%)	298
2013	9,902*	98	1.5	169 (66%)	76 (30%)	10 (4%)	255
2014	9,325	98	1.7	188 (71%)	77 (29%)	1 (0.4%)	266
2015	8,989	93	1.4	141 (69%)	53 (26%)	10 (5%)	204
Average	9,611	97	1.5	171 (69%)	68 (27%)	8 (4%)	247

[1]Unknown age bald eagles and unidentified eagles.
[2]Beginning of 104 standardized routes derived from the analysis of 1995-2005 surveys.
*Some survey times not recorded. Times averaged from reported times of previous counts.

In addition to documenting bald eagle sightings, winter count surveyors are asked each year to rate the general weather conditions compared to previous years as being either very mild, mild, normal, harsh, or very harsh. Of those that rated the conditions, most responded that this year's weather was normal (52.8%), followed by mild (35.6%), or very mild (11.5%). There were no responses for harsh or very harsh weather. Similarly, ice cover was rated as being normal (69.1%), less than normal (16.0%), more than normal (8.6%), much less than normal (4.9%), and much more than normal (1.2%). Nationally, winter count trends for bald eagles increased significantly from 1986 to 2010, particularly in twelve northern and eastern states (Eakle et al. 2015). However, despite growth of its bald eagle breeding population, Arizona was one of only four states with significantly decreasing winter count trends. Potentially, the distribution of wintering eagles has been impacted by climate change such that milder conditions allow eagles to stay farther north than in previous years.

MANAGEMENT RECOMMENDATIONS

1. Maintain the current 102 standardized routes.
2. Continue to assess non-standardized routes and add new routes for areas with consistent sightings of more than three bald eagles. The national coordinators require at least four years of data before a route is included in trend analyses.
3. Maintain winter count consistency by following established routes and methods to enable long-term analysis.
4. Continue updating the Nongame Wildlife Branch bald eagle winter count database with information from the standardized survey forms.

5. Compile spatial data from winter count survey maps to document the location and abundance of wintering bald eagles, spatially identify important habitat use areas, and develop statewide maps for distribution to cooperating agencies.
6. Examine the feasibility of gathering other winter raptor sightings along the routes in addition to eagles.

ARIZONA BALD EAGLE OCCUPANCY AND REPRODUCTIVE ASSESSMENTS AND NEST SURVEYS

INTRODUCTION

The bald eagle Occupancy and Reproductive Assessment (ORA) and nest surveys enhance our understanding of breeding bald eagle ecology in Arizona. Discovery of new BAs and alternate nests within BAs, coupled with the knowledge of current and historical BAs, allows for an accurate description of the distribution, status, and annual productivity of the breeding population in Arizona. Timely discovery of BAs also identifies sensitive areas requiring proactive management to prevent potentially adverse impacts.

In 1972, concern about bald eagle population declines nationwide prompted surveys for the species throughout Arizona (Rubink and Podborny 1976). These annual surveys have continued to the present, excluding 1976 and 1977 (e.g. McCarty et al. 2014). The Department administered and performed the 2015 nest surveys in cooperation with the SWBEMC.

METHODS

We monitored breeding activity at current and historic BAs, nest sites discovered between 1992 and 2014, and also investigated reports of bald eagles and nests by other agencies, biologists, and the public. Habitat quality, the presence of nests, previous bald eagle sightings, and spacing between BAs prioritized survey effort. A two to three-person team conducted surveys between January and June 2015. Winter count flights (January), monthly ORA flights (February to May), and nest search flights (April and May) were used to locate nests and search for new BAs. Timing of the ORA flights corresponded with the timing of different breeding stages (incubation, hatching, nestling, and fledging). We also opportunistically visited some BAs during aerial searches for golden eagle nests (February-May).

Boats, helicopters, and vehicles were used to access survey areas. Helicopters, provided by Arizona Public Service (APS), SRP, and USBR, flew at approximately 60 meters (200 ft) above ground level and at 50-60 knots (58-70 mph). Drainage topography, ground-based obstacles (high-tension wires, meteorological towers), and wind influenced altitude and speed. If nest occupancy could not be determined from the air, a ground survey ensued. We used Questar® spotting scopes (40-160x), binoculars (10x), nest map atlases from Hunt et al. (1992) and SRP (2010), and handheld GPS units to relocate historical BAs and find alternate nests in existing BAs. New nests were numbered consecutively according to the last number assigned within that BA as reported in previous Arizona bald eagle nest survey reports (e.g. McCarty et al. 2014).

Determination of breeding status followed operational definitions derived from Postupalsky (1974, 1983), Steenhof and Kochert (1982), and Driscoll (2010) (Appendix B). Additionally, we use the terms "tall" and "short" in this section to describe heights of cliffs, and "large" and "small" to describe the size of trees and nests. "Tall" and "large" refer to substrates and nests we deemed suitable for breeding bald eagles as compared to current bald eagle nests and locations in Arizona (e.g., Grubb and Eakle 1987). The terms "small" and "short" refer to structures and nests of inadequate height and size. A "nest site" refers to a nest of large size (unless otherwise noted) in appropriate bald eagle habitat that has not been documented as having been built or used by bald eagles, but which is routinely monitored for its potential to be utilized by eagles.

RESULTS

All known BAs (n=76) were examined for breeding activity (Figure 1). Of 59 occupied BAs, 56 were active, and 39 pairs successfully produced 66 fledglings (Table 3; Appendix C). Noteworthy findings of the 2015 nest survey include seven new bald eagle BAs, one re-occupied historic BA (Becker), 21 new alternate bald eagle nests within BAs (Becker #2, Bill Williams #2, Box Bar #5, Cibecue #9 and #10, Cliff #8 and #9, Goldfield #4, Granite Reef #6, Greer #6, Horseshoe #15, Orme #9, Pee Posh Wetlands #5, Pinto #9, San Carlos #7, 76 #6, Sheep #7, Show Low #2, Sycamore #6, Tapco #4, Woods Canyon #8), six fallen and three partially fallen nests within BAs (Box Bar #4, Doka #7, Ft. McDowell #18, Pee Posh Wetlands #5, Sycamore #5, Woods Canyon #8; and Bill Williams #1, Cliff #8, White Worse #4), and eight new potential nests at eight sites.

Table 3. Summary of Arizona bald eagle productivity 2015.

Number of BAs	76	Number of Active BAs	56
Number of Occupied BAs	59	Number of Failed Breeding Attempts	17
Number of Eggs	89+	Number of Successful Breeding Attempts	39
Nest Success = 39/59	0.66	Number of Young Hatched	75
Mean Brood Size = 66/39	1.69	Number of Young Fledged	66
		Productivity = 66/59	1.12

Results of the individual flights are located in Appendix D. Areas worthy of further discussion (bald eagle observations, fallen nests, new breeding areas, new nests, potential nest sites) are described here. Nest locations are sensitive data, considered confidential by the Department, and omitted from this report. Management agencies requiring specific locations should contact the Department's Heritage Data Management System at (623) 236-7618.

New Locations Surveyed (Table 4)
Ashurst Lake. – On May 11, an adult bald eagle was seen. No nests were found.

Black Cross (*new BA*). – On February 3, an adult bald eagle was seen perched next to a new nest on a pinnacle above the Salt River. On March 18, an adult was incubating in the new nest. Since activity was also noted at the nearby Tortilla Creek and Fish Creek BAs, the site was confirmed as a new BA.

Pineasco Creek (Black River) (*new nest site*). – On January 16, a large nest (#1) was found in a sycamore tree along the Black River upstream of Pineasco Creek. On February 3, an adult bald eagle was observed in the area. The nest had been found in 2014, but at the time was not considered large enough for use by eagles. This year, the nest was bigger and clearly had been improved to the point of being suitable for eagles.

Buckeye (*new BA*). – On March 21, an active bald eagle nest was reported by the public in Buckeye near the Gila River. On March 25, two nestlings were observed.

Chevelon Canyon Lake (*new BA*). – On May 11, an adult bald eagle was seen with one nestling in nest #4. Ospreys were active in nest #2.

Elaine (*new BA*). – On June 9, the USFWS reported a bald eagle nest near Lake Elaine in Flagstaff. On June 12, one nestling was observed and appeared to be approximately fledging age (9+ weeks old).

Goldwater Lake. – On March 17, one adult bald eagle was seen perched by the lake, but no nest was found.

Kerr (*new BA*). – On November 26, we found a new large nest downstream of the Goldfield BA, and presumed it to be associated with the Goldfield pair. However on January 6, two pairs of bald eagles were observed, including an incubating adult in a second new nest only a few hundred meters away (Goldfield #4). On February 3, two adults were perched at the nest previously discovered in November, and incubation was confirmed by February 9. With two active nests occurring so close together, the Goldfield-Kerr BA was split into two separate territories, Goldfield BA and Kerr BA.

Nevada Bay (*new BA*). – On March 9, an adult bald eagle was seen in cliff nest #2 and appeared to be brooding young, although nestlings were not confirmed. A second adult was perched nearby. On April 1, the nest was empty. The nest site had been discovered in 2011 and nest #1 was active with golden eagles in 2013.

Sheep Creek (*new BA*). – On February 2, an adult bald eagle was incubating in a new cliff nest #1, in the area where we have consistently observed eagles in previous years.

Trout Creek. – We searched the creek on March 9, finding suitable habitat mostly in the middle to upper reaches of the drainage. An adult and immature bald eagle were seen near the junction of Trout Creek with Dividing Canyon/Gonzalez Wash. A new medium to large nest was found in a tree two miles downstream of the two birds, although the nest may not have been large enough for use by eagles. Multiple cliff nests, discovered in previous years during golden eagle surveys, were present and empty.

Table 4. 2015 Arizona bald eagle nest survey summary.			
Location	Date(s)	Survey Method	Results
Ashurst Lake	5/11	Helicopter	No nests. One adult perched, flushed.
Black Cross	2/3, 3/18, 3/19, 4/16, 5/11, 6/26	Helicopter, Boat	3/18: Adult incubating in new cliff nest #1.
Pineasco Creek (Black River)	1/16, 2/3, 3/18	Helicopter	1/16: New large nest #1 found. 2/3: Adult in area.
Buckeye	3/25, 4/13, 4/29	Ground	3/25: Two nestlings, 4.5-5 weeks old, in new tree nest #1.
Chevelon Canyon	5/11, 6/3	Helicopter, Ground	5/11: One nestling, 2 weeks old, in nest #4.
Elaine	6/12	Ground	6/12: One nestling, close to fledging age.
Goldwater Lake	3/17	Helicopter	No nests. One adult perched.
Kerr	11/26, 2/3, 3/18, 3/19, 4/16, 4/21, 5/11	Helicopter, Ground	11/26: New large nest #1 found. 2/3: Pair of adults perched at nest.
Kinnickinick Lake	5/11	Helicopter	No nests or eagles.
Nevada Bay	3/9, 4/1	Helicopter	3/9: Adult incubating in nest #2.
Scholtz Lake	5/11	Helicopter	No nests or eagles.
Sheep Creek	1/5, 2/2, 3/17, 3/19, 4/15, 5/11	Helicopter, Ground	2/2: Adult incubating in new cliff nest #1.
Trout Creek	3/9	Helicopter	One adult and one immature bald eagle. One new tree nest found. All known nests empty.

Survey Sites with Existing Large Nests (Table 5)
Black Canyon Lake. – On May 11, nest #1 was fallen. No bald eagles were seen.

Bear Canyon Lake. – On May 11, ospreys were active in new nests #3 and #4. No bald eagles were seen.

Blue Ridge Reservoir. – On May 11, ospreys were active in nest #2. A new large nest (#6) was also found. No bald eagles were seen.

Dogtown Reservoir. – On May 11, two immature bald eagles and two ospreys were seen flying. All known nests were empty.

Granite. – On April 15, a three-week old golden eagle nestling was found in a new cliff nest (#6).

Hess Creek. – On March 18, a golden eagle was incubating in a new cliff nest (#2).

JD Dam Lake. – On May 11, ospreys were active in nests #1 and #2. No bald eagles were seen.

Jumpoff Canyon. – On April 16, a golden eagle nestling was found in nest #2.

Kaibab Lake. – On May 11, ospreys were active in nest #1-6 and a new tree nest (#7). No bald eagles were seen.

Knoll Lake. – On May 11, nests #1, 2, and 4 were fallen. An osprey was active in a new tree nest (#5). No bald eagles were seen.

Muldoon. – On February 2, three adult bald eagles were observed. Two were perched together on the outcrop where nest #1 had been, however no nest was seen.

Sunflower Flat. – On May 11, an osprey was active in nest #1.

Two Bar. – On February 3, one adult bald eagle was perched in nest #3. Although no breeding activity was detected this year, there is high potential for this site.

Willow Springs Lake. – On May 11, ospreys were active in nests #1, 2, 4-6, and new nest #8. No bald eagles were seen.

Table 5. 2015 Arizona bald eagle nest survey summary, potential nest sites (continued next page).

Location	Date(s)	Survey Method	Results
Black Canyon Lake	5/11	Helicopter	Nest #1 fallen. No eagles.
Bear Canyon Lake	5/11	Helicopter	Ospreys active in new nests #3 and #4. No eagles.
Blue Ridge Reservoir	5/11	Helicopter	Osprey active in nest #2. New large nest #6 found. No eagles.
Dogtown Reservoir	5/11	Helicopter	All known nests empty. Two immature bald eagles perched and two ospreys flying.
Gene Wash (CA)	3/9	Helicopter	At least three large nests on same cliff face, empty. No eagles.
George's Basin	1/16, 2/3, 3/18	Helicopter	All known nests empty. No bald eagles.
Granite (Verde River)	1/5, 2/2, 3/17, 4/15	Helicopter	4/15: One golden eagle nestling, 3 weeks old, in new cliff nest #6.
Hess Creek	3/18	Helicopter	3/18: Golden eagle incubating in new cliff nest #2.
Hidden Valley	2/2	Helicopter	All known nests empty. No eagles.
JD Dam Lake	5/11	Helicopter	Osprey active in nest #1. Osprey flushed from nest #2. No eagles.
Jumpoff Canyon	1/6, 4/16	Helicopter	4/16: One golden eagle nestling, 1-2 weeks old.
Kaibab Lake	5/11	Helicopter	Ospreys active in nests #1-6 and new nest #7. No eagles.
Knoll Lake	5/11	Helicopter	Nests #1, 2, 4 fallen. Osprey active in new nest #5. No eagles.
Mormon Pocket	1/5, 2/2, 3/17, 4/15	Helicopter	All known nests empty. No bald eagles.
Muldoon	2/2, 3/17	Helicopter	No nests. 2/2: Three adult bald eagles.
Needles Eye (Gila River)	3/18, 4/16	Helicopter	All known nests empty. No eagles.
Porphyry (Gila River)	1/6	Helicopter	All known nests empty. No eagles.

Table 5 continued.

Location	Date(s)	Survey Method	Results
Sunflower Flat	5/11	Helicopter	Osprey active in nest #1. Nest #2 fallen.
Tremaine/Soldier Annex/ Long Lakes	5/11	Helicopter	All known nests empty. No bald eagles.
Two Bar	1/6, 2/3, 3/18	Helicopter	2/3: Adult bald eagle standing in nest #3.
Watson Lake	2/2, 3/17	Helicopter	All known nests empty. No bald eagles.
Willow Springs Lake	5/11	Helicopter	Ospreys active in nests #1, 2, 4, 5, 6, and new nest #8. No eagles.

Historic Breeding Areas (Table 6)

Becker historic BA. – On February 19, photographs of a pair of bald eagles in the area of Becker Lake were shared with the Department. On March 18, we observed an adult sitting in a new nest (#2), perhaps incubating or preparing to lay eggs, however the nest was empty on March 31. The Becker BA had been unoccupied since 2003.

Hell Point historic BA. – A new cliff nest (#6) was found in poor condition on February 2. An adult and two immature bald eagles were seen in the area that same day.

Table 6. 2015 Arizona bald eagle nest survey summary, historic breeding areas.

Location	Date(s)	Survey Method	Results
Becker	3/18, 3/31	Helicopter	3/18: Adult incubating or brooding position in new tree nest #2.
Canyon	1/6	Helicopter	All known nests empty. No eagles.
Devil's Post	3/17	Helicopter	All known nests empty. No eagles.
Hell Point	1/5, 2/2, 3/17, 4/15	Helicopter	2/2: New cliff nest #6 found. Two immature and one adult bald eagle in area.
Mule Hoof	1/16, 2/3, 3/18	Helicopter	All known nests empty. No eagles.
Winkelman	1/6, 3/18	Helicopter	No nests or eagles.

Breeding Areas (Table 7)

Blue Point BA. – On January 6, an adult was incubating in Bagley nest # 2 (formerly Blue Point nest #10). Although the identity of the nesting eagles was not confirmed, we believe the nest was occupied by the Bagley pair since they were the last pair known occupying the area, and no other pairs were observed.

Bill Williams BA. – The USFWS monitored the area and did not report any sightings of bald eagles or nesting activity. On March 9, we observed nest #1 in poor condition and partially fallen. A new large cliff nest (#2) was also found and had layers of whitewash from multiple years of use. No bald eagles were seen.

Box Bar BA. – On January 5, nest #4 was fallen and a new large nest (#5) was found in a live cottonwood. On January 22, an adult bald eagle was incubating in the new nest.

Cedar Basin BA. – On January 16, one adult bald eagle was seen just upstream of nest #3. On February 3, an adult was perched at Carrizo Creek just upstream from the confluence with the Salt River. On March 18, a single adult was perched along the Salt River near Popcorn Canyon in the area where bald eagles have been observed in previous years. The continued sightings suggest the site may have been occupied by a pair.

Cibecue BA. – On January 16, we saw a pair of adult bald eagles, one standing in nest #2 which appeared to be in good condition. On March 18, both adults were observed and two new large nests (#9, #10) were found on cliffs. On April 16, one adult flew to #9, possibly with nesting material, but the nest was empty.

Cliff BA. – On February 2, an adult bald eagle was incubating in a new nest (#8) in a live tree. On March 26, nestwatchers reported the nest had partially collapsed and a nestling was found dead on the ground. On April 15, we found a new large nest (#9) had been built in a snag.

Coolidge BA. – On March 18, an adult bald eagle was seen perched, flying, and vocalizing. There are currently no known nests in the area.

Copper Basin BA (*CA*). – On March 9, we found a new large nest (#3) in poor condition on a cliff.

Doka BA. – On February 2, nest #7 was fallen.

Fort McDowell BA. – On January 5, nest #18 was fallen.

Goldfield BA. – On January 6, an adult was incubating in a new nest (#4) in a live tree.

Granite Basin BA. – On January 6, an adult bald eagle was standing in nest #2. On March 18, an adult was perched but no nesting activity was seen.

Granite Reef BA. – On February 2, an adult was incubating in a new nest (#6) in a live tree.

Greer BA. – On May 18, a new tree nest (#6) was found with one nestling 6-7 weeks old.

Horseshoe BA. – On January 5, an adult bald eagle was perched on Chalk Mountain. On March 17, two eggs were seen in a new large nest (#15) on a cliff, but no eagles were present. On April 15, a golden eagle was seen incubating in the nest.

Needle Rock BA. – The bald eagle pair at Box Bar BA has subsumed the territory previously associated with Needle Rock.

Orme BA. – On March 17, an adult bald eagle was incubating in a new nest (#9) in a snag.

Pee Posh Wetlands BA. – On January 5, an adult was seen incubating in a new nest (#5) in a snag. On October 11, the nest was reported fallen by GRIC. On November 18, the Department

and GRIC placed a platform (#6) in a snag to provide the breeding eagles with an alternative nest.

Pinto BA. – On February 3, an adult bald eagle was incubating in a new nest (#9) in a snag.

San Carlos BA. – On February 3, a new large nest (#7) was found in a tree, but no eagles were seen during multiple visits.

76 BA. – On January 6, a new large nest (#6) was found in a tree, and on March 19 an adult bald eagle was incubating.

Sheep BA. – On February 3, an adult bald eagle was incubating in a platform nest (#7) that had been started by the Department in 2012.

Show Low Lake BA. – On October 30, the Department reported bald eagles working on a new nest (#2) in a live tree. The pair was seen by USFS at the new nest in early January, but by February 18 an adult was incubating in nest #1.

Sycamore BA. – On January 5, nest #5 was fallen and the snag had lost a lot of branches since last year. On January 21, bald eagles were observed taking nesting materials to a new nest (#6) in a live tree where incubation was confirmed on February 2.

Tapco BA. – On February 2, an adult was incubating in a new nest (#4) in a live tree.

White Horse Lake BA. – On June 30, the platform holding nest #4 had lost a couple of boards and the nest was mostly fallen. However it appeared the platform might still be able to support a nest.

Woods Canyon BA. – On April 10, an adult bald eagle was found incubating in a new nest (#8) in a pine tree. On June 19, nestwatchers reported that the nest had fallen.

Table 7. 2015 Arizona bald eagle nest survey summary, breeding areas (continued next page).

Location	Date(s)	Survey Method	Results
Bill Williams	3/9	Helicopter	All known nests empty. No eagles. Nest #1 partially fallen. New cliff nest #2 found.
Black Canyon (NV)	3/9	Helicopter	Adult in nest appeared to be brooding.
Blue Point	1/6	Helicopter	Breeding area taken over by Bagley pair.
Box Bar	1/5, 1/22, 2/2, 3/17, 4/15, 5/11	Helicopter, Ground	Nest #4 fallen. New tree nest #5.
Burro Creek	3/17	Helicopter	No nests or eagles.
Campaign Bay	1/6, 2/3, 3/18	Helicopter	No nests or eagles.
Cedar Basin	1/16, 2/3, 3/18, 4/16	Helicopter	1/16, 2/3, & 3/18: One adult upstream.
Cibecue	1/16, 2/3, 3/18, 4/16	Helicopter	1/16 & 3/18: Pair of adults. New cliff nests #9 and #10 found. 4/16: One adult at nest #9.

Table 7 continued.

Location	Date(s)	Survey Method	Results
Cliff	1/5, 2/2, 3/17, 3/19, 4/15	Helicopter	2/2: Adult incubating in new tree nest #8. 4/15: Nest #8 partially fallen. New snag nest #9 found.
Coldwater	1/5, 2/2, 3/17, 4/15	Helicopter	All known nests empty. No eagles.
Coolidge	1/6, 2/3, 3/18, 4/16	Helicopter	No nests found. 3/18: One adult flying, perched, vocalized.
Copper Basin (CA)	3/9	Helicopter	All known nests empty. No eagles. New cliff nest #3 found.
Doka	1/5, 2/2, 3/17, 3/19, 4/15, 4/30, 5/11, 5/12	Helicopter, Ground	2/2: Nest #7 fallen.
Ft. McDowell	1/5, 2/2, 3/17, 3/19	Helicopter	1/5: Nest #18 fallen.
Gilbert	4/6	Ground	All known nests empty. No eagles.
Goldfield	1/6, 2/3, 3/18, 3/19, 4/16	Helicopter, Ground	1/6: Adult incubating in new tree nest #4.
Granite Basin	1/6, 2/3, 3/18, 4/16	Helicopter	1/6: Adult standing in nest #2. 3/18: One adult perched.
Granite Reef	1/6, 2/2, 2/3, 3/17, 4/15, 5/11, 5/14	Helicopter, Ground	2/2: Adult incubating in new tree nest #6.
Greer	3/18, 4/16, 5/18, 6/18	Helicopter, Ground	5/18: One nestling, 6-7 weeks old, in new tree nest #6.
Horseshoe	1/5, 2/2, 3/17, 4/15	Helicopter	3/17: Two eggs in new cliff nest #15. 4/15: Golden eagle incubating in nest #15.
Needle Rock	1/5, 2/2	Helicopter	Breeding area taken over by Box Bar pair.
Orme	1/5, 1/6, 2/2, 2/3, 3/17, 3/19, 4/15, 5/11, 5/14	Helicopter, Ground	3/17: Adult incubating in new snag nest #9.
Pee Posh Wetlands	1/5, 2/2	Helicopter	1/5: Adult incubating in new snag nest #5.
Pinto	1/6, 2/3, 3/18, 4/16, 5/11	Helicopter	2/3: Adult incubating in new nest #9.
Rock Creek	3/18	Helicopter	All known nests empty. No eagles.
San Carlos	1/6, 2/3, 3/18, 4/16	Helicopter	2/3: New large nest #7 in tree. No eagles.
76	1/6, 2/3, 3/19, 4/16, 5/11	Helicopter	1/6: New tree nest #6 found.
Sheep	1/6, 2/3, 3/19, 4/16, 5/11	Helicopter, Ground	2/3: Adult incubating in platform nest #7.
Show Low Lake	1/16, 2/3, 3/18, 4/16	Helicopter	2/3: New tree nest #2 found.
Sycamore	1/5, 1/21, 2/2, 3/17, 3/19, 4/15	Helicopter, Ground	1/5: Nest #5 fallen. 1/21: New tree nest #6.
Tapco	1/5, 2/2, 3/17, 4/15	Helicopter	2/2: Adult incubating in new tree nest #4.
Tower	1/5, 2/2, 3/17	Helicopter	All known nests empty. No eagles.
White Horse Lake	5/11, 6/30	Helicopter, Ground	6/30: Nest #4 partially fallen.
Woods Canyon	5/11, 6/4	Helicopter, Ground	5/11: One nestling, 2 weeks old, in new tree nest #8.

Overview

Noteworthy findings of the 2015 nest survey include seven new bald eagle BAs, one re-occupied historic BA, 21 new alternate bald eagle nests within BAs, nine fallen or partially fallen nests within BAs, and eight new potential nests at eight sites.

The seven new BAs this year were widely distributed across the state. Three of the new sites, Kerr, Black Cross, and Sheep Creek were established between existing territories. At the Kerr BA, the new pair built a nest and successfully fledged two young a month after the pair at the Goldfield BA fledged one, despite the two nests being only 400 meters apart from each other. The new Black Cross BA was established between the Tortilla Creek and Fish Creek BAs on a part of the Salt River that had room for growth. The new Sheep Creek BA, between the Yellow Cliffs and Cliff BAs, was anticipated due to sightings of adult bald eagles in the preceding years. The new Chevelon BA on the Mogollon Rim was expected for the same reason. Three other new BAs were established in less traditional areas, including Buckeye, Elaine, and Nevada Bay. None of these sites occur along regular survey routes, however we had checked the Nevada Bay site on a semi-annual basis since 2011 when the nests were found during golden eagle surveys. The new BAs at Buckeye (in agricultural lands on the outskirts of the town of Buckeye) and Elaine (in forest within the city of Flagstaff) were reported to the Department through the public and SWBEMC partners.

Productivity in 2015 at 1.12 young per occupied BA matched or exceeded the previous nine years (Table 8). Over the last ten years productivity has averaged 0.97 (2006-2015). By comparison, the average productivity of the previous ten-year period was 0.78 (1996-2005). With record numbers of breeding pairs and high productivity in the past decade, Arizona's bald eagle population seems primed for continued growth as more eagles reach adulthood.

Table 8. Arizona bald eagle 10-year productivity summary.

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Number of BAs	76	68	68	66	62	62	59	56	53	50
Number of occupied BAs	59	52	54	54	55	52	50	48	48	43
Number of eggs (minimum)	89	73	79	80	79	69	78	71	74	68
Number of active BAs	56	47	49	50	51	48	48	44	45	39
Failed breeding attempts	17	17	14	19	17	21	19	14	20	11
Successful breeding attempts	39	30	35	31	34	27	29	30	25	28
Young hatched	75	58	71	66	66	57	68	65	61	55
Young fledged	66	43	58	52	56	44	47	53	42	42
Nest success	0.66	0.58	0.65	0.57	0.62	0.52	0.58	0.63	0.52	0.65
Mean brood size	1.7	1.4	1.7	1.7	1.6	1.6	1.6	1.8	1.7	1.5
Productivity	1.12	0.83	1.07	0.96	1.0	0.85	0.94	1.10	0.87	0.98

The continued creation of new breeding areas and nests, and the loss of alternate nests, coupled with the potential for changes in the distribution of Arizona bald eagles further demonstrates the necessity and importance of ORA flights. These flights allow for the consistent monitoring of

bald eagle demography, including population size, distribution, and reproductive success, in the rugged terrain of Arizona. Without the aid of these flights, we would not be able to accurately document these important population parameters.

MANAGEMENT RECOMMENDATIONS

1. Future survey efforts should continue to monitor historic BAs, potential breeding habitat, large nests, and sightings of adult eagles reported in previous nest survey reports. These documents are useful tools for identifying occupancy trends, locating new BAs, and monitoring population expansion.
2. Surveyors should continue to use the nest survey, ORA, and winter count flights, in concert with follow-up ground surveys to inspect areas. From the air, surveyors can easily cover large sections of bald eagle habitat. From the ground, surveyors can investigate areas in more detail.
3. Confirm the band status and identify blue-banded adults observed at all new and recent breeding areas, including Bachelor Cove, Chevelon, Elaine, Kerr, Mohave, Nevada Bay, Show Low Lake, Tapco, and White Horse Lake.
4. Identify blue-banded adults at sites where one or both of the pair has long tenure within the breeding area in order to detect when replacement of these important birds has occurred.
5. Determine the identification of the breeding pair at Copper Basin, CA and yearly band the nestlings.
6. Examine the following areas for breeding bald eagles and/or nests:
    - Agua Fria River drainage – Up and downstream from Lake Pleasant.
    - Anderson Mesa Lakes – Ashurst Lake, Deep Lake, Horse Lake, Kinnikinick Lake, Long Lake, Marshall Lake, Potato Lake, Prim Lake, Tremaine Lake, Yaeger Lake.
    - Bill Williams River drainage – Alamo Lake to Bill Williams National Wildlife Refuge.
    - Black River drainage – Known osprey nesting areas on East and West Fork and main stem of the Black River.
    - Central and Eastern Mountain Lakes – Bear Canyon, Black Canyon, Blue Ridge, Cholla, Dry, JD Dam, Knoll, Lyman, Nash Creek, Point of Pines, Rogers, Willow Springs.
    - Colorado River drainage – Lake Havasu, Topock Marsh, Lake Mead (Grand Wash), Nankoweap Creek, Lee's Ferry.
    - North Fork of White River – Known osprey nesting locations.
    - Gila River drainage – Lower Blue River, San Francisco River to Gila River confluence, Gila Box.
    - Salt River Drainage – Redmond BA to Canyon BA, Cibecue BA to Cedar Basin BA, Tonto Creek north of Tonto BA, Pinto Creek, Salome Creek, Tanks Canyon, George's Basin.
    - Verde River drainage – Beaver Creek, East Verde River, Oak Creek, West Clear Creek.
    - White Mountain Lakes – Carnero, Christmas Tree, Horseshoe Cienega, Hawley, Lee Valley Reservoir, Nelson Reservoir, Nutrioso, Pacheta, Reservation.
    - White River – Whiteriver to confluence with Black and Salt Rivers.

ARIZONA BALD EAGLE NESTWATCH PROGRAM

INTRODUCTION

In 1978, the USFS and two Maricopa Audubon Society volunteers monitored bald eagles breeding near Bartlett Reservoir to understand the effects of recreation on nesting behavior and success (Forbis et al. 1985). This monitoring effort eventually expanded to other BAs, and developed into the Arizona Bald Eagle Nestwatch Program (ABENWP). In 1986, the USFWS assumed coordination of the ABENWP on behalf of the SWBEMC, and expanded its scope. Following passage of the Heritage Initiative in 1990, a voter initiative which created a fund from Arizona Lottery proceeds for conservation of wildlife and natural areas, the Department was able to develop and support a comprehensive bald eagle management program. In 1991, the USFWS transferred coordination of the ABENWP to the Department.

To address the continuing management needs for Arizona's breeding bald eagles, the ABENWP operates under three goals: education, data collection, and conservation. Due to high recreation pressures along some of Arizona's lakes and rivers, land management agencies enact seasonal closures when necessary to protect bald eagles during the breeding cycle. Nestwatchers interact with members of the public who enter these closures, educate them about bald eagles, distribute brochures, and/or direct them away from the breeding attempt. To help the land and wildlife agencies make better bald eagle management decisions, nestwatchers collect basic biological information and behavioral responses to human activities. One of the most tangible benefits of the ABENWP is determining when bald eagles are in life-threatening situations, allowing Department biologists to intervene in these situations and either eliminate or reduce the threat, or rescue injured eagles. In this report, we summarize significant discoveries at each BA monitored by the ABENWP in 2015. Detailed reports of each monitored BA are centralized at the Department, and are distributed to the appropriate land and wildlife management agencies.

METHODS

We selected the BAs to be monitored by weighing the level of recreation activity and management needs. Included are those with seasonal closures (Box Bar, Cliff, Crescent, Goldfield, Kerr, Luna, Pinto, Pleasant, Tapco, Tonto, Whiskey Spring, White Horse, and Woods Canyon), those without (Granite Reef, Orme, Rodeo, Sycamore), and those monitored opportunistically for information (Doka, Fort McDowell). In the fall of 2014, we advertised the ABENWP contract positions through newsletters, web pages, and at university and college job placement services nationwide. Presentations, brochures, and word-of-mouth also contributed to the pool of applicants.

We held two orientation meetings, and three question and answer sessions for the selected ABENWP contractors (nestwatchers). The two meetings offered an introduction to the program, background information on the ABENWP's role in bald eagle management, and an explanation of data forms and emergency protocols. After the orientation meetings, nestwatchers chose a partner, a BA, and were taken into the field. The question and answer sessions occurred after the first 10-day work period, and subsequently after every second 10-day work period. In these

sessions, we discussed filling out data forms, consistency in data collection, requirements for the final report, and any additional concerns or comments. When appropriate, additional problems or questions were handled on an individual basis.

Fieldwork began February 6 and continued until nestlings fledged. If a nesting attempt failed, nestwatchers were moved to alternate sites for the remainder of the season. Teams of two nestwatchers maintained a 10 days on/4 days off schedule. During each work period, weekend observations were conducted from dawn-to-dusk to cover times of high recreation use and document the resulting habitat use of the breeding pair. Monday through Thursday observations were a minimum of eight hours with emphasis on identifying territory boundaries, home range, and overall habitat use of the breeding pair.

Nestwatchers recorded bald eagle behavior and human activity data from assigned observation points (OP) within the BA. We selected each OP to provide optimal viewing while minimizing the impact to the breeding bald eagles. Alternate OPs were identified when the breeding pair utilized areas out of view of the primary OP. Nestwatchers were provided spotting scopes, Motorola® radios, and/or USFS radios for viewing and communication needs. We supplied standardized data forms, BA maps with river and/or lake kilometer (rk/lk) designations, and other reference materials. Nestwatchers provided their own transportation, gas, field supplies, binoculars, and housing on days off.

Within an arbitrary 1.0 km (3,300 ft) radius of a bald eagle or active nest, nestwatchers recorded all human activity and the associated bald eagle behavior. Aircraft flying below the 2,000 foot FAA advisory over bald eagle breeding areas were also recorded. Nestwatchers classified bald eagle behavior in response to human activity into seven categories: none, watched, restless, flushed, left area, bird not in area, and unknown. If the bald eagles performed their normal activities without acknowledging the human activity, nestwatchers recorded a “none” response. “Watched” was a bald eagle looking in the direction of the human activity without displaying any other observable reaction. If the bald eagle vocalized and/or moved noticeably without leaving the nest or perch, nestwatchers recorded “restless.” If a bald eagle left its location quickly in response to a human activity, nestwatchers recorded a “flushed” response. “Left area” was recorded when a bald eagle became intolerant and flew far away. Nestwatchers recorded “bird not in area” if a bald eagle was not present, and “unknown” if a bald eagle was present but its response could not be observed. Activities that caused a change in bald eagle behavior, provoking a response of “restless,” “flushed,” and “left area” were considered significant.

At the Granite Reef, White Horse, and Woods Canyon BAs, nestwatchers recorded human activity differently than described above. At Granite Reef, only aircraft below 1,000 feet were recorded due to the high volume of air traffic. At the White Horse BA, because of the proximity and high volume of background activity at the campgrounds, nestwatchers only recorded activities within about 200 m of the nest and those that caused a response from eagles. At the Woods Canyon BA, due to the high volume of recreationists at the lake, nestwatchers recorded eagle behavioral responses to activities within the nest area closure or which elicited a significant response from an eagle.

Nestwatchers documented all aspects of bald eagle behavior at their BA including: interactions with other wildlife; habitat use; forage events; type of prey species delivered and frequency of deliveries to the nest; incubation time; time attending the nest; and feeding frequency. In this report, we only describe human activity, foraging attempts, prey deliveries, habitat use, and site-specific management recommendations.

RESULTS AND DISCUSSION

The ABENWP monitored 19 breeding areas in 2015 including Box Bar, Cliff, Crescent, Doka, Fort McDowell, Goldfield, Granite Reef, Kerr, Luna, Orme, Pinto, Pleasant, Rodeo, Sycamore, Tapco, Tonto, Whiskey Spring, White Horse, and Woods Canyon. The final status of the monitored BAs was 7 failed, 12 successful, and 19 young fledged (Appendix C).

The Doka, Fort McDowell, and Pleasant BAs were either monitored part-time or opportunistically by nestwatchers at nearby BAs. Therefore, data for these sites are not included in the following section of this report.

Box Bar Breeding Area (Appendix E)

Observation Period. – February 6 to May 3. Total monitoring 70 days/561 hours.

Bald Eagle Identification. – Both the female and male were reported by nestwatchers as unbanded and in adult plumage (unknown origin). However in January we observed a banded adult.

Management Activities. – 1) The USFS placed "No Entry" signs around the nest area. 2) On March 23, two male nestlings were blue VID banded "30/H" and "30/K" at 5.5 weeks of age.

Figure 2. Box Bar breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Human Activity. – Nestwatchers recorded 336 human activities. Terrestrial activity of fifteen types represented 50.9%, aircraft activity represented 41.1%, and watercraft 8.0%. Eleven types of activities elicited 13 significant responses from the breeding pair. The bald eagles were restless in response to one horseback rider, Apache helicopter, and nestwatcher. They flushed in response to two hikers, and one each of helicopter, horseback rider, kayaker, birdwatcher, driver, gunshot, shooter, and Department biologist.

Food Habits. – Nestwatchers observed eight forage events, all by the male eagle who was successful in 87.5% (n=7) of events. The breeding pair was observed delivering 123 prey items to the nest, of which the male delivered 84.6% and the female 15.4%. Fish comprised 73.2% (n=90) of the deliveries, mammals 11.4% (n=14), birds 4.1% (n=5), reptiles 0.8% (n=1) and

unknown prey types 10.6% (n=13). Of the 33 prey items further identified, there were 11 tilapia, six rabbits, four suckers (*Catostomus sp.*), four bass (*Micropterus sp.*), two common carp (*Cyprinus carpio*), two waterfowl, and one each of American coot (*Fulica americana*), double-crested cormorant (*Phalacrocorax auritus*), gopher, and snake.

Habitat Use. – The Box Bar nestwatchers identified 17 separate perch locations, spanning 4.3 km of the Verde River and ranging from river kilometer (rk) 25.2 to 29.5, and including the ponds at the Tonto Verde Golf Course. The bald eagle pair spent 56.9% of the observed time at rk 25.8, 32.6% at rk 25.5, 8.2% at rk 26.3, and 2.3% at the remaining 9 locations.

Cliff Breeding Area (Appendix F)
Observation Period. – February 6 to March 27. Total monitoring 35 days/277 hours.

Bald Eagle Identification. – The male was reported by nestwatchers as unbanded and in adult plumage (unknown origin). The female was reported as having a blue VID band on her left leg, USFWS band on the right leg, and was in adult plumage (unknown, but blue band indicative of an Arizona origin).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The USFS maintained "Sensitive Species Area" signs around the nest area, as well as markers, posts, and natural barriers to prevent off-road traffic and to keep people on existing roads.

Human Activity. – Nestwatchers recorded 32 human activities during the monitoring period. Aircraft (helicopters, small planes, and jets) accounted for 75.0% and terrestrial activities of six different types for 25.0%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – Nestwatchers were able to observe four forage events, with fish and reptiles each accounting for 50%. The male was successful in 100% (n=2), the female in 100% (n=1), and unidentified adult in 0% (n=1) of forage events. The breeding pair was observed delivering 13 prey items to the nest, of which the male delivered 38.5%, the female 23.1%, and unknown adult 38.5%. Fish comprised 46.1% (n=6) of the deliveries, mammals 30.8% (n=4), birds 15.4% (n=2) and unknown prey types 7.7% (n=1). Of the two prey items further identified, both were channel catfish (*Ictalurus punctatus*).

Figure 3. Cliff breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Habitat Use. – The Cliff nestwatchers identified 17 separate habitat use areas, spanning a 9.9 km stretch of the Verde River ranging from river kilometer (rk) 66.5 to 76.4. The bald eagle pair

spent 40.2% of the observed time at rk 66.6, 30.7% at rk 66.5, 13.6% at rk 66.9, 6.9% at rk 67.3, and 9.4% at the remaining locations.

Crescent Breeding Area (Appendix G)
Observation Period. – April 17 to July 19. Total monitoring 70 days/674 hours.

Bald Eagle Identification. – Both adults were in adult plumage, but their identification and band status were undetermined.

Management Activities. – 1) The USFS posted "No Entry" signs surrounding the nest area knoll. 2) The USFS maintained a bald eagle information board along the west access road.

Human Activity. – Nestwatchers recorded 850 human activities during the monitoring period. Terrestrial activity of 12 different types represented 91.2%, water pursuits (boaters, float tubers, and kayaks/canoes) 8.6%, and aircraft (small planes) 0.1%. Two types of activity elicited three significant responses from the breeding pair. The bald eagles were restless in response to two gunshots, and flushed in response to one agency worker.

Food Habits. – The nestwatchers observed 112 forage events, with fish accounting for 55.4%, birds 43.8%, and unknown prey types 0.9%. The male was successful in 94.7% (n=57) and the female in 96.4% (n=55) of forage events. The breeding pair was observed delivering 105 prey items to the nest, of which the male delivered 50.5% and the female 49.5%. Fish comprised 54.3% (n=57), birds 44.8% (n=47), and unknown prey 1.0% (n=1) of these deliveries. Of the 104 prey items further identified, 45.2% (n=47) were rainbow trout (*Oncorhynchus mykiss*), 44.2% (n=46) American coot, 9.6% (n=10) brook trout (*Salvelinus fontinalis*), and 1.0% (n=1) mallard (*Anas platyrhynchos*).

Figure 4. Crescent breeding area. Apache County, Arizona. Photo by K. McCarty.

Habitat Use. – The Crescent nestwatchers identified 14 perch locations around Crescent Lake. The bald eagle pair spent 34.5% of the observed time at lake kilometer (lk) 2.1, 31.5% at lk 2.2, 24.6 % at lk 2.3, 7.7% at lk 2.4, and 1.6% at the remaining locations.

Goldfield Breeding Area (Appendix H)
Observation Period. – February 6 to May 10. Total monitoring 63 days/537 hours.

Bald Eagle Identification. – The female was in adult plumage but identification and band status were undetermined. The male had a blue VID band "19/D" on his left leg, USFWS band on the right leg, and was in adult plumage (2006 Needle Rock nestling).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The USFS closed off vehicle access to the nest area. 3) The USFS maintained wildlife breeding area signs along the river prohibiting entry. 4) On March 23, one female nestling was blue VID banded "30/M" at 6 weeks of age.

Human Activity. – Nestwatchers recorded 862 human activities during the observation period. Terrestrial activity of ten different types represented 57.8%, water activities 35.4%, and aircraft (helicopters, small planes) 6.7%. Four types of activities elicited five significant responses from the breeding pair. The bald eagles were restless in response to two helicopters, and flushed in response to a hiker, helicopter, and construction activity.

Figure 5. Goldfield breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Food Habits. – Nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 47 prey items to the nest, of which the male delivered 31.9%, the female 21.3%, and an unidentified adult 46.8%. Fish comprised 31.9% (n=15) of these deliveries, unknown prey types 61.7% (n=29), and mammals, birds, and reptiles 2.1% (n=1) each. Of the two prey items further identified, one was a Sonora sucker (*Catostomus insignis*) and one was an American coot.

Habitat Use. – The Goldfield nestwatchers identified 23 perch locations, spanning a 1.9 km stretch of the Salt River ranging from river kilometer (rk) 8.7 to 10.6. The bald eagle pair spent 65.9% of the observed time at rk 9.3, 12.2% at rk 10.5, 9.1% at rk 9.4, 4.3% at rk 9.5, 4.1% at rk 9.1, and 4.4% at the remaining locations.

Granite Reef Breeding Area (Appendix I)
Observation Period. – February 6 to May 11. Total monitoring 27 days/211 hours.

Bald Eagle Identification – The male had a blue VID band "11/B" on his left leg, USFWS band on the right leg, and was in adult plumage (2000 Ft. McDowell nestling). The female was reported by nestwatchers as unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The SRPMIC continues to restrict non-tribal member use of the river area. 2) Nestwatchers were issued a kayak and educated recreationists on the river about bald eagles and the no entry on tribal land.

Human Activity. – The nestwatchers recorded 246 human activities. Aircraft (small planes, helicopters) accounted for 47.1%, water pursuits 32.6% (canoes/kayaks, rafters, boaters, float tubers), and terrestrial activity of four different types for 20.3%. One type of activity elicited eight significant responses from the breeding pair. The bald eagles flushed in response to eight canoes/kayaks.

Figure 6. Granite Reef breeding area. Maricopa County, Arizona. Photo by J. Driscoll.

Food Habits. – The nestwatchers observed 25 forage events with fish accounting for 92.0% (n=23), birds 4% (n=1), and unknown prey 4% (n=1). The male was successful in 88.9% (n=9) and the female was successful in 62.5% (n=16) of forage events. The breeding pair was observed delivering 20 prey items to the nest, of which the male delivered 35.0% (n=7), the female 60.0% (n=12), and an unidentified adult 5.0% (n=1). Fish comprised 85.0% (n=17) of the deliveries, and unknown prey types 15.0% (n=3). Of the seven prey items further identified, 57.1% (n=4) were sucker species, 28.6% (n=2) were common carp, and 14.3% (n=1) were bass species.

Habitat Use. – The Granite Reef nestwatchers identified 19 separate habitat use areas spanning 1.5 km along the Salt River ranging from river kilometer (rk) 2.5 to 4.0. The bald eagle pair spent 19.5% of the observed time at rk 3.8, 19.2% at rk 2.5, 15.1% at rk 3.7, 14.2% at rk 3.5, 13.5% at rk 3.1, 10.5% at rk 3.4, and 8.3% at the remaining locations.

Kerr Breeding Area (Appendix J)
Observation Period. – February 7 to June 4. Total monitoring 83 days/740 hours.

Bald Eagle Identification – Nestwatchers reported that both the female and male had no bands and were in adult plumage (unknown origins).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) On April 21, one male and one female nestling were blue VID banded “30/Z” and “31/A”, respectively, at 5.5-6 weeks old.

Human Activity. – The nestwatchers recorded 823 human activities. Water activities (paddle boards, canoes/kayaks, float tubers, airboat) accounted for 53.1%, terrestrial activity of seven different types 34.8%, and aircraft (small planes, military planes, and helicopters) 12.1%. Eleven types of activity elicited 79 significant responses from the breeding pair. The bald eagles were restless in response to two helicopters, one horseback rider and small plane each, and flushed in response to 28 canoe/kayak/paddle board, 13 photographer, 11 horseback rider, seven tubers, six helicopters, four hikers, four agency biologists, one small plane, and one nestwatcher.

Food Habits. – The nestwatchers observed 11 forage events, with fish accounting for 100%. The male was successful in 100% (n=4), the female in 100% (n=2), and an unidentified adult (n=5) in 100% of forage events. The breeding pair was observed delivering 36 prey items to the nest, of which the male delivered 50.0% (n=18), the female 44.4% (n=16), and an unidentified adult 5.6% (n=2). Fish comprised 61.1% (n=22), birds 11.1% (n=4), reptiles 5.6% (n=2), mammals 2.8% (n=1), and unknown prey 19.4% (n=7) of the deliveries. Of the 15 prey items further identified, 33.3% each were sucker species and common carp (n=5), 13.3% each were American coot and gopher snake (*Pituophis catenifer*) (n=2), and 6.7% were muskrat (*Ondatra zibethicus*) (n=1).

Figure 7. Kerr breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Habitat Use. – The Kerr nestwatchers identified 14 separate habitat use areas spanning a 1.1 km stretch of the Salt River ranging from river kilometer (rk) 7.8 to 8.9. The bald eagle pair spent 59.5% of the observed time at rk 8.2, 24.1% at rk 8.4, 5.7% at rk 8.6, 3.8% at rk 8.8, 3.4% at rk 7.9, and 3.4% at the remaining locations.

Luna Breeding Area (Appendix K)
Observation Period. – February 6 to April 12. Total monitoring 50 days/486 hours.

Bald Eagle Identification – Both adults were in adult plumage, but their identification and band status were undetermined.

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) Nestwatchers were stationed at the boat ramp to talk to visitors.

Human Activity. – The nestwatchers recorded 375 human activities. Terrestrial activity of ten different types accounted for 91.7%, water pursuits (fishing boats, kayaks, float tubers) for 6.7%, and aircraft (small planes, military jets) 1.6%. One type of activity elicited three significant responses from the breeding pair. The bald eagles were restless in response to a military jet, and flushed in response to two military jets.

Figure 8. Luna breeding area. Apache County, Arizona. Photo by J. Driscoll.

Food Habits. – The nestwatchers observed 39 forage events, with birds accounting for 92.3%, fish 5.1%, and unknown prey 2.6%. The male was successful in 91.3% (n=23) and the female was successful in 93.8% (n=16) of forage events. The breeding pair was observed delivering 30 prey items to the nest, of which the male delivered 56.7% (n=17) and the female 43.3% (n=13). Birds comprised 93.3% (n=28), fish 3.3% (n=1), and unknown prey 3.3% (n=1) of the deliveries. Of the 29 prey items further identified, 86.2% were American coots (n=25), 6.9% (n=2) were waterfowl species, 3.4% (n=1) were bufflehead (*Bucephala albeola*), and 3.4% (n=1) were rainbow trout.

Habitat Use. – The Luna nestwatchers identified 25 separate habitat use areas around Luna Lake. The bald eagle pair spent 62.9% of the observed time at lk 2.4, 11.7% at lk 2.1, 7.2% at lk 2.6, 4.9% at lk 2.7, 2.9% at lk 2.8, and 10.5% at the remaining locations.

Orme Breeding Area (Appendix L)
Observation Period. – February 8 to May 10. Total monitoring 44 days/347 hours.

Bald Eagle Identification. – The male had a blue VID band "26/B" on his left leg, USFWS band on the right leg, and was in adult plumage (2011 Riverside nestling). The female had no bands and was in adult plumage (unknown origin).

Management Activities. – 1) The SRPMIC continues to restrict non-tribal member use of the river area. 2) The SRPMIC police routinely visited the ABENWP contractors and patrolled the nesting area during times of elevated recreation use.

Figure 9. Orme breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Human Activity. – Nestwatchers recorded 95 human activities. Aircraft (helicopters, small planes) represented 77.9%, and terrestrial activities of five types 22.1%. One type of activity elicited one significant response from the breeding pair. The bald eagles flushed in response to one helicopter.

Food Habits. – The nestwatchers were unable to observe any forage events by the breeding pair. The breeding pair was observed delivering 15 prey items to the nest, of which the male delivered 40.0% and the female 60.0%. Fish comprised 86.7%, mammals 6.7%, and unknown prey 6.7% of the deliveries. Of the two prey items further identified, 50.0% (n=1) each were common carp and sucker species.

Habitat Use. – The Orme nestwatchers identified 12 habitat use locations along the Verde and Salt Rivers, spanning a total of 1.5 km ranging from river kilometer (rk) 0.1 to 1.0 on the Verde

River and rk 4.8 to 5.4 on the Salt River. The bald eagle pair spent 45.4% of the observed time at rk 5.2 (Salt River), 23.5% at rk 4.9 (Salt River), 19.2% at rk 5.0 (Salt River), 7.0% at rk 5.1 (Salt River), 4.0% at rk 5.4 (Salt River), and 0.9% at the remaining locations.

Pinto Breeding Area (Appendix M)
Observation Period. – April 8 to May 11. Total monitoring 26 days/226 hours.

Bald Eagle Identification. – Nestwatchers reported the male was unbanded and in adult plumage (unknown origin), and the female had a blue VID band on the left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling).

Figure 10. Pinto breeding area. Gila County, Arizona. Photo by K. McCarty.

Management Activities. – 1) The USFS enacted the seasonal bald eagle closure. 2) The Southwestern Willow Flycatcher Closure limited recreational activities on the west side of the Salt River.

Human Activity. – Nestwatchers recorded one human activity (a helicopter). No significant responses were observed from the breeding pair.

Food Habits. – The nestwatchers were able to observe one forage event by the breeding pair. The male eagle successfully caught a fish of unknown species. The breeding pair was observed delivering 31 prey items to the nest, of which the male delivered 71% (n=22), the female 22.6% (n=7), and an unidentified adult 6.5% (n=2). Fish comprised 51.6% (n=16), birds 6.5% (n=2), carrion 3.2% (n=1) and unknown prey types 38.7% (n=12) of the deliveries. None of the prey items were further identified.

Habitat Use. – The Pinto nestwatchers identified 18 separate habitat use areas along the Salt River, spanning 3.6 km and ranging from river kilometer (rk) 102.0 to 105.6. The bald eagle pair spent 65.7% of the observed time at rk 105.5, 25.2% at rk 105.4, 7.5% at rk 105.3, and 1.6% at the remaining locations.

Rodeo Breeding Area (Appendix N)
Observation Period. – February 6 to May 7 (full-time mid-March to April 23). Total monitoring 35 days/208 hours.

Bald Eagle Identification. – Nestwatchers reported the female had no bands and was in adult plumage (unknown origin), and that the male had a blue VID band on his left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling).

Management Activities. – 1) The FMYN continues to restrict non-tribal member use of the river area.

Human Activity. – Nestwatchers recorded 77 human activities. Aircraft (helicopters, small planes, military planes) accounted for 64.9%, and terrestrial activities of six types for 35.1%. Two types of activities elicited two significant responses from the breeding pair. The bald eagles were restless in response to one AGFD biologist, and left the area in response to a photographer.

Figure 11. Rodeo breeding area. Maricopa County, Arizona. Photo by Arizona Game & Fish Department.

Food Habits. – The nestwatchers observed one forage event, a successful capture of fish by the male. The breeding pair was observed delivering 25 prey items to the nest, of which the male delivered 52.0% and the female 48.0%. Fish comprised 68.0% (n=17), birds 8.0% (n=2), mammals 4.0% (n=1), and unknown prey types 20.0% (n=5) of the deliveries. Of the 7 prey items further identified, 71.4% (n=5) were desert suckers, 14.3% (n=1) each were largemouth bass (*Micropterus salmoides*) and American coot.

Habitat use. – The Rodeo nestwatchers identified 9 perch locations along the Verde River, spanning a total of 1.7 km and ranging from river kilometer (rk) 2.5 to 4.2. The bald eagle pair spent 67.0% of the observed time at rk 3.8, 18.7% at rk 3.9, 4.7% at rk 2.7, 4.6% at rk 4.2, and 4.9% at the remaining locations.

Sycamore Breeding Area (Appendix O)
Observation Period. – February 6 to March 12. Total monitoring 28 days/230 hours.

Bald Eagle Identification. – Nestwatchers reported the male had a blue VID band on the left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling). The female was reported as unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The FMYN restricts non-tribal member use of the river area. 2) Nestwatchers, Fort McDowell Adventures, Green Zebra Tomcar tours, and community members worked collaboratively to ensure protection of eagles and promote outreach opportunities.

Human Activity. – Nestwatchers recorded 86 human activities. Terrestrial activities of five types represented 81.4%, and aircraft (helicopters and small planes) 18.6%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – Nestwatchers were unable to observe any forage events. Due to the early failure of the breeding attempt, no prey deliveries were observed.

Habitat use. – The Sycamore nestwatchers identified 10 separate habitat use areas, spanning a total of 3.8 km along the Verde River ranging from river kilometer (rk) 7.6 to 11.4. The bald eagle pair spent 35.2% of the observed time at rk 10.4, 17.9% at rk 9.7, 13.3% at rk 7.6, 11.3% at rk 10.0, 10.8% at rk 11.4, 5.7% at rk 9.3, and 5.8% at the remaining locations.

Figure 12. Sycamore breeding area. Maricopa County, Arizona. Photo by Arizona Game & Fish Department.

Tapco Breeding Area (Appendix P)
Observation Period. – February 7 to March 29. Total monitoring 39 days/308 hours.

Bald Eagle Identification. – Nestwatchers reported the male had a blue VID band on the left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling), and the female had a blue VID band on the left leg, no band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling).

Management Activities. – 1) No Trespassing signs were maintained along the private property line. 2) A portion of the private land was accessible to nestwatchers for management purposes.

Human Activity. – Nestwatchers recorded 114 human activities represented by terrestrial activities of five types. Four types of activities elicited eight significant responses from the breeding pair. The bald eagles were restless in response to a driver, and flushed from a perch in response to four trains, two railroad maintenance events, and one driver.

Food Habits. – The nestwatchers observed 5 forage events, with carrion accounting for 40.0%, and fish, mammals, and unknown prey types 20.0% each. The male was successful in 33.3% (n=3) and the female in 100% (n=2) of forage events. The breeding pair was observed delivering 7 prey items to the nest, of which the male delivered 71.4% and the female 28.6%. Fish comprised 28.6% (n=2), mammals 14.3% (n=1), and unknown prey types 57.1% (n=4) of delivered items. None of the prey items were further identified.

Figure 13. Tapco breeding area. Yavapai County, Arizona. Photo by K. Jacobson.

Habitat use. – The Tonto nestwatchers identified 24 separate perch locations along the Verde River, spanning 2.0 km and ranging from river kilometer (rk) 237.2 to 239.2. The bald eagle pair spent 27.1% of the observed time at rk 237.3, 24.1% at rk 239.2, 15.2% at rk 238.9, 11.2% at rk 237.8, 8.5% at rk 239.0, 7.2% at rk 238.0, and 6.7% at the remaining locations.

Tonto Breeding Area (Appendix Q)
Observation Period. – February 6 to May 20. Total monitoring 68 days/385 hours.

Bald Eagle Identification. – The male had a blue VID band "14/E" on the left leg, USFWS band on the right leg, and was in adult plumage (2002 Talkalai nestling). The female had no bands and was in adult plumage (unknown origin).

Figure 14. Tonto breeding area. Gila County, Arizona. Photo by K. McCarty.

Management Activities. – 1) A portion of the Indian Point campground remained closed throughout the breeding season. 2) The Southwestern Willow Flycatcher Closure limited recreational activities in the area. 3) The USFS enacted the seasonal bald eagle closure.

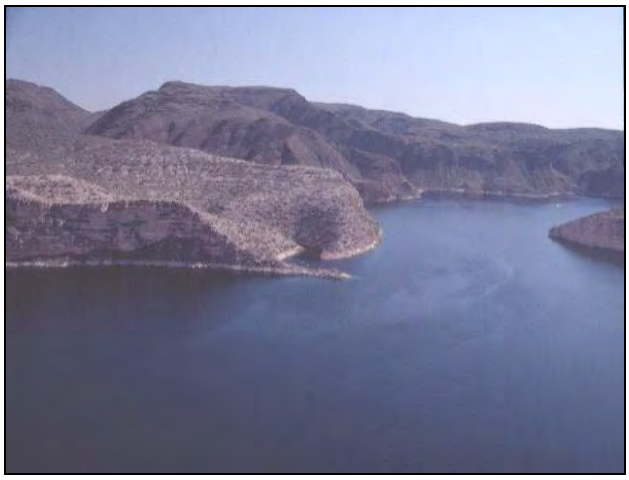
Human Activity. – Nestwatchers recorded 17 human activities. Aircraft (helicopters, small planes, jets, motorized parachutes) represented 64.7%, and terrestrial activities (gunshots, hikers, cattle) 35.3%. Four types of activities elicited five significant responses from the breeding pair. The bald eagles were restless in response to two gunshots, one hiker, and one cattle, and left the area in response to one motorized parachute.

Food Habits. – The nestwatchers observed 4 forage events, with fish accounting for 50%, birds 25%, and mammals 25%. An unidentified adult was successful in 50% (n=2). The breeding pair was observed delivering 52 prey items to the nest, of which the male delivered 82.7%, the female 13.5%, and an unidentified adult 3.8%. Fish comprised 59.6% (n=31), birds 11.5% (n=6), mammals 7.7% (n=4), and unknown prey types 21.2% (n=11) of delivered items. None of the prey items were further identified.

Habitat use. – The Tonto nestwatchers identified 11 separate perch locations along Tonto Creek, spanning 0.9 km and ranging from river kilometer (rk) 16.4 to 17.3. The bald eagle pair spent 30.8% of the observed time at rk 16.7, 18.7% at rk 16.9, 13.4% at rk 17.3, 10.2% at rk 16.5, 10.0% at rk 16.6, 8.9% at rk 17.0, and 8.0% at the remaining locations.

Whiskey Spring Breeding Area (Appendix R)
Observation Period. – February 6 to June 8. Total monitoring 77 days/640 hours.

Bald Eagle Identification. – The male had a blue VID band "21/X" on the left leg, USFWS band on the right leg, and was in adult plumage (2008 Box Bar nestling). The female had no bands and was in adult plumage (unknown origin).



Management Activities. – 1) MCPRD enacted the seasonal closure. 2) MCPRD marked closure boundaries with buoys and signs. 3) Nestwatchers were supplied a boat by the Department and educated recreationists about the closure and bald eagles.

Figure 15. Whiskey Spring breeding area. Maricopa County, Arizona. Photo by J. Driscoll.

Human Activity. – Nestwatchers recorded 262 human activities. Watercraft (boats, jet skis, canoes/kayaks) accounted for 77.9%, aircraft (small planes, jets, and helicopters) 16.4%, and other activities of two types for 5.7%. Three types of activities elicited four significant responses from the breeding pairs. The bald eagles were restless in response to one boat and one small plane, and flushed from a perch in response to one boat and one angler. Of the 3,079 watercraft that approached the southern closure buoy line, a total of 187 boats (6.1%) and 17 jet skis (0.6%) did not comply and entered the closure (agency boats omitted). In addition, 94% of the violations (n=176) occurred on weekend days.

Food Habits. – The nestwatchers observed five forage events, with fish accounting for 100%. The male was successful in 60% (n=3). The breeding pair was observed delivering 82 prey items to the nest, of which the male delivered 92.7%, the female 6.1%, and an unidentified adult 1.2%. Fish comprised 79.3% (n=65), birds 2.4% (n=2), reptiles 1.2% (n=1), and unknown prey types 17.1% (n=14) of delivered items. Of the four prey items further identified, 50% (n=2) were common carp, and 25% (n=1) each were waterfowl and snake species.

Habitat use. – At the Whiskey Spring BA, nestwatchers identified nine separate habitat use areas along the Agua Fria River arm of the lake, spanning a total of 0.6 km and ranging from river kilometer (rk) 68.7 to 69.3. The bald eagle pair spent 33.7% of the observed time at rk 69.0, 19.9% at rk 68.8, 16.7% at rk 69.3, 16.6% at rk 69.2, 5.5% at rk 68.9, 4.2% at rk 68.7, and 3.4% at the remaining locations.

White Horse Breeding Area (Appendix S)
Observation Period. – April 4 to July 13. Total monitoring 77 days/531 hours.

Bald Eagle Identification. – Nestwatchers reported the male had a blue VID band on the left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling), and the female had no bands and was in adult plumage with some (unknown origin).

Management Activities. – 1) The USFS established a trail closure around the nest area.

Human Activity. – Nestwatchers recorded 49 human activities within or at the closure. Terrestrial activities (hiker, angler, bicycle) represented 67.3%, watercraft (kayak/canoe, raft, boat) 28.6%, and aircraft (helicopters and small planes) 4.1 %. Three types of activities elicited 11 significant responses from the breeding pair. The bald eagles were restless in response to three hikers, and flushed from a perch in response to four canoes/kayaks, three hikers, and one boat.

Figure 16. White Horse breeding area. Coconino County, Arizona. Photo by K. McCarty.

Food Habits. – The nestwatchers observed 27 forage events, with fish accounting for 96.3% and unknown prey 3.7%. The male was successful in 85.7% (n=14) and the female was successful in 84.6% (n=13) of forage events. The breeding pair was observed delivering 43 prey items to the nest, of which the male delivered 53.5% and the female delivered 46.5%. Fish comprised 72.1% (n=31), mammals 7.0% (n=3), birds 4.6% (n=2) and carrion 16.3% (n=7) of the delivered items. Of the 35 prey items further identified, 77.1% (n=27) were rainbow trout, 11.4% (n=4) were black crappie (*Pomoxis nigromaculatus*), 5.7% (n=2) were ground squirrels (*Spermophilus sp.*), and 2.9% (n=1) each were American coot and waterfowl species.
Habitat Use. – The White Horse nestwatchers identified 38 separate perch areas within a small area around the lake. The bald eagles primarily spent most of the observed time (66.7%) at three locations within 150 m of the nest tree.

Woods Canyon Lake Breeding Area (Appendix R)
Observation Period. – April 3 to July 19. Total monitoring 108 days/807 hours.

Bald Eagle Identification. – Both resident eagles were in adult plumage and unbanded (unknown origins).

Management Activities. – 1) The USFS established a closure around the nest area and placed closure signs. 2) Nestwatchers were supplied a boat and kayak by AGFD and educated recreationists about the closure and bald eagles. *Human Activity*. – Nestwatchers recorded 58 human activities within or at the closure. Terrestrial activities of five types accounted for 86.2%, and aircraft (helicopters and small planes) for 13.8%. Two types of activities elicited two significant responses from the breeding pair. The bald eagles were restless in response to one helicopter and one photographer.

Food Habits. – The nestwatchers observed 55 forage events. The male was successful in 84.2% (n=19) the female in 96.3% (n=27), an unidentified adult in 85.7% (n=7), and tandem pair in 50.0% (n=2) of forages, which were all for fish. The breeding pair was observed delivering 86 prey items to the nest, of which the male delivered 53.5%, the female 41.9%., and an unknown adult 4.6%. Fish comprised 87.2% (n=75), and unknown prey 12.8% (n=11) of the delivered items. Of 41 prey items further identified, 97.6% (n=40) were rainbow trout and 2.4% (n=1) were sunfish (unidentified species).

Habitat Use. – The Woods Canyon nestwatchers identified 72 separate habitat use areas around the lake. The bald eagle pair spent 26.3% of the observed time at lake kilometer (lk) 4.9, 22.5% at lk 4.7, 15.6% at lk 0.9, 7.9% at lk 4.8, 4.0% at lk 4.6, and 23.6% at the remaining locations.

Figure 17. Woods Canyon breeding area. Coconino County, Arizona. Photo by K. McCarty.

MANAGEMENT CONSIDERATIONS

Management considerations included below are summarized in an edited format from the individual nestwatch reports and therefore are not opinions of the authors or AGFD. We have included them as informational material for land and wildlife management agencies reviewing this report, and for further discussion at SWBEMC meetings.

Box Bar

1. Relocate the observation point from the ridge to the trail sometime around Easter weekend when the nestlings are large enough to see in the nest from the trail below.
2. As recommended by Forest Service law enforcement, nestwatchers should not drive their cars down to the Box Bar Recreation area.
3. Continue to inform nestwatchers about the former Needle Rock observation point which was extremely useful.

Cliff

1. Retain nestwatchers at the Cliff BA. Many OHV operators do not obey the closure signs and freely enter the area.
2. Locate a new observation point if the eagles use the same nest tree. Views into the nest were obscured by branches and leaves.
3. Post more signs for the Cliff Sensitive Species Area.

Crescent

1. Implement a conscientious supplementation of food for this pair through the tough times of February and March. With the already high use and projected major increase in human

activity in the area, this could become a wildlife viewing destination with eagle viewing added as a highlight if we can aid their breeding attempts.
2. Enforce speed limits in recreation areas and off road vehicle use.

Goldfield

1. Closure signs on the north side of the Salt River seem to be effective in keeping many forest users away from eagle nests and should be maintained or increased in order to keep activities in the vicinity of the nest to a minimum.
2. Place informational signs about the bald eagle nestwatch program at nearby parking areas. This could include signage as well as a durable map of the closure and a program brochure dispenser.
3. Restore cottonwood and other tree species in coordination with the appropriate land management agencies, including identifying suitable habitat, planting, monitoring and maintaining seedlings of future nest trees to ensure continued viability of nesting bald eagles.

Granite Reef and Orme

1. AZGFD should work with SRPMIC contacts to stay advised of the situation with the Verde River Water Treatment Plant property, which is in the process of being transferred back to SRPMIC. Any future work on the property could potentially pose a disturbance to nesting eagles if conducted during the bald eagle breeding season.
2. As in 2015, SPRMIC staff should communicate with Verde River Water Treatment Plant staff to make sure scheduled maintenance activities such as landscaping do not take place near the nest during the breeding season. This is especially important if Orme nest #9 continues to be used by the eagles in the future.
3. While human activity at granite Reef was low due to the location of the nest, if the eagles continue using Granite Reef nest #6, we recommend that Tonto National Forest staff regularly check fencing along Bush Highway for damage and ensure it is repaired in a timely fashion to prevent recreationists from driving down washes toward the nest.
4. Water traffic near river kilometer 3.2 elicited the most significant responses from Granite Reef eagles perched along the river. However, the opinion of the nestwatchers is that there is no effective action that can be taken to prevent people from landing on small ephemeral islands in the channel.
5. Nestwatchers had good communication (via cell phone) with the Salt River Rangers, but no method of communication with the Salt River Patrol Police (except through Dispatch). This made communication in the field difficult. To avoid confusion, the SRPMIC police officers and Dispatch should be provided with nestwatcher cell phone numbers and a map that includes the locations of Orme and Granite Reef nests, the nestwatchers' primary observation points, and numbered poles.
6. Install monofilament fishing line recycling bins at recreation areas contiguous with the Orme and Granite Reef BAs.

Kerr

1. Create a portable, weather-resistant educational display to further the education component/goal of the ABENWP and create more of an attraction to the otherwise often overlooked OP. Many features make Goldfield-Kerr a model ABENWP education site.
2. The closure on the north side of the Salt River is effective and should be maintained in order to keep activities in the vicinity of the nest to a minimum. Signage (in addition to the closure signs posted along the river) could be useful to prevent entry from areas other than the river, both at the boundaries of the closure itself and in the nearby parking areas where people normally access the area.

Luna

1. Retain the nestwatch program at Luna Lake.
2. Maintain closure boundaries as they are, including Group Campsite A.
3. Consider creating "islands" isolated from shore by cutting off ends of peninsulas. These "islands" will enhance breeding areas for resident waterfowl and improve survival rates for their chicks.

Pinto

1. Given the limited amount of human activity in the Pinto area, it should be considered if there are other breeding areas which would benefit more from having nestwatchers.
2. It is a sound strategy to relocate nestwatchers from a failed site to Pinto for the later part of the season during the crucial stage before nestlings fledge, as well as proximity to the Armer Gulch BA which can be monitored.

Sycamore

1. Communicate details about nestwatcher presence, duties, schedules and vehicles to Fort McDowell Yavapai Nation (FMYN) law enforcement at the beginning of nestwatch season, in the first week of February.
2. Continue to emphasize protection of the Sycamore BA by signage, law enforcement patrols, possible pole fence construction, and public awareness.
3. Continue to monitor and clear all tourism activities through the Environmental Department. This would include Fort McDowell Adventures events, organized tours, and fireworks displays. Involve AGFD staff when applicable.
4. Continue and expand community involvement with bald eagle breeding and habitat protection, during and beyond the breeding season, including education, viewing opportunities, river clean ups and multi-generational awareness outreach. Encourage year-round observation of bald eagles and the reporting of any disturbance of eagles and/or habitat.
5. Explore the possibility of adding a tribal wildlife ranger position. Combine all human activity numbers and discussion collected by nestwatchers during 2010-2015 and present the data for consideration.
6. Continue collaboration with FMYN elders, H'man Shawa ECDC, and Fort McDowell Adventures.
7. Keep the road into the Rodeo BA locked and accessible only to authorized personnel.

Tapco

1. Continue to monitor the Tapco BA in order to investigate further causes of the consistent nest failure and hopefully develop a solution to the problem.

Tonto

1. It may be helpful to place more signs around the breeding area closure. Nestwatchers observed few closure violations, yet speculated that some violations may have been due to inability to see signage.

Whiskey Spring

1. Consider creating a large sign that is on land near the southern closure line saying "Eagle Area: Closed to public", including an informative sign to show people the closure buoys are different from the "No Wake" buoys that are seen everywhere else.

White Horse

1. Construct a new nest platform for the eagles at White Horse Lake before the next breeding season begins. The current platform that held the 2015 nest is in a state of disrepair, and this may have contributed to the eaglet falling from the nest tree prematurely.

Woods Canyon

1. Assign a third nestwatcher to the site during Memorial Day and Fourth of July weekends in order to facilitate quality data collection and public outreach, and to enable nestwatchers to more easily address problems that arise during those times.

LITERATURE CITED

Brown, B.T. and L.E. Stevens. 1992. Winter abundance, age structure, and distribution of bald eagles along the Colorado River, Arizona. Southwestern Naturalist 37:404-435.

Brown, D.E. (ed.). 1994 Biotic Communities, Southwestern United States and Mexico. The University of Utah Press. Salt Lake City.

Canaca J.S., K.V. Jacobson, and J.T. Driscoll. 2004. Arizona bald eagle 2003 nest survey. Nongame and Endangered Wildlife Program Technical Report 229. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll, J.T., G.L. Beatty, and J.D. Hanna. 1992. 1992 Arizona bald eagle nest survey: Final report and recommendations. Nongame and Endangered Wildlife Program Technical Report. Arizona Game and Fish Dept., Phoenix, AZ.

Driscoll J.T. and G.L. Beatty. 1994. 1993 Arizona bald eagle nest survey. Nongame Endangered Wildlife Program Technical Report 31. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll J.T., G.L. Beatty and M.C. Siemens. 1995a. Arizona bald eagle 1994 nest survey. Nongame Endangered Wildlife Program Technical Report 71. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll J.T., G.L. Beatty and J.G. Koloszar. 1995b. Arizona bald eagle 1995 nest survey. Nongame Endangered Wildlife Program Technical Report 87. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll J.T., G.L. Beatty, and J.G. Koloszar. 1997. Arizona bald eagle 1996 nest survey. Nongame Endangered Wildlife Program Technical Report 117. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll J.T., G.L. Beatty, and J.G. Koloszar. 1998. Arizona bald eagle 1997 nest survey. Nongame and Endangered Wildlife Program Technical Report 127. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll J.T., G.L. Beatty, and J.G. Koloszar. 1999. Arizona bald eagle 1998 nest survey. Nongame and Endangered Wildlife Program Technical Report 138. Arizona Game and Fish Department, Phoenix, Arizona.

Driscoll, J.T., K.V. Jacobson, G. Beatty, J.S. Canaca, and J.G. Koloszar. 2006. Conservation Assessment and Strategy for the Bald Eagle in Arizona. Technical Report 173, Nongame and Endangered Wildlife Program, Arizona Game and Fish Dept., Phoenix, AZ.

Driscoll, D.E. 2010. Protocol for golden eagle occupancy, reproduction, and prey population assessment. American Eagle Research Institute, Apache Junction, AZ.

Eakle, W.L., L. Bond, M.R. Fuller, R.A. Fischer, and K. Steenhof. 2015. Wintering bald eagle count trends in the coterminous United States, 1986-2010. Journal of Raptor Research 49:259-268.

Forbis, L.A, T.G. Grubb, and W.D. Zeedyk. 1985. "Eagle Beagles": A volunteer bald eagle nest watcher program on Arizona National Forests. Pp. 246-254 in The Bald Eagle in Canada, J.M. Gerrard and T.M. Ingram (eds.). White Horse Plains Publishers and The Eagle Foundation, Headingley, MB, CA and Apple River, IL.

Grubb, T. G. 1980. An artificial bald eagle nest structure. U.S. Dep. Agric., For. Serv. Res. Note RM-383. 4pp.

Grubb, T.G., and W.L. Eakle. 1987. Comparative morphology of bald and golden eagle nests in Arizona. J. Wildlife Management 51:744-748.

Hunt, W.G., D.E. Driscoll, E.W. Bianchi, and R.E. Jackman. 1992. Ecology of bald eagles in Arizona. Volumes A-F. Report to U.S. Bureau of Reclamation, Contract 6-CS-30-04470. BioSystems Analysis, Inc., Santa Cruz, California.

Jacobson, K.V., J.S. Canaca, J.G. Koloszar, and J.T. Driscoll. 2004. Arizona bald eagle management program 2004 summary report. Nongame and Endangered Wildlife Program Technical Report 247. Arizona Game and Fish Department, Phoenix, Arizona.

Jacobson, K.V., J.S. Canaca, and J.T. Driscoll. 2005. Arizona bald eagle management program 2005 summary report. Nongame and Endangered Wildlife Program Technical Report 237. Arizona Game and Fish Department, Phoenix, Arizona.

Jacobson, K.V., K.M. McCarty, and J.T. Driscoll. 2006. Arizona bald eagle management program 2006 summary report. Nongame and Endangered Wildlife Program Technical Report 239. Arizona Game and Fish Department, Phoenix, Arizona.

Jacobson, K.V., K.M. McCarty, and J.T. Driscoll. 2007. Arizona bald eagle management program 2007 summary report. Nongame and Endangered Wildlife Program Technical Report 250. Arizona Game and Fish Department, Phoenix, Arizona.

Koloszar, J.G. and J.T. Driscoll. 2001a. Arizona bald eagle 1999 – 2000 nest survey. Nongame and Endangered Wildlife Program Technical Report 182. Arizona Game and Fish Department, Phoenix, Arizona.

Koloszar, J.G. and J.T. Driscoll. 2001b. Arizona bald eagle 2001 nest survey. Nongame and Endangered Wildlife Program Technical Report 189. Arizona Game and Fish Department, Phoenix, Arizona.

Koloszar J.G., K.V. Jacobson, J.S. Canaca and J.T. Driscoll. 2002. Arizona bald eagle 2002 nest survey. Nongame and Endangered Wildlife Program Technical Report 206. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., and K.V. Jacobson. 2008. Arizona bald eagle management program 2008 summary report. Nongame and Endangered Wildlife Program Technical Report 252. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., and K.V. Jacobson. 2009. Arizona bald eagle management program 2009 summary report. Nongame and Endangered Wildlife Program Technical Report 260. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., and K.V. Jacobson. 2010. Arizona bald eagle management program 2010 summary report. Nongame and Endangered Wildlife Program Technical Report 261. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., and K.V. Jacobson. 2011. Arizona bald eagle management program 2011 summary report. Nongame and Endangered Wildlife Program Technical Report 266. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., and K.V. Jacobson. 2012. Arizona bald eagle management program 2012 summary report. Nongame and Endangered Wildlife Program Technical Report 270. Arizona Game and Fish Department, Phoenix, Arizona.

McCarty, K.M., K.L. Licence, and K.V. Jacobson. 2013. Arizona bald eagle management program 2013 summary report. Nongame and Endangered Wildlife Program Technical Report 276. Arizona Game and Fish Department, Phoenix, Arizona.

Millsap, B.A. 1986. Status of wintering bald eagles in the coterminous 48 states. Wildlife Society Bulletin 14:433-440.

Postupalsky, S. 1974. Raptor reproductive success: some problems with methods, criteria, and terminology. *In* F.N. Hammerstrom, B.E. Harrell and R.R. Olendorff, Eds. Management of raptors. Proceedings of the conference on raptor conservation techniques. Raptor Research Report 2:21-31.

Postupalsky, S. 1983. Techniques and terminology for surveys of nesting bald eagles. Appendix D *in* J.W. Grier and others, eds. Northern States bald eagle recovery plan. U.S. Dept. Inter., U.S. Fish and Wildlife Service, Twin Cities, Minn.

Rubink, D.M. and K. Podborny. 1976. The southern bald eagle in Arizona: a status report. U.S. Fish and Wildlife Service Endangered Species Report 1. Albuquerque, New Mexico.

Salt River Project. 2010. Bald Eagle Nesting Areas: Arizona. Tempe, Arizona.

Stalmaster, M.V. 1987. *The bald eagle*. Universe Books, New York, New York.

Steenhof, K. and M.N. Kochert. 1982. An evaluation of methods used to estimate raptor nesting success. Journal of Raptor Management. 46:885-893.

Steenhof, K., L. Bond, K.K. Bates, and L.L. Leppert. 2002. Trends in midwinter counts of bald eagles in the contiguous United States, 1986-2000. Bird Populations 6:21-32. Available online at http://gis.nacse.org/eagles/ (accessed December 3, 2015).

Steenhof, K., L. Bond, and L. L. Dunn. 2008. The midwinter bald eagle survey results and analysis 1986-2005. U.S. Geological Survey, National Biological Information Infrastructure, and Northwest Alliance for Computational Science and Engineering. Available online at http://www.nacse.org/nbii/eagles (accessed December 3, 2015).

Todd, R.L. 1981. Multi-agency findings on the distribution of bald eagles for Arizona in the January months of 1979, 1980, 1981. Arizona Game and Fish Department, Phoenix, Arizona.

U.S. Fish and Wildlife Service. 1982. Bald eagle recovery plan (southwestern population). U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 1995. Endangered and threatened species: bald eagle reclassification; final rule. Federal Register. 60(133):36000-10. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2007a. Endangered and threatened wildlife and plants; removing the bald eagle in the lower 48 states from the list of endangered and threatened wildlife; final rule. Federal Register. 72(130):37346-37372. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2007b. Protection of eagles; definition of “disturb”. Final rule. Federal Register. 72(107):31132-31140. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; listing the potential Sonoran Desert bald eagle distinct population segment as threatened under the endangered species act; final rule. Federal Register. 73(85):23966-23970. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2009. Eagle permits; take necessary to protect interests in particular localities; final rule. Federal Register. 74(175):46836-46879. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; 12-month finding on a petition to list the Sonoran Desert population of the bald eagle as a threatened or endangered distinct population segment. Federal Register. 75(37):8601-8621. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants; bald eagles nesting in Sonoran Desert Area of central Arizona removed from the list of endangered and threatened wildlife. Federal Register. 76(171):54711-54713. Department of the Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; 12-month finding on a petition to list the Sonoran Desert Area bald eagle as threatened or endangered. Federal Register. 77(84):25792-25828. Department of the Interior, Washington, D.C.

APPENDIX A: 2015 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 9. 2015 Arizona bald eagle winter count volunteer survey results (continued next page).

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Apache County						
1	Becker Lake	Not surveyed.				
2	Little Colorado River (LCR)	Not surveyed.				
3	S. Fork LCR – Campground	Not surveyed.				
4	Casa Malapais – LCR	Not surveyed.				
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	Not surveyed.				
6	Sponseller Lake	20	0	0	0	0
7	Mexican Hay Lake	15	0	0	0	0
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	45	0	0	0	0
9	The Ranch Lake	30	0	0	0	0
10	Ortega Lake	45	0	0	0	0
11	Concho Lake	45	2	0	0	0
12	Luna Lake	180	2	1	4	0
13	Nelson Reservoir	60	3	0	0	0
14	Nutrioso Reservoir	60	0	0	0	0
16	San Francisco River (Luna Lake to New Mexico line)	180	2	0	0	0
Total		**680**	**9**	**1**	**4**	**0**
Cochise County						
18	Parker Canyon Lake	30	0	0	0	0
19	Willcox Playa	180	0	1	0	0
Total		**210**	**0**	**1**	**0**	**0**
Coconino County						
21	Long Lake Complex	90	0	1	0	0
22	Stoneman Lake	180	3	1	0	0
23	FH-3	46	0	0	0	0
24	I-17, Section to Flagstaff	233	10	2	0	0
25	Bellemont	325	0	0	0	0
26	Townsend/Winona A/B	402	2	0	0	0
27	HWY 89 North /Sunset Crater – Wupatki	305	2	1	0	1
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	478	6	1	0	0
29	Continental Country Club Lakes	185	3	0	0	0
30	Chevelon Canyon Lake	300	1	0	0	0
32	Spring Valley Wash	180	0	0	0	0
33	Red Lake Valley	30	0	0	0	0
34	Kaibab Lake	45	0	0	0	0
35	Pittman Valley	60	1	1	0	0
36	Davenport Lake	40	0	1	0	0
37	Scholz Lake	140	0	0	0	0
38	Cataract Lake	45	0	0	0	0
39	Willow Springs Lake	110	0	1	0	0

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
40	West Chevelon Canyon	80	0	0	0	0
41	Willow Creek	Not surveyed.				
42	White Horse Lake – Pomeroy Tanks	75	0	0	0	0
43	JD Dam Lake	60	0	0	0	0
45	Steel/Stone Road	139	0	0	0	0
48	Blue Stem Wash-Babbit property	90	1	0	0	0
49	Glen Canyon Nat'l Rec. Area (Lake Powell to Lee's Ferry)	80	2	2	0	0
118	Bill Williams Loop Road	123	2	2	0	1
119	Johnson Canyon	70	1	0	0	0
120	Highway 64 east	30	0	0	0	0
121	Highway 64	18	0	0	0	0
122	Camp Navajo	148	0	1	0	0
123	Partridge Creek[1]	172	0	0	0	4
124	Odell Lake	80	1	0	0	0
125	Highway 87 north	90	1	0	0	0
126	Highway 180	185	0	0	0	0
Total		**4,634**	**36**	**14**	**0**	**6**
Graham County						
51	Point of Pines Lake area	Not surveyed.				
Mohave County						
57	Alamo Lake	144	4	0	0	0
Total		**144**	**4**	**0**	**0**	**0**
Navajo County						
58	Lake of the Woods	45	2	0	0	0
59	Rainbow Lake	35	4	3	0	0
61	Whipple Lake	30	0	0	0	0
62	Long Lake	45	0	0	0	0
63	Lone Pine Dam	47	0	0	0	0
64	Schoens Reservoir	52	0	0	0	0
65	White Mountain Lake	112	2	1	0	0
67	Jacques Marsh	30	1	1	0	0
68	Scott's Reservoir	60	1	1	0	0
69	Show Low Lake	75	2	0	0	0
70	Pintail Lake	23	2	0	0	0
71	Telephone Lake	12	1	4	0	0
72	Fool Hollow Lake	120	3	2	0	0
75	Cottonwood Wash/ Clay Springs	24	0	0	0	0
76	White Lake	10	0	0	0	0
127	Mortenson Wash	47	0	0	0	0
Total		**767**	**18**	**12**	**0**	**0**
Santa Cruz County						
82	Pena Blanca Lake	60	0	0	0	0
Total		**60**	**0**	**0**	**0**	**0**
Yavapai County						
83	Wet Beaver Creek	465	0	0	0	0
84	Oak Creek	Not surveyed.				

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
85	Willow Lake	240	0	0	0	0
86	Lynx Lake	255	2	0	0	0
87	Watson Lake	240	0	0	0	0
88	Goldwater Lake	250	1	3	0	0
Total		**1,450**	**3**	**3**	**0**	**0**
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	360	4	2	0	0
Total		**360**	**4**	**2**	**0**	**0**

Table 10. 2015 Arizona bald eagle winter count helicopter survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
90	Verde River	175	13	4	0	0
91	Lower East Verde River	7	0	0	0	0
92	Lower West Clear Creek	15	0	0	0	0
93	Lower Salt River	92	22	3	0	0
94	Upper Salt River	57	5	1	0	0
95	Lower Tonto Creek	22	3	1	0	0
97	Lower Canyon Creek	5	0	0	0	0
98	Lower Cibecue Creek	12	0	0	0	0
100	White River	17	1	0	0	0
101	North Fork White River	49	4	6	0	0
102	Lower Black River	30	7	2	0	0
103	Big and Little Bonito Creeks	Not surveyed.				
104	San Carlos River–Talkalai Lake	14	1	0	0	0
105	San Carlos Reservoir	14	4	3	0	0
106	Upper and Lower Gila River	41	1	0	0	0
107	Eagle Creek	40	2	0	0	0
108	Bonita Creek	13	0	0	0	0
109	Lower San Francisco River	20	1	0	0	0
110	Blue River	12	0	0	0	0
111	Sunrise Lake	1	0	0	0	0
112	Big Lake	2	0	0	0	0
114	Crescent Lake	1	0	0	0	0
115	Lake Pleasant	24	0	0	0	0
116	Del Rio Ponds	1	2	0	0	0
117	Tres Rios	20	1	0	0	0
Total		**684**	**67**	**20**	**0**	**0**

Table 11. 2015 Arizona bald eagle winter count non-standardized survey route results.						
Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Highway 260 and F.R. 618 (976)	Yavapai	230	0	0	0	0
Blue Ridge Reservoir (977)	Coconino	70	0	0	0	0
Kachina Wetlands (986)	Coconino	42	0	0	0	0
Clint's Well (991)	Coconino, Yavapai	117	2	1	0	0
Total		**459**	**2**	**1**	**0**	**0**

APPENDIX B: TERMINOLOGY AND RAPTOR REPRODUCTIVE STATUS CRITERIA

Breeding Area (BA): An area containing one or more nests within the range of a mated pair of birds displaying occupancy as described below. Operationally, once a BA is established, we consider it a BA whether it is occupied by bald eagles in a given year or not, until or unless it is designated historical (i.e., ten consecutive years unoccupied).

Historic BA: A BA that has remained unoccupied for ten consecutive years. This term also applies to BAs identified before the 1970s.

Occupied BA: An area with at least one nest structure where at least one of the following activity patterns was observed during the breeding season:

a. Young were raised.
b. Eggs were laid.
c. One adult sitting low in a nest, presumably incubating.
d. Two adults present on or near the nest.
e. One adult and 1 bird in immature plumage at or near a nest, if mating behavior was observed (display flight, nest repair, coition).

Active Nest: One in which eggs have been laid. Activity patterns (a), (b), and (c) above are diagnostic of an active nest.

Unoccupied BA/Nest: A nest or group of nests at which none of the activity patterns diagnostic of occupancy were observed in a given breeding season. BAs must exist as occupied before they can be recognized and classified as unoccupied.

Successful BA/Nest: An active nest from which at least one young fledged during the breeding season under consideration. Nests were successful if at least one young was raised past 80% of fledging age.

Failed BA/Nest: An active nest from which no young fledged regardless of cause.

Productivity: The number of young fledged per occupied BA.

Reoccupied Historic BA: A Historic BA which shows signs indicative of being occupied.

Pioneer Effort: The occupancy of a new BA, in previously undocumented breeding habitat, where there is no evidence of prior activity. These occur in areas monitored by the ORA flights before discovery due to: 1) the presence of a large nest built by another or unknown species, or 2) the observed suitability of the habitat.

Previously Existing BA: A new BA that shows signs of prior occupancy (e.g. multiple large nests) and/or signs of prior activity (e.g. prey remains below an existing nest) upon discovery.

APPENDIX C: 2015 ARIZONA BALD EAGLE PRODUCTIVITY

Table 12. Arizona bald eagle breeding area productivity summary, 2015 (continued next page).

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Alamo	S	4	1/8-2/2	2	2/2-3-9	2	2	>4/29
Armer Gulch	S	1	1/15-1/24	2	3/31-4/16	2	2	>6/16
Bachelor Cove	S	1	<1/6	2	2/3-2/12	2	2	>5/1
Bagley	F	2	<1/6	1	Failed during incubation by 4/16.			
Bartlett	O	Two adults seen in area.						
Beaver	S	1	1/5-2/2	2	2/2-3/26	1	1	>5/11
Becker	F	1	<3/18	1	Failed during incubation.			
Bill Williams	U							
Blue Point	--	Overtaken by Bagley Pair.						
Box Bar*	S	5	1/8-1/22	2	2/13-2/15	2	2	5/3, >5/3
Black Cross	F	1	2/3-3/18	1	3/18-4/16	1	Failed by 6/26.	
Buckeye	S	1	<3/21	2	<3/21	2	2	>4/29
Bulldog	U	Adult bald eagle found dead at Saguaro Lake 2/7, unknown if one of this pair.						
Burro Creek	U	No nests or eagles seen.						
Campaign Bay	U	No nests or eagles seen.						
Canyon de Chelly	S	2	<4/6	2	<4/6	2	2	6/19, >6/19
Cedar Basin	U	All known nests empty. One adult seen 1.5 miles upstream.						
Chevelon	S	4	<5/11	1	<5/11	1	1	>7/1
Cibecue	O	Adult seen standing in nest #2. Second adult in area.						
Cliff*	F	8	1/5-2/2	1	2/28-3/1	1	Failed by 3/26.	
			Nest fell by 3/26 with one 3 week old nestling.					
Coldwater	U	All known nests empty. No eagles.						
Coolidge	U	One adult in area, no new nests.						
Crescent*	S	1	2/11-3/18	2		2	2	7/10, >7/10
Doka*	S	3	<2/20	2	2/20-4/6	2	1	>6/10
East Verde	S	6	1/5-2/2	1	2/2-3/17	1	1	>5/11
Elaine	S	1	<6/9	1	6/9	1	1	>6/10
Fish Creek	S	1	1/6-2/3	2	2/3-3/18	2	2	>5/11
Fort McDowell*	S	15	<1/5	2	1/5-2/2	2	2	3/24, 3/30-4/2
Gilbert	U	No nests or eagles seen.						
Goldfield*	S	4	11/26-1/7	1	2/6-2/9	1	1	>5/2
Granite Basin	U	One adult seen standing in nest #2 on 1/6.						
Granite Reef*	S	6	1/6-2/2	2	2/15-3/2	2	2	5/10-5/11
Greer Lakes	F	6	<5/19	1	<5/19	1	10.5 week nestling missing 6/18.	
Horse Mesa	S	4	1/6-2/3	2	2/3-3/18	2	2	4/16-5/11
Horseshoe	U	One adult perched at Chalk Mountain on 1/5. Golden eagle incubating nest #15.						
Ive's Wash	S	3	1/8-2/2	3	2/2-3/9	3	3	>5/15
Kerr*	S	1	1/21-2/9	2	3/11	2	2	5/24, 5/28
Ladders	O	Two adults standing in nest #3 on 2/2.						

[1]Breeding area status codes (Postupalsky 1974): U=unoccupied, O=occupied, S=successful, F=failed.

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997, 1998, 1999; Jacobson and others 2004, 2005, 2006, 2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013.

[3]Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 12 continued.

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Lone Pine	S	2	<1/16	1	2/3-3/18	1	1	>4/16
Lower Lake Mary	S	3	<3/30	3	3/30-4/27	3	3	6/11-6/24, >6/24
Luna*	F	1	<2/7	1	3/12	1	Failed 4/11 predation.	
Lynx	S	3	2/2-3/17	1	3/17-4/15	1	1	>5/22
Mohave	U	All known nests empty. No eagles.						
Needle Rock	U	Box Bar pair has encroached on area. No other pairs or nests are known.						
Nevada Bay	F	3	<3/9	1	<3/9	1	Failed by 4/1.	
Oak Creek	F	4	1/22-1/23	1	Failed by 4/5 during incubation.			
Orme*	F	9	2/24-2/27	2	4/8	1	Failed by 6/19 due to heat.	
Pee Posh Wetlands	S	5	<12/22	2	1/5-2/2	2	2	4/7, 4/14
Perkinsville	S	4	2/2-3/17	1	3/17-4/15	1	1	>5/11
Pinal	U	All known nests empty. No eagles.						
Pinto*	S	9	1/14-1/29	2	1/29-3/11	1	1	>5/11
Pleasant*	F	3	1/5-1/23	1	Failed 3/19 during incubation.			
Redmond	F	4	2/3-3/18	1	Failed by 4/16 during incubation.			
Riverside	S	1	<1/6	2	1/6-2/2	2	2	3/30-4/6
Rock Creek	U	All known nests empty. No eagles.						
Rodeo*	F	4	1/5-1/20	1	2/20-3/1	1	Failed by 4/23.	
Saguaro	S	1	1/6-2/3	3	2/3-3/19	3	3	>5/11
San Carlos	U	New large nest (#7) found, but no eagles seen.						
76	S	7	2/3-2/10	2	3/19-4/16	2	2	5/31, >5/31
Sheep	S	7	1/6-2/3	1	2/3-3/19	1	1	5/11-6/17
Sheep Creek	S	1	1/5-2/2	2	2/2-3/17	2	2	>5/11
Show Low Lake	S	1	2/14-2/18	1	3/18-4/16	1	1	6/11-6/28
Silver Creek	S	2	2/4-2/12	1	2/12-3/31	1	1	>5/18
Suicide	S	2	1/6-2/3	3	2/3-3/18	3	3	>4/23
Sullivan Lake	F	2	1/11-1/15	1	Failed by 3/26. Eggs failed to hatch.			
Sycamore*	F	6	1/21-2/2	1	Failed by 3/29 during incubation.			
Table Mountain	F	4	2/2-3/17	1	3/17-4/15	1	Failed by 5/11.	
Talkalai	S	8	<1/6	2	2/3-3/18	2	1	>4/23
Tapco*	F	4	1/21-2/2	1	Failed by 3/29. Eggs failed to hatch.			
Tonto*	S	5	<1/6	1	1/6-2/7	1	1	4/22-4/26
Tortilla Creek	S	1	1/6-2/3	3	2/3-3/18	2	2	>5/11
Tower	U	All known nests empty. No eagles.						
Whiskey Spring*	S	1	1/5-2/6	2	3/8-3/10	2	2	>5/24
White Horse*	S	1	<3/30	1	4/27-5/11	1	1	6/30
Woods Canyon*	S	1	<4/10	2	4/17	2	2	7/7, 7/8
Yellow Cliffs	F	1	2/2-3/17	1	Failed by 4/15 during incubation.			

[1]Breeding area status codes (Postupalsky 1974): U=unoccupied, O=occupied, S=successful, F=failed.

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997, 1998, 1999; Jacobson and others 2004, 2005, 2006, 2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013, 2014.

[3]Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

APPENDIX D: NEST SURVEY RESULTS

Table 13. Results of the 2015 bald eagle winter count, ORA, and nest survey flights (continued next page).

Location	Time	Comments
January 5, 2015		
Orme BA	0803	All known nests empty. No eagles.
Rodeo BA	0809	All known nests empty. One adult perched.
Sycamore BA	0812	One adult perched. Nest #5 fallen.
Doka BA	0820	All known nests empty. One adult perched.
Fort McDowell BA	0821	Adult incubating in nest #15. Nest #18 fallen.
Box Bar BA	0826	One adult bald eagle flushed from new tree nest #5. Nest #4 fallen.
Needle Rock BA	0826	No nests or eagles.
Bartlett BA	0834	All known nests empty. No eagles.
Yellow Cliffs BA	0850	All known nests empty. Two adults perched at lake.
Sheep Creek	0854	One adult perched.
Cliff BA	0858	All known nests empty. One adult perched.
Horseshoe BA	0911	All known nests empty. One adult perched at Chalk Mountain.
Table Mountain BA	0932	All known nests empty. One adult flushed from nest #4.
East Verde River	0945	No nests or eagles.
East Verde BA	0955	All known nests empty. No eagles.
Coldwater BA	1002	All known nests empty. No eagles.
Ladders BA	1008	All known nests empty. No eagles.
West Clear Creek	1013	No nests or eagles.
Beaver BA	1229	All known nests empty. Pair of adults perched.
Oak Creek BA	1239	All known nests empty. No eagles.
Tapco BA	1251	All known nests empty. No eagles.
Tower BA	1255	All known nests empty. No eagles.
Mormon Pocket nest site	1302	All known nests empty. No eagles.
Perkinsville BA	1304	All known nests empty. No eagles.
Hell Point historic BA	1314	All known nests empty. No eagles.
Granite nest site	1322	All known nests empty. No eagles.
Sullivan Lake BA	1328	All known nests empty. Pair of adults perched.
Lynx BA	1405	All known nests empty. No eagles.
Pleasant BA	1433	All known nests empty. No eagles.
Whiskey Spring BA	1435	All known nests empty. No eagles.
Pee Posh Wetlands BA	1527	Adult incubating in new snag nest #5.
January 6, 2015		
Riverside BA	0735	Adult incubating in nest #1. Second adult perched.
Granite Reef BA	0740	Adult standing in new tree nest #6. Second adult perched.
Orme BA	0744	All known nests empty. Pair of adults perched.
Goldfield BA	0747	Adult incubating in new tree nest #4. Three other adults perched.
Bulldog BA	0754	All known nests empty. One adult standing in nest #2.
Bagley & Blue Point BAs	0800	Adult incubating in Bagley nest #2. Second adult at lake.
Saguaro BA	0804	All known nests empty. No eagles.
Tortilla BA	0807	All known nests empty. One adult perched.
Fish Creek BA	0816	One adult sitting in nest #1 (incubation not confirmed). Second adult perched.
Horse Mesa BA	0821	All known nests empty. No eagles.
Two Bar nest site	0828	All known nests empty. No eagles.
Bachelor Cove BA	0833	One egg in nest #1. No eagles.

Table 13 continued.

Location	Time	Comments
Tonto BA	0837	Adult incubating in nest #5.
Sheep BA	0845	All known nests empty. One adult perched.
76 BA	0853	New tree nest #6 found. One adult perched.
Armer Gulch BA	1036	All known nests empty. Pair of adults perched.
Pinto BA	1041	Pair of adults perched at new snag nest #9.
Pinal BA	1047	All known nests empty. No eagles.
Redmond BA	1053	All known nests empty. One adult flying.
Jumpoff Canyon nest site	1059	All known nests empty. Pair of golden eagles flying.
Canyon historic BA	1107	All known nests empty. No eagles.
Campaign Bay BA	1124	No nests or eagles.
Talkalai BA	1221	Adult standing in nest #8 with at least one egg.
San Carlos BA	1230	No nests or eagles.
Suicide BA	1241	All known nests empty. Pair of adults perched.
Coolidge BA	1255	No nests or eagles.
Porphyry nest site	1259	All known nests empty. No eagles.
Granite Basin BA	1301	Adult standing in nest #2.
Winkelman historic BA	1310	No nests or eagles.
January 15, 2015		
Willow nest site	--	Not surveyed.
Eagle nest site	--	Not surveyed.
January 16, 2015		
Crescent BA	1001	All known nests empty. No eagles.
Cibecue BA	1300	One adult standing in nest #2. Second adult perched.
Mule Hoof historic BA	1312	All known nests empty. No eagles.
Cedar Basin BA	1329	All known nests empty. One adult upstream.
Lone Pine BA	1335	Adult incubating in nest #2.
Show Low Lake BA	1409	All known nests empty. No eagles.
Pineasco Creek nest site	1512	New large nest (#1) found in sycamore tree. No eagles.
George's Basin nest site	1521	All known nests empty. No eagles.
February 2, 2015		
Riverside BA	0705	At least one nestling, 2.5-3 weeks old. Both adults perched.
Granite Reef BA	0735	Adult incubating in new tree nest #6.
Orme BA	0736	All known nests empty. No eagles.
Rodeo BA	0738	Adult incubating in nest #4.
Sycamore BA	0742	Adult incubating in new tree nest #6.
Doka BA	0743	All known nests empty. No eagles. Nest #7 fallen.
Fort McDowell BA	0744	At least one nestling, 2-3 weeks old.
Box Bar BA	0748	Adult incubating in new tree nest #5. One adult perched on Needle Rock (probably second Box Bar adult).
Needle Rock BA	0748	No nests or eagles
Bartlett BA	0750	All known nests empty. No eagles.
Yellow Cliffs BA	0757	All known nests empty. No eagles.
Sheep Creek BA	0802	Adult incubating in new cliff nest #1.
Cliff BA	0803	Adult incubating in new tree nest #8.
Horseshoe BA	0810	All known nests empty. No eagles.
Table Mountain BA	0825	All known nests empty. No eagles.
East Verde BA	0832	Adult incubating in nest #6.
Coldwater BA	0834	All known nests empty. No eagles.
Ladders BA	0843	Pair of adults standing in nest #3.

Table 13 continued.

Location	Time	Comments
Beaver BA	0850	Adult incubating in nest #1.
Oak Creek BA	0855	Adult incubating in nest #4.
Hidden Valley nest site	0910	All known nests empty. No eagles.
Tapco BA	0916	Adult incubating in new tree nest #4.
Tower BA	0921	All known nests empty. No eagles.
Mormon Pocket nest site	0928	All known nests empty. No eagles.
Perkinsville BA	0932	All known nests empty. No eagles.
Hell Point historic BA	0938	New cliff nest #6 found. Two immature and one adult bald eagle in area.
Muldoon nest site	0945	Three adults. No nests.
Granite nest site	0949	All known nests empty. One golden eagle perched.
Sullivan Lake BA	0952	Adult incubating in nest #2. Second adult perched.
Watson Lake nest site	1125	All known nests empty. No eagles.
Lynx BA	1132	One adult standing in nest #3.
Alamo BA	1200	Adult incubating in nest #4.
Ive's Wash BA	1206	Adult incubating in nest #3.
Pleasant BA	1240	Adult incubating in nest #3
Whiskey Spring BA	1241	One adult standing in nest #1.
Pee Posh Wetlands BA	1302	Adult incubating or brooding.
February 3, 2015		
Granite Reef BA	0750	Adult incubating.
Orme BA	0752	All known nests empty. One adult perched.
Goldfield BA	0757	Adult incubating.
Kerr BA	0757	Pair of adults perched at new tree nest #1.
Bulldog BA	0803	All known nests empty. No eagles.
Bagley BA	0805	Adult incubating.
Saguaro BA	0809	Adult incubating in nest #1.
Tortilla Creek BA	0811	Adult incubating in nest #1.
Black Cross	0813	One adult standing by new pinnacle nest #1.
Fish Creek BA	0818	Adult incubating in nest #1.
Horse Mesa BA	0821	Adult incubating in nest #4.
Two Bar nest site	0826	One adult standing in nest #3.
Bachelor Cove BA	0832	Adult incubating.
Tonto BA	0835	Adult incubating or brooding.
Sheep BA	0841	Adult incubating in platform nest #7.
76 BA	0850	All known nests empty. Pair of adults upstream.
Armer Gulch BA	0908	All known nests empty. No eagles.
Campaign Bay BA	0910	No nests or eagles.
Pinto BA	0914	Adult incubating in new nest #9. Second adult perched in nest.
Pinal BA	0920	All known nests empty. No eagles.
Redmond BA	0926	One adult perched at nest #5.
Cibecue BA	1058	All known nests empty. No eagles.
Mule Hoof historic BA	1114	All known nests empty. No eagles.
Cedar Basin BA	1125	All known nests empty. One adult on Carrizo Creek.
Lone Pine BA	1135	Adult incubating.
Pineasco Creek nest site	1140	All known nests empty. One adult perched.
George's Basin nest site	1145	All known nests empty. No eagles.
Silver Creek BA	1218	All known nests empty. One adult perched.
Show Low Lake BA	1230	All known nests empty. No eagles. New tree nest #2.

Table 13 continued.

Location	Time	Comments
Talkalai BA	1354	Adult incubating or brooding.
San Carlos BA	1404	New large nest #7 in tree. No eagles.
Suicide BA	1413	Adult incubating in nest #2.
Coolidge BA	1416	No nests or eagles.
Granite Basin BA	1424	All known nests empty. No eagles.
March 9, 2015		
Pleasant BA	0745	Adult incubating or brooding.
Alamo BA	0830	Adult with two nestlings, 2.5-3 weeks.
Ive's Wash BA	0836	Adult in nest appeared to be brooding hatchling(s).
Bill Williams BA	0906	All known nests empty. No eagles. New cliff nest #2 found.
Gene Wash nest site	0915	At least three large nests on same cliff face, empty. No eagles.
Copper Basin BA	0920	All known nests empty. No eagles. New cliff nest #3 found.
Mohave BA	1010	All known nests empty. No eagles.
Nevada Bay BA	1115	Adult in nest appeared to be brooding hatchling(s). Second adult perched.
Black Canyon BA	1135	Adult in nest appeared to be brooding, not confirmed.
Trout Creek	1424	Medium to large tree nest by creek. One adult and one immature bald eagle perched.
March 17, 2015		
Riverside BA	0717	Two nestlings, 8 weeks old.
Granite Reef BA	0723	Two nestlings, 3-4 weeks old.
Orme BA	0724	Adult incubating in new tree nest #9.
Rodeo BA	0725	At least one nestling, 3-4 weeks old. One adult perched.
Sycamore BA	0730	Nest obstructed by leaf-out, status not confirmed. One adult flew to nest, second adult perched.
Doka BA	0735	All known nests empty. No eagles.
Fort McDowell BA	0738	Two nestlings, 8 weeks old. One adult perched.
Box Bar BA	0741	Two nestlings, 5 weeks old. Pair of adults perched.
Bartlett BA	0743	All known nests empty. No eagles.
Yellow Cliffs BA	0748	Adult incubating in nest #1.
Sheep Creek BA	0750	Adult in nest appeared to be brooding nestling(s).
Cliff BA	0754	One nestling, 2 weeks old.
Horseshoe BA	0757	Two unattended eggs in new nest #15. No eagles.
Table Mountain BA	0806	Adult incubating in nest #4. Second adult in nest.
East Verde BA	0812	One nestling, 2 weeks old.
Coldwater BA	0819	All known nests empty. No eagles.
Ladders BA	0825	All known nests empty. No eagles.
Beaver BA	0910	Adult incubating or brooding. Second adult perched, flushed.
Oak Creek BA	0915	Adult incubating. Second adult perched.
Tapco BA	0920	Adult incubating.
Tower BA	0922	All known nests empty. No eagles.
Mormon Pocket nest site	0926	All known nests empty. No eagles.
Perkinsville BA	0927	Adult incubating in nest #4.
Hell Point historic BA	0938	All known nests empty. No eagles.
Muldoon nest site	0940	No nests or eagles.
Granite nest site	0945	All known nests empty. No eagles.
Sullivan Lake BA	0946	Adult incubating.
Watson Lake nest site	1138	All known nests empty. No eagles.
Lynx BA	1142	Adult incubating in nest #3.

Table 13 continued.

Location	Time	Comments
Goldwater Lake	1149	One adult perched. No nests.
Devil's Post historic BA	1209	All known nests empty. No eagles.
Burro Creek BA	1225	No nests or eagles.
Alamo BA	1240	Adult shading two nestlings, 3-3.5 weeks old.
Ive's Wash BA	1242	Adult shading at least one nestling, two weeks old.
Pleasant BA	1316	Adult incubating.
Whiskey Spring BA	1320	Adult in nest appeared to be brooding nestling(s).
March 18, 2015		
Goldfield BA	0747	One nestling, 5 weeks old.
Kerr BA	0751	At least one nestling, 1-2 weeks old. One adult perched.
Bulldog BA	0755	All known nests empty. No eagles.
Bagley BA	0800	Adult still incubating.
Saguaro BA	0803	Adult in nest appeared to be brooding nestling(s).
Tortilla Creek BA	0809	Adult with two nestlings, 2 weeks old. Second adult perched.
Black Cross BA	0811	Adult incubating in nest #1.
Fish Creek BA	0815	Two nestlings, 2-2.5 weeks old.
Horse Mesa BA	0819	Adult with two nestlings, 4.5-5 weeks old.
Rock Creek BA	0826	All known nests empty. No eagles.
Bachelor Cove BA	0832	One nestling, 5.5-6 weeks old.
Two Bar nest site	0835	All known nests empty. No eagles.
Armer Gulch BA	0845	Adult incubating in nest #1.
Campaign Bay BA	0848	No nests or eagles.
Pinto BA	0852	Adult with one nestling, 1-2 weeks old. One unhatched egg in nest.
Pinal BA	0855	All known nests empty. No eagles.
Redmond BA	0904	Adult incubating in nest #5.
Hess Canyon nest site	0911	Golden eagle incubating in new cliff nest #2.
Cibecue BA	1042	All known nests empty. New cliff nests #9 and #10 found. Pair of adults.
Mule Hoof historic BA	1053	All known nests empty. No eagles.
Cedar Basin BA	1108	All known nests empty. One adult perched upstream.
Lone Pine BA	1117	Two adults with one nestling, 3.5-4 weeks old.
Pineasco Creek nest site	1123	All known nests empty. No eagles.
George's Basin nest site	1128	All known nests empty. No eagles.
Crescent BA	1151	Adult incubating in nest #1.
Greer Lakes BA	1200	All known nests empty. No eagles.
Becker BA	1310	Adult incubating or brooding position in new tree nest #2.
Show Low Lake BA	1337	Adult incubating in nest #1.
Talkalai BA	1424	Adult brooding at least one small nestling.
San Carlos BA	1429	All known nests empty. No eagles.
Suicide BA	1440	Three nestlings, 3 weeks old.
Coolidge BA	1445	All known nests empty. One adult flying, perched, vocalized.
Needles Eye nest site	1453	All known nests empty. No eagles.
Granite Basin BA	1500	All known nests empty. One adult perched.
Winkelman historic BA	1510	No nests or eagles.
March 19, 2015		
Cliff BA	0942	At least one nestling, 2 weeks old. One adult perched.
Sheep Creek BA	0945	Adult brooding nestling(s).
Bartlett BA	0951	All known nests empty. One adult perched by nest #1. Second adult at lake.

Table 13 continued.

Location	Time	Comments
Fort McDowell BA	0959	Two nestlings, 8-9 weeks old. One adult perched.
Doka BA	1003	Adult incubating in nest #3. Second adult perched.
Sycamore BA	1004	Adult in nest appeared to be incubating. Second adult perched.
Rodeo BA	1009	Adult with at least one nestling.
Orme BA	1010	Adult incubating.
Goldfield BA	1014	One nestling, 5 weeks old.
Kerr BA	1014	At least one nestling, 1-2 weeks old.
Saguaro BA	1019	Three nestlings, 3 weeks old.
Tortilla Creek BA	1021	Adult with two nestlings, 2 weeks old.
Black Cross BA	1025	Adult incubating.
Fish Creek BA	1030	Two nestlings, 2-2.5 weeks old. One adult perched.
Horse Mesa BA	1036	Two nestlings, 4.5-5 weeks old. One adult perched.
Tonto BA	1044	One nestling, 6 weeks old. One adult perched.
Sheep BA	1048	Adult brooding at least one hatchling.
76 BA	1055	Adult incubating in nest #7.
Yellow Cliffs BA	1310	Adult incubating. Second adult perched.
April 15, 2015		
Whiskey Spring BA	0733	Adult with at least one nestling.
Alamo BA	0809	Two nestlings, 8 weeks old.
Ive's Wash BA	0816	Three nestlings, 5-5.5 weeks old.
Lynx BA	1152	Adult with one nestling, 4-4.5 weeks old.
Sullivan Lake BA	1205	Failed, one unhatched egg in nest. No eagles.
Granite nest site	1207	One golden eagle nestling, 3 weeks old, in new cliff nest #6.
Hell Point historic BA	1220	All known nests empty. No eagles.
Perkinsville BA	1224	Adult with one nestling, 3 weeks old.
Mormon pocket nest site	1229	All known nests empty. No eagles.
Tapco BA	1236	Adult incubating.
Oak Creek BA	1427	Nest empty, failed.
Beaver BA	1434	One nestling, 5-5.5 weeks old.
Coldwater BA	1440	All known nests empty. No eagles.
East Verde BA	1446	One nestling, 6 weeks old.
Table Mountain BA	1449	Adult in nest appeared to be shading a small nestling.
Horseshoe BA	1458	Golden eagle incubating in nest #15.
Cliff BA	1501	Nest #8 partially fallen. New snag nest #9 found.
Sheep Creek BA	1505	Two nestlings, 6 weeks old. Two adults flying.
Yellow Cliffs BA	1638	Nest empty, failed.
Bartlett BA	1643	All known nests empty. No eagles.
Box Bar BA	1645	Two nestlings, 8.5 weeks old.
Doka BA	1650	Two nestlings, 4 weeks old.
Sycamore BA	1655	All known nests empty. No eagles.
Rodeo BA	1657	Adult with one nestling, 7-8 weeks old.
Orme BA	1659	Adult with one nestling, 1-2 weeks old. One unhatched egg in nest.
Granite Reef BA	1659	Two nestlings, 7 weeks old. One adult perched, flushed.
April 16, 2015		
Kerr BA	0743	One nestling, 5-6 weeks old. One adult flying.
Goldfield BA	0743	One nestling, 9 weeks old.
Bagley BA	0750	Adult still incubating.
Saguaro BA	0754	Adult with three nestlings, 6-7 weeks old.
Tortilla Creek BA	0756	Two nestlings, 5-6 weeks old. One unhatched egg in nest.

Table 13 continued.

Location	Time	Comments
Black Cross BA	0758	Adult incubating or brooding.
Fish Creek BA	0802	Two nestlings, 6-6.5 weeks old.
Horse Mesa BA	0805	Two nestlings, 8.5-9 weeks old.
Bachelor Cove BA	0812	Two nestlings, 9.5-10 weeks old.
Tonto BA	0816	One nestling, 10 weeks old. Two adults perched.
Sheep BA	0819	One nestling, 5 weeks old.
76 BA	0829	Adult with two nestlings, 4-4.5 weeks old.
Armer Gulch BA	0845	Adult with one nestling, 2 weeks old.
Pinto BA	0849	Adult with one nestling, 5.5 weeks old.
Redmond BA	0855	Nest empty, failed.
Jumpoff Canyon nest site	0900	Adult golden eagle with one nestling, 1-2 weeks old.
Show Low Lake BA	0932	Adult with one nestling, 2 weeks old.
Horseshoe Cienega	1045	No nests found. Pair of adults.
Greer Lakes BA	1059	All known nests empty. No eagles.
Crescent BA	1114	Adult incubating.
Lone Pine BA	1141	One nestling, 7.5-8 weeks old. One adult flying.
Cedar Basin BA	1148	All known nests empty. No eagles.
Cibecue BA	1200	One adult perched at nest #9.
Talkalai BA	1410	One nestling, 6 weeks old.
San Carlos BA	1416	All known nests empty. No eagles.
Suicide BA	1424	Three nestlings, 7 weeks old.
Coolidge BA	1426	No nests or eagles.
Needles Eye nest site	1432	All known nests empty. No eagles.
Granite Basin BA	1433	All known nests empty. No eagles.
May 11, 2015		
Granite Reef BA	0740	One fledgling and one adult.
Orme BA	0741	One nestling, 4 weeks old.
Kerr BA	0745	Two nestlings, 8 weeks old.
Bagley BA	0751	Nest empty, failed.
Saguaro BA	0755	Three nestlings, 9-10 weeks old.
Tortilla Creek BA	0759	Two nestlings, 8-9 weeks old.
Black Cross BA	0802	One nestling, 3-4 weeks old.
Fish Creek BA	0804	Two nestlings, 9-10 weeks old.
Horse Mesa BA	0808	Nest empty. No eagles.
Pinto BA	0819	One nestling, 8.5 weeks old. One adult perched.
Armer Gulch BA	0826	Two nestlings, 4-5 weeks old. One adult perched, flushed.
Sheep BA	0837	One nestling, 8 weeks old.
76 BA	0845	Two nestlings, 7-7.5 weeks old. One adult flying.
Black Canyon Lake nest site	0910	Nest #1 fallen. No eagles.
Willow Springs Lake nest site	0915	Ospreys active in nests #1, 2, 4, 5, 6, and new nest #8.No eagles.
Woods Canyon BA	0930	Adult with at least one nestling, 2 weeks old, in new tree nest #8.
Bear Canyon Lake nest site	0934	Ospreys active in new nests #3 and #4. No eagles.
Knoll Lake nest site	0945	Nests #1, 2, 4 fallen. Osprey active in new nest #5. No eagles.
Chevelon Canyon	1145	Adult in nest #4 with one small nestling, 2 weeks old. Second adult seen.

Table 13 continued.

Location	Time	Comments
Blue Ridge Reservoir nest site	1115	Osprey active in nest #2. New large nest #6 found. No eagles.
Tremaine/Soldier Annex/ Long Lakes nest site	1200	All known nests empty. No eagles.
Kinnickinick Lake	1212	No nests or eagles.
Ashurst Lake	1216	No nests. One adult perched, flushed.
Lower Lake Mary BA	1232	Adult with two nestlings, 4 weeks old.
Scholtz Lake	1415	No nests or eagles.
Kaibab Lake nest site	1423	Ospreys active in nests #1-6 and new nest #7. No eagles.
Dogtown Lake nest site	1430	All known nests empty. Two immature bald eagles perched and two ospreys flying.
Sunflower Flat nest site	1435	Osprey active in nest #1. Nest #2 fallen.
JD Dam Lake nest site	1451	Osprey active in nest #1. Osprey flushed from nest #2. No eagles.
Perkinsville BA	1502	One nestling, 6 weeks old.
Beaver BA	1525	One nestling, 8 weeks old. One adult perched.
East Verde BA	1538	One nestling, 9-10 weeks old. One adult flying.
Table Mountain BA	1542	Nest empty, failed.
Sheep Creek BA	1556	Two nestlings, 9 weeks old. Two adults.
Box Bar BA	1605	One fledgling perched. Two adults.
Doka BA	1613	One nestling, 7 weeks old. Two adults perched.

APPENDIX E: BOX BAR BREEDING AREA SUMMARY

Table 14. Observed human activity and bald eagle behavior, Box Bar BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	86	7	--	2	--	--	1	96	28.6
Small plane	81	4	--	--	--	--	--	85	25.3
Helicopter	27	8	--	1	--	--	--	36	10.7
Horseback rider	32	--	1	1	--	--	--	34	10.1
Kayaker	20	--	--	1	--	--	--	21	6.3
Apache helicopter	10	2	1	--	--	--	--	13	3.9
Picnicker	7	--	--	--	--	--	--	7	2.1
Hunters	7	--	--	--	--	--	--	7	2.1
Fisherman	7	--	--	--	--	--	--	7	2.1
Birdwatcher	3	1	--	1	--	--	--	5	1.4
Swimmer	5	--	--	--	--	--	--	5	1.4
Driver	1	2	--	1	--	--	--	4	1.2
Sheriff helicopter	3	--	--	--	--	--	--	3	0.9
Gunshots	--	--	--	1	--	1	--	2	0.6
Camper	2	--	--	--	--	--	--	2	0.6
Mountain biker	2	--	--	--	--	--	--	2	0.6
Rafter	1	--	--	--	--	--	--	1	0.3
Jet	1	--	--	--	--	--	--	1	0.3
Nestwatcher	--	--	1	--	--	--	--	1	0.3
Photographer	1	--	--	--	--	--	--	1	0.3
Shooter	--	--	--	1	--	--	--	1	0.3
AGFD biologist	--	--	--	1	--	--	--	1	0.3
Construction	1	--	--	--	--	--	--	1	0.3
Total	297	24	3	10	--	1	1	336	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=bird not in area, U=unknown.

Table 15. Observed forage events and success, Box Bar BA, Arizona, 2015.				
Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	8	7-1	8	7-1
Female	--	--	--	--
Total	8	7-1	8	7-1

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U= Successful – Unsuccessful forage events.

Table 16. Observed prey types delivered to the nest, Box Bar BA, Arizona, 2015.							
Sex	Fish	Mammals	Birds	Reptiles	Unknown	Total	Percent
Male	80	10	3	1	10	104	84.6
Female	10	4	2	--	3	19	15.4
Total	90	14	5	1	13	123	
Percent	73.2	11.4	4.1	0.8	10.6		

Table 17. Observed prey species delivered to the nest, Box Bar BA, Arizona 2015.

Sex	Fish				Birds		Mammals			Reptiles	Total	Percent
	[1]TI	SU	BA	CP	AC	CO	RS	WS	GS	SN		
Male	10	4	2	2	--	1	4	1	--	1	25	
Female	1	--	2	--	1	--	2	1	1	--	8	
Total	11	4	4	2	1	1	6	2	1	1	33	
Percent	33.3	12.1	12.1	6.1	3.0	3.0	18.2	6.1	3.0	3.0		

[1]TI=tilapia, SU=sucker, BA=bass species, CP=carp, AC=American coot, CO=double-crested cormorant, RS=rabbit species, WS=waterfowl species, GS=gopher species, SN=snake species.

Table 18. Bald eagle habitat analysis at the Box Bar BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type	Land Type[5]
25.2	CM	Right	Yes	5	RU	MB
25.3	HS	Right	No	5	RU	GB
25.3	SO	Right	Partial	1	RU	SO
25.5	CL	Right	Partial	5	RU	MB
25.8	HS	Right	Partial	5	RU	MB
26.3	CL	Right	Partial	4	RU	MB
26.3	SO	Right	Partial	1	RI	SO
26.3	RW	Center	No	1	RI	GB
26.3	CM	Right	Yes	1	RU	SO
26.3	TX	Left	Partial	1	RI	TX
26.4	CM	Right	Yes	1	RI	CG
26.6	TX	Left	No	3	RU	TX
26.8	CM	Right	Partial	1	RI	CG
26.9	SG	Left	No	5	RU	TX
27.5	TX	Right	Partial	1	RU	TX
29.5	PT	Right	No	2	RI	CG
Golf Course	DM	Right	Partial	8	PN	GC

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood, large/20-30+ m, CM=cottonwood, medium/10-20 m, DM=deciduous, medium/10-20 m, HS=hard snag, PT=pinnacle top, RW=rock in water, SO=shore, TX=tamarisk.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PN=pond, RI=riffle, RU=run.
[6]CG=cottonwood grove, GB=gravel bar, GC=golf course, MB=mesquite bosque, SO=shore, TX=tamarisk thicket.

Table 19. Bald eagle habitat use at the Box Bar BA, Arizona, 2015.

River km[1]	PW[2,3]	PP	CL	PD	PH	PV	PG	PE	SS	OT	Total	Percent
25.2	7	0	0	0	0	0	0	0	0	0	7	0.04
25.3	141	0	0	0	0	0	9	0	0	0	150	0.89
25.5	5,026	285	106	0	0	24	0	36	0	4	5,481	32.6
25.8	8,166	1,226	19	96	0	68	0	0	0	0	9,575	56.9
26.3	1,148	153	0	0	0	8	27	0	13	35	1,384	8.2
26.4	19	0	0	0	0	0	0	0	0	0	19	0.11
26.6	0	0	0	15	0	0	0	0	0	0	15	0.10
26.8	0	0	0	0	6	0	0	0	0	0	6	0.04
26.9	53	0	0	0	0	0	0	0	0	0	53	0.31
27.5	29	0	0	0	0	0	0	0	0	0	29	0.17
29.5	0	0	0	0	24	0	0	0	0	0	24	0.14
GC[4]	17	0	0	0	71	0	0	0	3	0	91	0.54
Total	14,606	1,664	125	111	101	100	36	36	16	39	16,834	
Percent	86.8	9.9	0.7	0.7	0.6	0.6	0.2	0.2	0.1	0.2		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, CL=perched close to mate, PD=perched drying, PH=perched hunting, PV=perched vocalizing, PG=perched on ground, PE=perched eating, SS=standing on shore, OT=other (includes bathing, gathering nest material, drinking water, perched interaction).
[4]GC=Tonto Verde Golf Course.

APPENDIX F: CLIFF BREEDING AREA SUMMARY

Table 20. Observed human activity and bald eagle behavior, Cliff BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small plane	11	--	--	--	--	--	3	14	43.8
Helicopter	6	--	--	--	--	--	1	7	21.9
Military helicopter	1	--	--	--	--	--	1	2	6.3
Driver	2	--	--	--	--	--	--	2	6.3
Hiker	2	--	--	--	--	--	--	2	6.3
Hunter	1	--	--	--	--	--	--	1	3.1
Equestrian	1	--	--	--	--	--	--	1	3.1
OHV	1	--	--	--	--	--	--	1	3.1
Shooter	1	--	--	--	--	--	--	1	3.1
Military jet	--	1	--	--	--	--	--	1	3.1
Total	26	1	--	--	--	--	5	32	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=bird not in area, U=unknown.

Table 21. Observed forage events and success, Cliff BA, Arizona, 2015.								
Sex	Fish		Mammals		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	2	2-0	--	--	--	--	2	2-0
Female	--	--	1	1-0	--	--	1	1-0
Unknown	--	--	--	--	1	0-1	1	0-1
Total	2	2-0	1	1-0	1	0-1	4	3-1

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U= Successful – Unsuccessful forage events.

Table 22. Observed prey types delivered to the nest, Cliff BA, Arizona, 2015.						
Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	3	2	--	--	5	38.5
Female	1	1	--	1	3	23.1
Unknown	2	1	2	--	5	38.5
Total	6	4	2	1	13	
Percent	46.1	30.8	15.4	7.7		

Table 23. Observed prey species delivered to the nest, Cliff BA, Arizona, 2015.			
Sex	Fish	Total	Percent
	CC[1]		
Male	1	1	50.0
Female	--	--	--
Unknown	1	1	50.0
Total	2	2	
Percent	100		

[1]CC=channel catfish

Table 24. Bald eagle habitat analysis at the Cliff BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[5]
66.5a	CL	Right	Yes	5	PO	CW
66.5b	HS	Right	Partial	5	PO	UP
66.6a	HS	Right	No	5	PO	MB
66.6b	CF	Left	No	1	PO	UP
66.6c	HS	Right	No	5	PO	MB
66.6d	HS	Right	No	6	PO	MB
66.7	HS	Right	No	5	PO	MB
66.8a	SS	Right	No	1	PO	MB
66.8b	CF	Left	No	1	PO	UP
66.9	HS	Right	No	1	PO	MB
67.2	HS	Right	No	1	PO	MB
67.3	CF	Left	No	1	PO	UP
73.6	SO	Left	No	1	RC	SO
73.8	HS	Left	No	1	RC	SO
74.0	SS	Left	No	2	RC	UP
74.1	HS	Left	No	1	RC	SO
76.4	SS	Right	No	2	RC	UP

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, CL=cottonwood large/20-30m, HS=hard snag (main branches only), ST=snag top.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=pool, RC=reservoir cove.
[6]CW=cottonwood grove, MB=mesquite bosque, UP=desert upland, SO=shore.

Table 25. Bald eagle habitat use at the Cliff BA, Arizona, 2015.

River km[1]	PX[2,3]	PW	PP	PD	SL	PE	CL	FD	FU	OT	Total	Percent
66.3	--	--	--	--	2	--	--	--	3	0	5	0.1
66.4	--	--	--	--	--	--	--	--	1	11	12	0.3
66.5	292	590	116	--	50	69	36	57	17	56	1,283	30.7
66.6	698	158	388	210	49	6	73	9	18	72	1,681	40.2
66.7	--	1	--	--	8	--	--	3	--	4	16	0.4
66.8	--	--	--	--	7	--	--	1	--	9	17	0.4
66.9	395	7	48	--	15	47	--	8	19	29	568	13.6
67.0	--	--	--	--	7	--	--	7	5	12	31	0.7
67.2	4	22	62	--	11	--	--	3	7	17	126	3.0
67.3	174	30	--	--	2	--	--	1	2	40	249	6.0
67.5	--	--	--	--	--	--	--	2	--	2	4	0.1
67.8	--	--	--	--	4	--	--	--	1	0	5	0.1
68.0	--	--	--	--	--	--	--	--	--	2	2	0.0
68.3	--	--	--	--	7	--	--	--	--	7	14	0.3
68.5	--	--	--	--	--	--	--	--	1	4	5	0.1
69	--	--	--	--	6	--	--	--	1	0	7	0.2
69.8	--	--	--	--	1	--	--	--	--	1	2	0.0
73.5	--	--	--	--	--	--	--	--	--	5	5	0.1
73.6	1	--	--	--	--	--	--	1	1	8	11	0.3
73.8	--	--	--	--	--	--	--	--	--	23	23	0.5
74.0	27	--	--	--	--	--	--	--	--	4	31	0.7
74.1	--	--	--	--	--	--	--	--	--	34	34	0.8
74.6	--	--	--	--	15	--	--	--	--	9	24	0.6
75.0	--	--	--	--	--	--	--	--	--	7	7	0.2
76.4	--	--	--	--	7	--	--	--	--	15	22	0.5
Total	1,591	808	614	210	191	122	109	92	76	371	4,184	
Percent	38.0	19.3	14.7	5.0	4.6	2.9	2.6	2.2	1.8	8.9		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PX=perched various, PW=perched watching, PP=perched preening, PD=perched drying, SL=soaring over land, PE=perched eating, CL=perched very close to mate, FD=flying downstream, FU=flying upstream, OT= other (includes perched hunting, perched with prey, various flying activities, perched roosting, flying hunting, soaring over water, perched vocalizing).

APPENDIX G: CRESCENT BREEDING AREA SUMMARY

Table 26. Observed human activity and bald eagle behavior, Crescent BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Anglers	490	--	--	--	--	--	--	490	57.6
Drivers	83	--	--	--	--	--	--	83	9.8
Picnickers	74	--	--	--	--	--	--	74	8.7
Birders	67	--	--	--	--	--	--	67	7.9
Boater - fishing	44	--	--	--	--	--	--	44	5.2
Agency Workers	22	--	--	1	--	--	--	23	2.7
Canoe - kayak	19	--	--	--	--	--	--	19	2.2
Hikers *	16	--	--	--	--	--	--	16	1.9
Float tubers fishing	10	--	--	--	--	--	--	10	1.2
Photographer	7	--	--	--	--	--	--	7	0.8
Campers	7	--	--	--	--	--	--	7	0.8
Gunshots	2	--	2	--	--	--	--	4	0.5
Bicycle	2	--	--	--	--	--	--	2	0.2
OHV	2	--	--	--	--	--	--	2	0.2
Small Plane	1	--	--	--	--	--	--	1	0.1
Horseback Riders	1	--	--	--	--	--	--	1	0.1
Total	847	--	2	1	--	--	--	850	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 27. Observed forage events and success, Crescent BA, Arizona, 2015.								
Sex	Fish		Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	31	29-2	26	25-1	--	--	57	54-3
Female	31	30-1	23	22-1	1	1-0	55	53-2
Total	62	59-3	49	47-2	1	1-0	112	107-5

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U= Successful – Unsuccessful forage events.

Table 28. Observed prey types delivered to the nest, Crescent BA, Arizona, 2015.					
Sex	Fish	Birds	Unknown	Total	Percent
Male	27	26	--	53	50.5
Female	30	21	1	52	49.5
Total	57	47	1	105	
Percent	54.3	44.8	1.0		

Table 29. Observed prey species delivered to the nest, Crescent BA, Arizona 2015.						
Sex	Fish		Birds		Total	Percent
	RT[1]	BT	AC	MA		
Male	21	6	26	--	53	51.0
Female	26	4	20	1	51	49.0
Total	47	10	46	1	104	
Percent	45.2	9.6	44.2	1.0		

[1]RT=rainbow trout, BT=brook trout, AC=American coot, MA=mallard.

Table 30. Bald eagle habitat analysis at the Crescent BA, Arizona, 2015.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type	Land Type[5]
2.0	HS	W	Partial	6	--	CF
2.1a	SC	W	Yes	4	--	CF
2.1b	HS	W	Partial	5	--	CF
2.15	HS	W	Partial	8	--	CF
2.2	PO	W	Yes	8	--	CF
2.25	HS	W	No	8	--	CF
2.3a	HS	W	No	5	--	CF
2.3b	PO	W	Yes	7	--	CF
2.3c	PO	W	Yes	8	--	CF
2.35a	HS	W	No	8	--	CF
2.35b	PS	W	Yes	5	--	CF
2.4	SC	W	No	7	--	CF
2.5	PO	W	No	6	--	CF
2.6	PO	W	Yes	3	--	CF

[1]Lake kilometer (clockwise from north boat ramp) .
[2]HS=hard snag (main branches only), PO=pine/conifer old growth, PS=pine/conifer 2nd growth, SC=snag, conifer.
[3]Direction from nest.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]CF=coniferous forest.

Table 31. Bald eagle habitat use at the Crescent BA, Arizona, 2015.											
Lake km[1]	PW[2,3]	PR	PP	PH	PD	CL	ET	PV	PK	Total	Percent
2.0	121	--	--	--	--	--	--	--	--	121	0.3
2.1	11,342	947	203	118	38	113	9	2	2	12,774	34.5
2.2	11,074	555	10	0	0	0	0	0	0	11,639	31.5
2.3	8,003	860	70	77	104	0	4	1	0	9,119	24.6
2.4	2,656	195	15	0	0	0	0	0	0	2,866	7.7
2.5	269	--	--	22	--	--	--	--	--	291	0.8
2.6	121	--	--	--	--	--	--	--	--	190	0.5
Total	33,655	2,557	298	217	142	113	13	3	2	37,000	
Percent	91.0	6.9	0.8	0.6	0.4	0.3	<0.1	<0.1	<0.1		

[1]Lake kilometer (clockwise from north boat ramp).
[2]Observation time (minutes).
[3]PW=perched watching, PR=perched roosting, PP=perched preening, PH=perched hunting, PD=perched drying, CL=perched close to mate, ET=eating in tree, PV=perched vocalizing, PK=perched with prey.

APPENDIX H: GOLDFIELD BREEDING AREA SUMMARY

Table 32. Observed human activity and bald eagle behavior, Goldfield BA, Arizona, 2015.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Horse Riders	207	--	--	--	--	--	2	209	24.2
River Tubists	164	--	--	--	--	--	--	164	19.0
Hikers	134	--	--	1	--	--	5	140	16.2
Canoe/Kayak/Paddle board	122	1	--	--	--	--	1	124	14.4
Photographers	89	--	--	--	--	--	--	89	10.3
Helicopters	6	2	1	1	--	--	24	34	3.9
Birders	23	--	--	--	--	--	1	24	2.8
Fisherman	18	--	--	--	--	--	2	20	2.3
Swimmers	18	--	--	--	--	--	--	18	2.1
Military helicopters	3	3	1	--	--	--	9	16	1.9
Construction	2	1	--	1	--	--	4	8	0.9
Small planes	--	--	--	--	--	--	7	7	0.8
Hunters	2	--	--	--	--	--	1	3	0.3
Agency Workers	--	--	--	--	--	--	2	2	0.2
Picnic makers	2	--	--	--	--	--	--	2	0.2
Drivers	--	--	--	--	--	--	1	1	0.1
Sonic Boom	1	--	--	--	--	--	--	1	0.1
Total	791	7	2	3	--	--	59	862	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 33. Observed prey types delivered to the nest, Goldfield BA, Arizona, 2015.

Sex	Fish	Mammals	Birds	Reptiles	Unknown	Total	Percent
Male	6	--	--	--	9	15	31.9
Female	4	1	1	1	3	10	21.3
Unknown	5	--	--	--	17	22	46.8
Total	15	1	1	1	29	47	
Percent	31.9	2.1	2.1	2.1	61.7		

Table 34. Bald eagle habitat analysis at the Goldfield BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
8.7	CM	Left	Partial	1	RB	SO
9.1a	HS/SP	Right	No	5	RU	MB
9.1b	CM	Right	Partial	1	RU	MB
9.2a	CS	Right	Partial	4	RU	MB
9.2b	HS/SP	Right	No	5	RU	MB
9.3a	HS	Right	No	5	RU	MB
9.3b	SD	Right	No	7	RU	MB
9.3c	CM	Right	Partial	1	RU	SO
9.3d	CM	Right	Partial	7	RU	MB/CW
9.4a	CM	Left	Partial	1	RU	SO
9.4b	CM	Right	Partial	1	RU	SO
9.4c	HS	Left	No	1	RU	SO
9.4d	WO	Left	Partial	1	RU	SO
9.5a	WO	Left	Yes	1	RI	SO
9.5b	CM	Right	No	1	RI	SO
9.5c	CM	Right	Yes	6	RI	MB
9.6	CM	Right	No	7	RU	MB
9.9	HS	Right	No	8	RU	MB
10.0	CS	Right	Partial	5	RU	MB
10.2	SB	Middle	No	1	RI	SO
10.3	CM	Right	Partial	1	RU	MB
10.5	CM	Left	Partial	2	RB	CW
10.6	UN	Right	--	--	RU	SO

[1]River kilometer (Hunt et. al. 1992).
[2]CM=cottonwood medium/10-20+m, CS=cottonwood small/0-10 m, HS=hard snag (main branches only), SB=sand bar , SP=stump, WO=willow.
[3]Side of river facing downstream.
[4]1=0-25m, 2 =26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RB=river bend, RI=riffle, RU=run.
[6]CW=cottonwood grove, MB=mesquite bosque, SO=shore.

Table 35. Bald eagle habitat use at the Goldfield BA, Arizona, 2015.											
River km[1]	PW[2,3]	PX	PP	PU	CL	PD	ET	PV	OT	Total	Percent
8.7	3	--	--	--	--	--	--	--	--	3	<0.1
9.1	36	7	29	199	--	--	1	5	2	279	4.1
9.2	73	--	--	19	--	--	--	1	4	97	1.4
9.3	2,370	1,042	482	82	206	134	94	59	45	4,514	65.9
9.4	71	500	--	28	--	24	--	2	--	625	9.1
9.5	133	114	--	5	45	--	--	--	--	297	4.3
9.6	27	--	13	--	--	--	--	--	--	40	0.6
9.9	7	--	--	--	--	--	--	1	--	8	0.1
10.0	7	--	--	--	--	--	--	--	--	7	0.1
10.2	--	--	--	--	--	--	1	--	25	26	0.4
10.3	64	22	22	--	--	--	--	8	--	116	1.7
10.5	560	74	--	--	197	--	--	2	--	833	12.2
10.6	1	--	--	--	--	--	--	1	--	2	<0.1
Total	3,352	1,759	546	333	448	158	96	79	76	6,847	
Percent	49.0	25.7	8.0	4.9	6.5	2.3	1.4	1.2	1.1		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PX=perched various, PP=perched preening, PU=perched unknown, CL=perched close to mate, PD=perched drying, ET=eating in tree, PV=perched vocalizing, OT=other (copulating, standing in water, perched eating, gathering nest materials, perched hunting).

APPENDIX I: GRANITE REEF BREEDING AREA SUMMARY

Table 36. Observed human activity and bald eagle behavior, Granite Reef BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter (civilian)	63	12	--	--	--	4	--	79	32.1
Canoe/Kayak	58	4	--	8	--	--	--	70	28.5
Hiker	17	1	--	--	--	3	--	21	8.5
Small plane	12	5	--	--	--	1	--	18	7.3
Helicopter (Apache)	12	4	--	--	--	--	--	16	6.5
Fisherman	11	1	--	--	--	4	--	16	6.5
Driver	10	1	--	--	--	--	--	11	4.5
Rafter	8	--	--	--	--	--	--	8	3.3
Helicopter (patrol)	2	--	--	--	--	1	--	3	1.2
Birder	1	--	--	--	--	--	--	1	0.4
Boater	1	--	--	--	--	--	--	1	0.4
ATV	1	--	--	--	--	--	--	1	0.4
Tuber	1	--	--	--	--	--	--	1	0.4
Total	197	28	--	8	--	13	--	246	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 37. Observed forage events and success, Granite Reef BA, Arizona, 2015.								
Sex	Fish		Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	8	7-1	--	--	1	1-0	9	8-1
Female	15	10-5	1	0-1	--	--	16	10-6
Total	23	17-6	1	0-1	1	1-0	25	18-7

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U= Successful – Unsuccessful forage events.

Table 38. Observed prey types delivered to the nest, Granite Reef BA, Arizona, 2015.				
Sex	Fish	Unknown	Total	Percent
Male	6	1	7	35.0
Female	11	1	12	60.0
Unknown	--	1	1	5.0
Total	17	3	20	
Percent	85.0	15.0		

Table 39. Observed prey species delivered to the nest, Granite Reef BA, Arizona 2015.					
Sex	Fish			Total	Percent
	SU[1]	CA	BA		
Male	--	--	1	1	14.3
Female	4	2	--	6	85.7
Total	4	2	1	7	
Percent	57.1	28.6	14.3		

[1]SU=sucker species, CA=common carp, BA=bass species.

Table 40. Bald eagle habitat analysis at the Granite Reef BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
2.5a	HS	Left	No	1	RU	MB
2.5b	CM	Left	Yes	2	RU	MB
2.5c	HS	Left	No	2	RU	MB
3.1	CL	Right	Partial	2	--	UP
3.2a	SB	Middle	No	1	RI	--
3.2b	SO	Right	No	1	RU	--
3.3	CS	Left	No	4	--	MB
3.4a	SG	Left	No	5	--	MB
3.4b	WO	Right	No	1	RI	WT
3.5a	CL	Left	Partial	5	--	MB
3.5b	WO	Left	No	1	RU	WT
3.5c	CS	Left	No	5	--	MB
3.7	SG	Left	No	5	--	MB
3.8a	SG	Left	No	5	--	MB
3.8b	HS	Left	No	1	RU	MB
3.8c	CM	Left	Partial	4	--	MB
3.8d	CM	Left	No	4	--	MB
3.9	CM	Left	No	5	--	MB
4.0	CL	Left	No	4	--	MB

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood large (20-30+m), CM=cottonwood medium (10-20+m), CS=cottonwood small (0-10m), HS=hard snag, SB=sand bar, SG=soft snag, SO=shore, WO=willow.
[3]Side of river facing downstream.
[4]1=0-25m, 2 =26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RI=riffle, RU=run.
[6]MB=mesquite bosque, UP=desert upland, WT=-willow thicket.

Table 41. Bald eagle habitat use at the Granite Reef BA, Arizona, 2015.

River km[1]	PW[2,3]	PP	PH	PG	PE	PU	PV	BA	PK	Total	Percent
2.5	428	680	12	29	--	--	--	--	--	1,149	19.2
3.1	654	18	52	32	--	53	--	--	--	809	13.5
3.2	--	16	--	66	119	--	--	10	2	213	3.6
3.3	57	--	42	--	--	--	--	--	--	99	1.7
3.4	218	347	66	--	--	--	--	--	--	631	10.5
3.5	617	145	87	--	--	--	--	--	--	849	14.2
3.7	691	--	216	--	--	--	--	--	--	907	15.1
3.8	836	165	153	--	--	--	15	--	--	1,169	19.5
3.9	16	--	--	--	--	--	--	--	--	16	0.3
4.0	117	--	37	--	--	--	1	--	--	155	2.6
4.2	--	3	--	--	--	--	--	--	--	3	0.1
Total	3,634	1,374	665	127	119	53	16	10	2	6,000	
Percent	60.6	22.9	11.1	2.1	2.1	0.9	0.3	0.2	<0.1		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PH=perched hunting, PG=perched ground, PE=perched eating, PU=perched unknown, PV=perched vocalizing, BA=bathing, PK=perched with prey.

APPENDIX J: KERR BREEDING AREA SUMMARY

Table 42. Observed human activity and bald eagle behavior, Kerr BA, Arizona, 2015.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Kayak/Canoe/Paddle board	364	27	--	28	--	--	--	419	50.9
Horseback riders	114	--	1	11	--	--	--	126	15.3
Photographers	62	--	--	13	--	--	--	75	9.1
Hiker	69	2	--	4	--	--	--	75	9.1
Helicopters	44	5	1	4	--	--	--	54	6.6
Small planes	17	3	1	1	--	--	--	22	2.7
Tubers	9	--	--	7	--	--	--	16	1.9
Apache helicopter	13	--	--	1	--	--	--	14	1.7
Sheriff helicopter	3	--	1	1	--	--	--	5	0.6
Agency biologist	--	--	--	4	--	--	--	4	0.5
Fisher	3	--	--	--	--	--	--	3	0.4
Military plane	3	--	--	--	--	--	--	3	0.4
Military helicopter	2	--	--	--	--	--	--	2	0.2
Sheriff airboat	2	--	--	--	--	--	--	2	0.2
Biker	2	--	--	--	--	--	--	2	0.2
Nestwatcher	--	--	--	1	--	--	--	1	0.1
Total	707	37	4	75	--	--	--	823	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=bird not in area, U=unknown.

Table 43. Observed forage events and success, Kerr BA, Arizona, 2015.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	4	4-0	4	4-0
Female	2	2-0	2	2-0
Unknown	5	5-0	5	5-0
Total	11	11-0	11	11-0

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U=Successful – Unsuccessful forage events.

Table 44. Observed prey types delivered to the nest, Kerr BA, Arizona, 2015.

Sex	Fish	Birds	Reptiles	Mammals	Unknown	Total	Percent
Male	13	1	--	1	3	18	50.0
Female	7	3	2	--	4	16	44.4
Unknown	2	--	--	--	--	2	5.6
Total	22	4	2	1	7	36	
Percent	61.1	11.1	5.6	2.8	19.4		

Table 45. Observed prey species delivered to the nest, Kerr BA, Arizona 2015.							
Sex	Fish		Birds	Reptiles	Mammals	Total	Percent
	SU[1]	CA	AC	GO	MU		
Male	4	2	1	2	--	9	60.0
Female	1	2	1	--	--	4	26.7
Unknown	--	1	--	--	1	2	13.3
Total	5	5	2	2	1	15	
Percent	33.3	33.3	13.3	13.3	6.7		

[1]SU=sucker species, CA=common carp, AC=American coot, GO=gopher snake, MU=muskrat.

Table 46. Bald eagle habitat analysis at the Kerr BA, Arizona, 2015.						
River km[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
7.8	CM	Left	Partial	1	RI	SO
7.9	CM	Right	No	1	RI	SO
8.0	SP	Middle	No	1	RI	GB
8.1	CM	Right	Partial	1	RI	SO
8.2a	CM	Left	Partial	1	RI	SO
8.2b	CM	Right	Partial	1	RI	SO
8.3	CM	Right	No	1	RI	SO
8.4a	CM	Left	Partial	1	RI	SO
8.4b	CM	Right	Partial	1	RI	SO
8.5	CM	Right	Partial	1	RI	SO
8.6	SP	Middle	No	7	RI	MB
8.7	CM	Right	No	1	RI	SO
8.8	CM	Right	No	1	RI	SO
8.9	CM	Right	No	1	RI	SO

[1]River kilometer (Hunt et. al. 1992).
[2]CM=cottonwood medium/10-20m, SP=stump.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RI=riffle.
[6]GB=gravel bar, MB=mesquite bosque, SO=shore.

Table 47. Bald eagle habitat use at the Kerr BA, Arizona, 2015.

Perch Location[1]	PW[2,3]	PD	ET	PV	PP	CO	DW	Total	Percent
7.8	186	--	--	--	--	--	--	186	1.0
7.9	618	--	--	1	--	--	--	619	3.4
8.0	136	--	--	--	--	--	--	136	0.8
8.1	10	--	12	--	3	--	--	25	0.1
8.2	9,479	1,212	--	20	19	3	2	10,735	59.5
8.3	13	--	--	5	3	--	--	21	0.1
8.4	3,337	971	1	27	21	1	--	4,358	24.1
8.5	174	--	19	--	--	--	--	193	1.1
8.6	998	--	26	2	--	--	--	1,026	5.7
8.7	50	--	--	--	--	--	--	50	0.3
8.8	692	--	--	1	--	--	--	693	3.8
8.9	6	--	--	--	--	--	--	6	<0.1
Total	15,699	2,183	58	56	46	4	2	18,048	
Percent	87.0	12.1	0.3	0.3	0.3	<0.1	<0.1		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PD=perched drying, ET=eating in tree, PV= perched vocalizing, PP=perched preening, CO=copulating, DW=drinking water.

APPENDIX K: LUNA BREEDING AREA SUMMARY

Table 48. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Drivers	92	--	--	--	--	--	--	92	24.5
Fisherman	90	--	--	--	--	--	--	90	24
Birders	56	--	--	--	--	--	--	56	14.9
Hikers	37	--	--	--	--	--	--	37	9.9
Picnickers	35	--	--	--	--	--	--	35	9.3
Boaters (fishing)	20	--	--	--	--	--	--	20	5.3
Agency Workers	14	-	-	-	-	-	-	14	3.7
Photographers	7	--	--	--	--	--	--	7	1.9
Photographers	7	--	--	--	--	--	--	7	1.9
All Others	5	--	--	--	--	--	--	5	1.3
Military Jet	--	1	1	2	--	--	--	4	1.1
Float Tubers (fishing)	3	--	--	--	--	--	--	3	0.8
Small Planes	2	--	--	--	--	--	--	2	0.5
Kayaks/ Canoes	1	--	--	--	--	--	--	1	0.3
Boaters	1	--	--	--	--	--	--	1	0.3
AGFD Biologist	1	--	--	--	--	--	--	1	0.3
Total	371	1	1	2	--	--	--	375	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=bird not in area, U=unknown.

Table 49. Observed forage events and success, Luna BA, Arizona, 2015.								
Sex	Birds		Fish		Unknown		Total	
	E[1]	S-U	E	S-U	E	S-U	E	S-U
Male	21	19-2	2	2-0	--	--	23	21-2
Female	15	14-1	--	--	1	1-0	16	15-1
Total	36	33-3	2	2-0	1	1-0	39	36-6

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U=Successful – Unsuccessful forage events.

Table 50. Observed prey types delivered to the nest, Luna BA, Arizona, 2015.					
Sex	Birds	Fish	Unknown	Total	Percent
Male	16	1	--	17	56.7
Female	12	--	1	13	43.3
Total	28	1	1	30	
Percent	93.3	3.3	3.3		

Table 51. Observed prey species delivered to the nest, Luna BA, Arizona 2015.						
Sex	Birds			Fish	Total	Percent
	AC[1]	WS	BH	RT		
Male	13	2	1	1	17	58.6
Female	12	--	--	--	12	41.4
Total	25	2	1	1	29	
Percent	86.2	6.9	3.4	3.4		

[1]AC=American coot, WS=waterfowl species, BH=bufflehead, RT=rainbow trout.

Table 52. Bald eagle habitat analysis at the Luna BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
0.1	PS	R - E	No	1	RS	--
0.7	SH	R - E	No	2	RC	--
1.6	PO	R - E	Yes	2	RS	--
1.8	PS	R - E	Yes	1	RC	--
1.9	PS	R - NE	Yes	1	RC	--
2.0	PS	R - E	Yes	1	RC	--
2.0	SH	R - N	Yes	8	--	CF
2.1	PO	R - N	No	7	--	CF
2.2	SH	L - N	No	7	--	CF
2.3a	PO	L - N	Partial	7	--	CF
2.3b	PO	R - N	Yes	7	--	CF
2.4a	SH	L - N	No	7	--	CF
2.4b	PS	L - N	Yes	7	--	CF
2.5	PS	L - NW	No	2	--	CF
2.6a	WF	L - NW	No	2	RS	--
2.6b	SC	L - NW	No	6	--	CF
2.7	PS	L - NW	No	2	RS	--
2.8	PS	L - NW	Yes	2	--	CF
3.0	PS	L - NW	Yes	2	--	CF
3.2	ST	L - NW	No	2	--	CF
3.5	PO	L - NW	No	7	RC	--
4.5	FP	R - SW	No	7	RC	--
4.6	PS	R - SW	No	7	RC	--
5.1a	FP	R - SW	No	7	RC	--
5.1b	PO	R - SW	Yes	8	--	CF

[1]Lake kilometer (counterclockwise from boat ramp).
[2]FP=fence post, PO=Pine/Conifer, old growth/20-30+ m, PS=pine/conifer 2nd growth, SC=snag conifer, SH=hard snag (main branches only), ST=snag top, WF=waterfowl closure sign.
[3]Direction from observation point. L=left, R=right, E=east, NE=northeast, N=north, NW=northwest, SW=southwest
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RS=reservoir main body, RC=reservoir cove.
[6]CF=coniferous forest.

Table 53. Bald eagle habitat use at the Luna BA, Arizona, 2015.

River km[1]	PW[2,3]	PR	PH	PP	PD	CL	PU	Total	Percent
1.6	--	--	2	--	--	--	--	2	<0.1
2.0	2	--	--	--	--	--	--	2	<0.1
2.1	767	643	--	--	--	--	--	1410	11.7
2.2	161		--	27	--	--	--	188	1.6
2.3	42	28	--	--	--	--	--	70	0.6
2.4	5,599	1,268	--	674	--	31	15	7587	62.9
2.5	--	--	--	--	85	--	--	85	0.7
2.6	508	104	202	27	23	--	--	864	7.2
2.7	188	--	406	--	--	--	--	594	4.9
2.8	270	--	77	--	--	--	--	347	2.9
2.9	--	--	76	--	--	--	--	76	0.6
3.0	--	--	7	--	--	--	--	7	0.1
3.2	51	--	--	--	--	--	--	51	0.4
3.3	85	--	--	--	--	--	--	85	0.7
3.4	95	--	83	--	--	--	--	178	1.5
3.5	94	--	62	--	--	--	--	156	1.3
4.5	--	--	22	--	--	--	--	22	0.2
4.6	5	--	10	--	--	--	--	15	0.1
4.9	--	--	18	--	--	--	--	18	0.1
5.1	128	--	184	--	--	--	--	312	2.6
Total	7,995	2,043	1,149	728	108	31	15	12,069	
Percent	66.2	16.9	9.5	6.0	0.9	0.3	0.1		

[1]Lake kilometer (counterclockwise from boat ramp).
[2]Observation time (minutes).
[3]PW=perched watching, PR=perched roosting, PH=perched hunting, PP=perched preening, PD=perched drying, CL=perched close to mate, PU=perched unknown.

APPENDIX L: ORME BREEDING AREA SUMMARY

Table 54. Observed human activity and bald eagle behavior, Orme BA, Arizona, 2015.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter (civilian)	45	5	--	1	--	--	--	51	53.7
Vehicles	11	1	--	--	--	--	--	12	12.6
Helicopter (Apache)	6	6	--	--	--	--	--	12	12.6
Small plane	4	3	--	--	--	--	--	7	7.4
Hiker	4	1	--	--	--	--	--	5	5.3
Helicopter (patrol)	2	2	--	--	--	--	--	4	4.2
Agency Worker	1	1	--	--	--	--	--	2	2.1
Ceremony	1	--	--	--	--	--	--	1	1.1
Fisherman	1	--	--	--	--	--	--	1	1.1
Total	75	19	--	1	--	--	--	95	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=bird not in area, U=unknown.

Table 55. Observed prey types delivered to the nest, Orme BA, Arizona, 2015.

Sex	Fish	Mammal	Unknown	Total	Percent
Male	5	--	1	6	40.0
Female	8	1	--	9	60.0
Total	13	1	1	15	
Percent	86.7	6.7	6.7		

Table 56. Observed prey species delivered to the nest, Orme BA, Arizona 2015.

Sex	Fish		Total	Percent
	SU[1]	CP		
Female	1	1	2	100.0
Total	1	1	2	
Percent	50.0	50.0		

[1]SU=sucker species, CP=common carp.

Table 57. Bald eagle habitat analysis at the Orme BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
V 0.1	CM	Right	Yes	4	--	MB
V 0.7	UP	Right	No	5	--	UP
V 1.0	WO	Right	Partial	--	--	WT
S 4.8	WO	Left	Yes	1	RU	WT
S 4.9	WO	Left	Partial	1	RU	MB
S 5.0a	CM	Right	No	4	--	MB
S 5.0b	CM	Right	No	7	--	MB
S 5.0c	UP	Right	No	7	--	MB
S 5.0d	UP	Right	No	7	--	MB
S 5.1	CM	Right	No	5	RU	MB
S 5.2	SG	Right	No	2	RU	MB
S 5.4	HS	Right	No	2	RU	MB

[1]River kilometer (Hunt et. al. 1992). V=Verde River, S=Salt River.
[2]CM=cottonwood medium (10-20+m), HS=hard snag (main branches only), SG=soft snag, WO=willow.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[4]RU=run.
[5]MB=mesquite bosque, UP=desert upland, WT=-willow thicket.

Table 58. Bald eagle habitat use at the Orme BA, Arizona, 2015.

Perch Location[1]	PW[2,3]	PH	PP	PD	PE	PV	PK	CL	PU	PI	PG	Total	Percent
V 0.1	--	--	--	--	--	--	--	--	6	--	--	6	0.1
V 0.7	--	--	--	--	17	--	--	--	--	--	--	17	0.2
V 1.0	5	--	--	--	--	--	--	--	--	--	--	5	0.1
S 4.8	--	20	--	--	--	--	--	--	--	--	--	20	0.2
S 4.9	188	2,101	--	--	--	--	--	--	--	--	--	2,289	23.5
S 5.0	1,436	25	337	62	--	9	--	--	--	--	--	1,869	19.2
S 5.1	659	--	21	--	--	--	--	--	--	--	1	681	7.0
S 5.2	3,383	28	928	58	--	5	14	10	--	3	--	4,429	45.4
S 5.4	127	--	245	19	--	--	--	--	--	--	--	391	4.0
S 5.8	--	44	--	--	--	--	--	--	--	--	--	44	0.5
Total	5,798	2,218	1,531	139	17	14	14	10	6	3	1	9,751	
Percent	59.5	22.7	15.7	1.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1		

[1]River kilometer (Hunt et. al. 1992). V=Verde River, S=Salt River.
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, PD=perched drying, PE=perched eating, PV= perched vocalizing, PK=perched with prey, CL=perched close to mate, PU=perched unknown, PI=perched, interaction, PG=perched on the ground.

APPENDIX M: PINTO BREEDING AREA SUMMARY

Table 59. Observed human activity and bald eagle behavior, Pinto BA, Arizona 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter	--	--	--	--	--	1	--	1	100.0
Total	--	--	--	--	--	1	--	1	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 60. Observed prey types delivered to the nest, Pinto BA, Arizona, 2015.						
Sex	Fish	Birds	Carrion	Unknown	Total	Percent
Male	10	1	1	10	22	71.0
Female	5	1	--	1	7	22.6
Unknown	1	--	--	1	2	6.5
Total	16	2	1	12	31	
Percent	51.6	6.5	3.2	38.7		

Table 61. Bald eagle habitat analysis at the Pinto BA, Arizona, 2015.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
102.0	CF	Right	No	1	RU	CL
104.3a	SS	Right	No	1	RI	MB
104.3b	SO	Left	No	1	RI	SO
104.3c	HS	Right	No	5	RU	TX
104.7	HS	Right	No	7	RU	MB
105.3a	HS	Right	No	8	RU	TX
105.3b	SS	Right	No	8	RU	TX
105.4a	SS	Right	No	8	RU	TX
105.4b	SS	Right	No	8	RU	TX
105.4c	CL	Right	No	6	RU	TX
105.4d	CT	Left	No	1	RU	CL
105.4e	CT	Left	No	1	RU	CL
105.4f	HS	Right	No	8	RU	TX
105.4g	CT	Left	No	1	RU	CL
105.4h	HS	Right	No	8	RU	TX
105.5a	SS	Right	No	8	RU	TX
105.5b	HS	Right	No	8	RU	TX
105.6	CL	Right	Yes	7	RU	TX

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, CT=cliff top, HS=hard snag (main branches only), SO=shore, SS=soft snag (dead but branches still intact).
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RI=riffle, RU=run.
[6]CL=cliffs, MB=mesquite bosque, SO=shore, TX=tamarisk thicket.

Table 62. Bald eagle habitat use at the Pinto BA, Arizona, 2015.

River km[1]	PX[2,3]	PW	PP	SL	FD	FU	FM	FR	FK	OT	Total	Percent
102.0	--	32	--	--	--	--	--	--	--	--	32	0.6
103.4	--	--	--	2	--	--	--	--	--	--	2	<0.1
103.9	--	--	--	--	--	1	--	--	--	3	4	0.1
104.3	--	--	9	--	2	1	--	--	--	16	28	0.5
104.7	--	1	14	--	1	2	--	--	--	--	18	0.3
105.3	311	30	50	--	13	4	4	--	2	--	414	7.5
105.4	809	379	129	15	7	11	3	20	--	23	1,396	25.2
105.5	1,940	1,409	26	94	56	40	28	15	22	15	3,645	65.7
105.6	--	4	--	--	--	1	1	--	1	--	7	0.1
Total	3,060	1,855	228	111	79	60	36	35	25	57	5,546	
Percent	55.2	33.4	4.1	2.0	1.4	1.1	0.6	0.6	0.5	1.0		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PX=perched various, PW=perched watching, PP=perched preening, SL=soaring over land, FD=flying downstream, FU=flying upstream, FM=flying with nest material, FR=flying to river, FK=flying with prey, OT=other (includes standing on shore, perched close to mate, perched eating, flying chasing, flying interaction, flying escaping, perched vocalizing, perched interaction, flying hunting, perched with prey, drinking water, perched hunting).

APPENDIX N: RODEO BREEDING AREA SUMMARY

Table 63. Observed human activity and bald eagle behavior, Rodeo BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter	17	--	--	--	--	10	--	27	35.0
Small Plane	9	--	--	--	--	6	--	15	19.5
Driver	6	--	--	--	--	4	--	10	13.0
Agency worker (Police)	6	--	--	--	--	--	--	6	7.8
Military helicopter	2	--	--	--	--	3	--	5	6.5
Gunshots	4	1	--	--	--	--	--	5	6.5
OHV	3	--	--	--	--	--	--	3	3.9
Military plane	3	--	--	--	--	--	--	3	3.9
Photographer	--	--	--	--	1	1	--	2	2.6
AGFD worker	--	--	1	--	--	--	--	1	1.3
Total	50	1	1	--	1	24	--	77	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=bird not in area, U=unknown.

Table 64. Observed forage events and success, Rodeo BA, Arizona, 2015.				
Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	1	1-0	1	1-0
Total	1	1-0	1	1-0

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U= Successful – Unsuccessful forage events.

Table 65. Observed prey types delivered to the nest, Rodeo BA, Arizona, 2015.						
Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	8	1	1	3	13	52.0
Female	9	1	0	2	12	48.0
Total	17	2	1	5	25	
Percent	68.0	8.0	4.0	20.0		

Table 66. Observed prey species delivered to the nest, Rodeo BA, Arizona 2015.					
Sex	Fish		Birds	Total	Percent
	SU[1]	LB	AC		
Unknown	5	1	1	7	100.0
Total	5	1	1	7	
Percent	71.4	14.3	14.3		

[1]SU=desert sucker, LB=largemouth bass, AC=American coot.

Table 67. Bald eagle habitat analysis at the Rodeo BA, Arizona, 2015.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
2.5	CT	Left	Yes	4	RU	UP
2.7	WO	Right	Partial	1	RU	WT
3.6	SG	Left	No	5	RU	CW
3.8a	CM	Left	No	6	RU	CW
3.8b	HS	Left	No	6	RU	CW
3.9a	CM	Left	Yes	6	RU	CW
3.9b	CL	Left	Partial	6	RU	CW
4.0	SG	Right	Partial	1	RU	TX
4.2	CL	Right	Yes	1	RI	MB

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood, large/20-30+ m, CM=cottonwood, medium/10-20 m, CT=cliff top, HS=hard snag (main branches), SG=soft snag, WO=willow.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RI=riffle, RU=run.
[6]CW=cottonwood grove, MB=mesquite bosque, UP=desert upland, TX=tamarisk thicket, WT=willow thicket.

Table 68. Bald eagle habitat use at the Rodeo BA, Arizona, 2015.									
River km[1]	PW[2,3]	CL	PP	PH	PK	ET	GN	Total	Percent
2.5	97	--	--	32	--	--	--	129	2.4
2.7	103	--	--	153	--	--	--	256	4.7
3.6	122	10	--	--	--	--	3	135	2.5
3.8	3,062	279	285	--	32	--	--	3,658	67.0
3.9	832	103	74	--	3	10	1	1,023	18.7
4.0	--	--	--	5	--	--	--	5	0.1
4.2	136	26	48	40	--	--	--	250	4.6
Total	4,352	418	407	230	35	10	4	5,456	
Percent	79.8	7.6	7.5	4.2	0.6	0.2	0.1		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, CL=perched close to mate, PP=perched preening, PH=perched hunting, PK=perched with prey, ET=eating in tree, GN=gathering nest materials.

APPENDIX O: SYCAMORE BREEDING AREA SUMMARY

Table 69. Observed human activity and bald eagle behavior, Sycamore BA, Arizona, 2015.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
OHV	33	--	--	--	--	--	--	33	38.4
Horseback groups	20	--	--	--	--	--	--	20	23.2
Driver	11	--	--	--	--	--	--	11	12.8
Helicopter	7	--	--	--	--	--	--	7	8.1
Military helicopter	6	--	--	--	--	--	--	6	7.0
Agency worker (Police)	5	--	--	--	--	--	--	5	5.8
Small plane	2	--	--	--	--	--	--	2	2.3
Apache helicopter	1	--	--	--	--	--	--	1	1.2
Gunshots	1	--	--	--	--	--	--	1	1.2
Total	86	--	--	--	--	--	--	86	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=birds not in area, U=unknown.

Table 70. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
7.6	CM	Left	Yes	1	RU / PN	TX
9.3	CM	Right	No	1	RU	CW
9.5	SM	Left	Yes	2	RI	MB
9.7	CM	Right	No	1	RI	CW
10.0	CM	Right	Partial	3	RU	CW
10.4	HS	Left	No	6	RU	MB
10.7	SG	Left	Partial	3	RU	CW
10.9	CL	Left	Yes	7	RU	CW
11.3	CL	Left	Partial	6	RU	CW
11.4	SG	Left	No	6	RU	CW

[1]River kilometer (Hunt and others 1992).
[2] CL=cottonwood, large/20-30+ m, CM=cottonwood, medium/10-20 m, HS=hard snag, SG=soft snag, SM=snag, mesquite.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[5]PN=pond, RI=riffle, RU=run.
[6]CW=cottonwood grove, MB=mesquite bosque, TX=tamarisk thicket.

Table 71. Bald eagle habitat use at the Sycamore BA, Arizona, 2015.

River km[1]	PW[2, 3]	PH	CL	PP	PD	ET	Total	Percent
7.6	65	39	127	--	--	--	231	13.3
9.3	--	99	--	--	--	--	99	5.7
9.5	10	--	--	--	30	--	40	2.3
9.7	194	112	--	4	--	--	310	17.9
10.0	154	43	--	--	--	--	197	11.3
10.4	574	--	--	23	--	15	612	35.2
10.7	40	--	--	--	--	--	40	2.3
10.9	7	--	--	--	--	--	7	0.4
11.3	14	--	--	--	--	--	14	0.8
11.4	155	--	--	32	--	--	187	10.8
Total	1,213	293	127	59	30	15	1,737	
Percent	69.8	16.9	7.3	3.4	1.7	0.9		

[1]River kilometer (Hunt and others 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, CL=perched close to mate, PP=perched preening, PD=perched drying, ET=eating in tree.

APPENDIX P: TAPCO BREEDING AREA SUMMARY

Table 72. Observed human activity and bald eagle behavior, Tapco BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Train	59	--	--	4	--	--	--	63	55.2
Railroad Maintenance	40	1	--	2	--	--	--	43	37.7
Driver	--	2	1	1	--	--	--	4	3.5
Horseback Rider	--	2	--	--	--	--	--	2	1.8
Hiker	2	--	--	--	--	--	--	2	1.8
Total	101	5	1	7	--	--	--	114	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=birds not in area, U=unknown.

Table 73. Observed forage events and success, Tapco BA, Arizona, 2015.										
Sex	Carrion		Fish		Mammals		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	--	--	1	0-1	1	1-0	1	0-1	3	1-2
Female	2	2-0	--	--	--	--	--	--	2	2-0
Total	2	2-0	1	0-1	1	1-0	1	0-1	5	3-2

Table 74. Observed prey types delivered to the nest, Tapco BA, Arizona, 2015.					
Sex	Fish	Mammals	Unknown	Total	Percent
Male	2	1	2	5	71.4
Female	--	--	2	2	28.6
Total	2	1	4	7	
Percent	28.6	14.3	57.1		

Table 75. Bald eagle habitat analysis at the Tapco BA, Arizona, 2015.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
237.2a	CL	Right	No	1	RU	CW
237.2b	SD	Right	No	2	RU	CW
237.3a	SD	Right	Partial	1	RU	MB
237.3b	SD	Right	No	1	PO	MB
237.7a	SD	Left	Yes	1	RU	CW
237.7b	SD	Left	No	1	PO	MB
237.8a	SD	Right	Partial	1	RU	CW
237.8b	ST	Left	No	2	PO	CW
237.9a	ID	--	Yes	1	RU	CW
237.9b	CM	Left	No	1	PO	CW
237.9c	CM	Right	No	1	PO	CW
237.9d	SD	Right	No	1	PO	CW
238.0a	CL	Right	Partial	2	RU	CW
238.0b	CL	Right	No	2	RU	CW
238.0c	SD	Right	No	2	RU	CW
238.1	CL	Right	No	2	RU	CW
238.3	CL	Right	Partial	1	RU	MB
238.7a	GR	Left	No	6	PO	MB
238.7b	MS	Left	No	5	PO	MB
238.9a	AS	Right	Partial	1	PO	MB
238.9b	SO	Left	No	1	PO	SO
239.0a	MS	Left	No	1	PO	MB
239.0b	CL	Left	No	1	PO	MB
239.2	SM	Right	Partial	2	PO	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood large/20-30m, SD=snag cottonwood, ST=snag top, ID=island, CM=cottonwood medium/10-20m, GR=ground, MS=mesquite, AS=Ash, SO=shore, SM=snag mesquite.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=pool, RU=run.
[6]CL=cliffs, CW=cottonwood grove, MB=mesquite bosque, SO=shore.

Table 76. Bald eagle habitat use at the Tapco BA, Arizona, 2015.													
Perch Location[1]	PW[2,3]	PH	PP	PE	PD	PG	CL	VX	PV	DW	PI	Total	Percent
237.2	10	15	--	--	--	--	--	--	--	--	2	27	0.5
237.3	986	148	349	--	94	--	4	--	--	--	--	1,581	27.1
237.7	4	66	16	--	--	--	--	--	--	--	--	86	1.5
237.8	498	--	153	--	--	--	--	--	--	--	--	651	11.2
237.9	8	154	--	--	--	--	--	--	--	3	--	165	2.8
238.0	104	--	281	33	--	--	--	--	5	--	--	423	7.2
238.3	7	--	--	--	--	--	--	--	--	--	--	7	0.1
238.9	256	573	42	--	--	18	--	--	--	--	--	889	15.2
239.0	352	61	84	--	--	--	--	--	--	--	--	497	8.5
239.2	936	187	278	--	--	--	6	--	--	--	--	1,407	24.1
238.7	22	--	--	77	--	--	--	6	--	--	--	105	1.8
Total	3,183	1,204	1,203	110	94	18	10	6	5	3	2	5,838	
Percent	54.5	20.6	20.6	1.9	1.6	0.3	0.2	0.1	0.1	0.1	0.0		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3] PW=perched watching, PH=perched hunting, PP=perched preening, PE=perched eating, PD=perched drying, PG=perched on ground, CL=perched close to mate, VX=various activities, PV=perched vocalizing, DW=drinking water, PI=perched interaction.

APPENDIX Q: TONTO BREEDING AREA SUMMARY

Table 77. Observed human activity and bald eagle behavior, Tonto BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	X	Total	Percent
Small plane	1	5	--	--	--	--	--	6	35.3
Gunshots	1	1	2	--	--	--	--	4	23.5
Helicopter	--	2	--	--	--	--	--	2	11.8
Motorized Parachute	--	1	--	--	1	--	--	2	11.8
Jet	--	--	--	--	--	--	1	1	5.9
Hikers	--	--	1	--	--	--	--	1	5.9
Cattle	--	--	1	--	--	--	--	1	5.9
Total	2	9	4	--	1	--	1	17	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=birds not in area, X=returned to nest.

Table 78. Observed forage events and success, Tonto BA, Arizona, 2015.								
Sex	Fish		Birds		Mammals		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	--	--	--	--	--	--	--	--
Female	--	--	--	--	--	--	--	--
Unknown	2	2-0	1	0-1	1	0-1	4	2-2
Total	2	2-0	1	0-1	1	0-1	4	2-2

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U=Successful – Unsuccessful forage events.

Table 79. Observed prey types delivered to the nest, Tonto BA, Arizona, 2015.						
Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	25	6	3	9	43	82.7
Female	5	--	1	1	7	13.5
Unknown	1	--	--	1	2	3.8
Total	31	6	4	11	52	
Percent	59.6	11.5	7.7	21.2		

Table 80. Bald eagle habitat analysis at the Tonto BA, Arizona, 2015.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
16.4	SO	Right	No	1	RU	TX
16.5	HS	Right	No	4	--	MB
16.6	SH	Left	No	2	--	DU
16.7	SO	Left	No	1	RU	SO
16.8a	SS	Right	No	2	--	MB
16.8b	SS	Right	No	1	RU	TX
16.9	HS	Left	No	1	RU	TX
17.0	HS	Left	No	2	--	TX
17.1	SM	Left	No	8	--	MB
17.2	SC	Right	No	4	--	TX
17.3	SM	Left	No	3	--	MB

[1]River kilometer (Hunt et. al. 1992).
[2]SO=shore, HS=hard snag, SH=shrub, SS=soft snag, SM=snag mesquite, SC=snag cottonwood.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RU=run.
[6]TX=tamarisk thicket, MB=mesquite bosque, DU=desert upland, SO=shore.

Table 81. Bald eagle habitat use at the Tonto BA, Arizona, 2015.									
Perch Location[1]	PW[2,3]	SS	BA	PP	DW	GN	PV	Total	Percent
16.4	3	--	--	--	--	4	--	7	1.2
16.5	61	--	--	--	--	--	--	61	10.2
16.6	60	--	--	--	--	--	--	60	10.0
16.7	10	107	48	--	19	--	--	184	30.8
16.8	20	--	--	--	--	--	--	20	3.3
16.9	78	--	--	27	--	--	7	112	18.7
17.0	47	--	--	5	--	--	1	53	8.9
17.1	15	--	--	--	--	--	--	15	2.5
17.2	6	--	--	--	--	--	--	6	1.0
17.3	75	--	--	--	--	5	--	80	13.4
Total	375	107	48	32	19	9	8	598	
Percent	62.7	17.9	8.0	5.4	3.2	1.5	1.3		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, SS=standing on shore, BA=bathing, PP=perched preening, DW=drinking water, GN=gather nest material, PV=perched vocalizing.

APPENDIX R: WHISKEY SPRING BREEDING AREA SUMMARY

Table 82. Observed human activity and bald eagle behavior, Whiskey Spring BA, Arizona, 2015.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Boat	97	58	1	1	--	1	14	172	65.6
Small plane	19	9	1	--	--	--	2	31	11.8
Jet ski	9	6	--	--	--	--	2	17	6.5
Agency Worker	7	5	--	--	--	--	1	13	5.0
Fishing by Boat	4	5	--	--	--	--	--	9	3.4
Jet (> 2,000 ft)	2	5	--	--	--	--	1	8	3.1
Helicopter	1	1	--	--	--	1	1	4	1.5
Fisherman	3	--	--	1	--	--	--	4	1.5
Motorized Canoe	--	1	--	--	--	--	--	1	0.4
Kayak	1	--	--	--	--	--	--	1	0.4
Nestwatcher	--	1	--	--	--	--	1	2	0.8
Total	143	91	2	2	--	2	22	262	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=birds not in area, U=unknown.

Table 83. Watercraft compliance: weekend vs. weekday, Whiskey Spring BA, Arizona, 2015.

Date	Boats at closure line[1]	Boats in closure[2]	Jet ski events in closure	Agency boats in closure	Total	Percent
Weekend	2,427	162	14	5	2,608	84.7
Weekday	435	25	3	8	471	15.3
Total	2,862	187	17	13	3,079	

[1]Data collected Feb 7 through April 26, but not afterward.
[2]Includes the categories of boats, fishing by boat, fisherman, canoe and kayak.

Table 84. Observed forage events and success, Whiskey Spring BA, Arizona, 2015.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	5	3-2	5	3-2
Female	--	--	--	--
Total	5	3-2	5	3-2

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U=Successful – Unsuccessful forage events.

Table 85. Observed prey types delivered to the nest, Whiskey Spring BA, Arizona, 2015.

Sex	Fish	Birds	Reptiles	Unknown	Total	Percent
Male	64	1	1	10	76	92.7
Female	1	1	--	3	5	6.1
Unknown	--	--	--	1	1	1.2
Total	65	2	1	14	82	
Percent	79.3	2.4	1.2	17.1		

Table 86. Observed prey species delivered to the nest, Whiskey Spring BA, Arizona 2015.					
Sex	Fish	Birds	Reptiles	Total	Percent
	CA[1]	WS	SS		
Male	1	--	1	2	50.0
Female	--	--	--	--	--
Unknown	1	1	--	2	50.0
Total	2	1	1	4	
Percent	50.0	25.0	25.0		

[1]CA=common carp, WS=waterfowl species, SS=snake species.

Table 87. Bald eagle habitat analysis at the Whiskey Spring BA, Arizona, 2015.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
68.7	SO	Left	No	1	RB	SO
68.8	CT	Left	No	1	RB	CL
68.9	DW	Left	No	1	RB	--
69.0	CT	Left	No	1	RB	CL
69.0	CF	Left	Yes	1	RB	CL
69.1	PT	Left	Yes	1	RB	CL
69.1	HL	Left	Yes	1	RB	CL
69.2	CF	Left	Partial	1	RB	CL
69.3	SO	Left	No	1	RB	SO

[1]River kilometer (Hunt et. al. 1992).
[2]SO=shore, CT= cliff top, DW= driftwood, CF= cliffs; PT=pinnacle top, HL=hillside.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]RB=river bend.
[6]SO=shore, CL=cliffs.

Table 88. Bald eagle habitat use at the Whiskey Spring BA, Arizona, 2015.												
Perch Location[1]	PW[2,3]	PP	SS	DW	PR	GN	PX	ES	PV	OT	Total	Percent
68.4	65	--	--	10	--	--	--	--	--	--	75	0.5
68.7	426	--	125	109	--	--	--	--	--	8	668	4.2
68.8	2,647	423	--	13	--	22	8	--	14	8	3,135	19.9
68.9	743	101	--	17	--	--	--	--	--	--	861	5.5
69.0	4,896	359	--	--	--	30	22	--	1	13	5,321	33.7
69.1	248	60	--	--	--	3	--	--	--	--	311	2.0
69.2	2,457	21	19	--	117	--	8	--	2	--	2,624	16.6
69.3	2,580	43	--	12	--	--	9	--	--	--	2,644	16.7
69.5	79	--	22	--	--	--	--	22	--	28	151	1.0
Total	14,141	1,007	166	161	117	55	47	22	17	57	15,790	
Percent	89.6	6.4	1.1	1.0	0.7	0.3	0.3	0.1	0.1	0.4		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, SS=standing on shore, DW=drinking water, PR=perched roosting, GN=gathering nest material, PX=perched various, ES=eating on shore, PV=perched vocalizing, OT=other (includes perched drying, perched eating, bathing, various activities).

APPENDIX S: WHITE HORSE BREEDING AREA SUMMARY

Table 89. Observed human activity and bald eagle behavior, White Horse BA, Arizona, 2015.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	6	7	3	3	--	--	--	19	38.8
Fishermen	5	6	--	--	--	2	--	13	26.5
Kayak/Canoe	3	3	--	4	--	--	--	10	20.4
Boat	--	2	--	1	--	--	--	3	6.1
Raft	1	--	--	--	--	--	--	1	2.0
Helicopter	--	1	--	--	--	--	--	1	2.0
Small Plane	--	1	--	--	--	--	--	1	2.0
Bicycle	--	1	--	--	--	--	--	1	2.0
Total	15	21	3	8	--	2	--	49	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=Left area, B=birds not in area, U=unknown.

Table 90. Observed forage events and success, White Horse BA, Arizona, 2015.						
Sex	Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	14	12-2	--	--	14	12-2
Female	12	10-2	1	1-0	13	11-2
Total	26	22-4	1	1-0	27	23-4

Table 91. Observed prey types delivered to the nest, White Horse BA, Arizona, 2015.						
Sex	Fish	Mammals	Birds	Carrion	Total	Percent
Male	19	2	1	1	23	53.5
Female	12	1	1	6	20	46.5
Total	31	3	2	7	43	
Percent	72.1	7.0	4.6	16.3		

Table 92. Observed prey species delivered to the nest, White Horse Lake BA, Arizona, 2015.							
Sex	Fish		Mammals	Birds		Total	Percent
	RT[1]	CR	GS	AC	WS		
Male	18	1	2	1	--	22	62.9
Female	9	3	--	--	1	13	38.9
Total	27	4	2	1	1	35	
Percent	77.1	11.4	5.7	2.9	2.9		

[1]RT=rainbow trout, CR=crappie, GS=ground squirrel species, AC=American coot, WS=waterfowl species.

Table 93. Bald eagle habitat analysis at the White Horse BA, Arizona, 2015.

Perch Location	Perch Type[1]	Side	Shade	Distance to H_2O[2]	H_2O Type[3]	Land Type[4]
P1	PO	--	No	1	RS	CF
P2	SO	--	No	1	RS	SO
P3	PO	--	No	2	RS	CF
P4	ST	--	No	1	RS	CF
P5	HS	--	No	2	RS	CF
P6	PO	--	No	1	RS	CF
P7	PO	--	No	1	RS	CF
P8	PO	--	No	1	RS	CF
P9	PO	--	No	1	RS	CF
P10	HS	--	Yes	2	RS	CF
P11	BO	--	Yes	1	RS	CF
P12	ST	--	No	1	RS	CF
P13	HS	--	No	1	RS	CF
P14	PO	--	No	1	RS	CF
P15	ST	--	No	1	RS	CF
P16	SP	--	No	--	RS	SO
P17	HS	--	No	1	RS	CF
P18	OA	--	Yes	1	RS	CF
P19	SO	--	No	1	RS	SO
P20	PS	--	Yes	1	RS	CF
P21	PS	--	Yes	1	RS	CF
P22	PS	--	Partial	3	RS	CF
P23	PO	--	No	2	RS	CF
P24	SG	--	No	1	RS	CF
P25	PO	--	No	1	RS	CF
P26	HS	--	No	2	RS	CF
P27	ST	--	Yes	1	RS	CF
P28	HS	--	No	1	RS	CF
P29	PO	--	Partial	2	RS	CF
P30	PO	--	No	1	RS	CF
P31	SG	--	No	1	RS	CF
P32	PO	--	No	1	RS	CF
P33	HS	--	No	1	RS	CF
P34	PO	--	No	1	RS	CF
P35	PS	--	Partial	2	RS	CF
P36	PO	--	Yes	1	RS	CF
P37a	PO	--	No	3	RS	CF
P37b	PO	--	No	3	RS	CF

[1]BO=boulder, HS=hard snag (main branches only), OA=oak, PO=large ponderosa, PS=pine/conifer, 2nd growth/10-20 m, SG=soft snag, SO=shore, SP=stump, ST=snag top.
[2]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[3]RS=reservoir.
[4]CF=conifer forest, SO=shore.

Table 94. Bald eagle habitat use at the White Horse BA, Arizona, 2015.

Perch Location	PW[1,2]	PH	PP	CL	PD	PV	PI	PX	GM	OT	Total	Percent
P1	--	7	12	--	--	--	--	--	--	--	19	0.2
P2	--	--	--	--	--	--	--	--	2	3	5	0.1
P3	13	--	--	--	--	--	--	--	--	--	13	0.1
P4	791	75	318	--	70	--	18	--	--	--	1,272	14.5
P5	--	32	--	--	--	--	--	--	--	--	32	0.4
P6	52	35	--	--	--	--	--	--	--	--	87	1.0
P7	2,306	426	266	--	33	17	--	--	--	2	3,050	34.7
P8	2	7	11	--	--	--	11	--	--	--	31	0.4
P9	21	29	--	--	--	--	--	--	--	--	50	0.6
P10	5	--	--	--	--	--	--	--	--	--	5	0.1
P11	4	--	--	--	--	--	--	--	--	--	4	0.0
P12	211	134	44	--	--	41	34	--	--	--	464	5.3
P13	16	18	26	--	--	1	--	--	--	--	61	0.7
P14	--	--	3	--	--	--	--	--	--	--	3	0.0
P15	886	387	57	190	--	16	2	10	--	3	1,551	17.6
P16	--	--	--	--	--	--	--	--	--	5	5	0.1
P17	41	--	15	--	--	--	--	--	--	--	56	0.6
P18	--	12	--	--	--	--	--	--	--	--	12	0.1
P19	--	--	--	--	--	--	--	--	7	4	11	0.1
P20	--	22	--	--	--	--	--	--	--	--	22	0.2
P21	--	27	--	--	--	--	--	--	--	--	27	0.3
P22	3	--	--	--	--	--	--	--	--	--	3	0.0
P23	19	--	--	--	--	--	--	--	--	--	19	0.2
P24	332	89	94	--	--	3	--	--	--	--	518	5.9
P25	12	--	--	--	--	--	--	--	--	--	12	0.1
P26	20	--	9	--	--	--	--	--	--	--	29	0.3
P27	426	11	36	--	--	--	--	--	--	--	473	5.4
P28	64	--	5	--	--	--	--	--	--	--	69	0.8
P29	91	--	17	--	--	--	--	--	--	--	108	1.2
P30	152	--	11	--	--	--	--	--	--	--	163	1.9
P31	187	--	--	--	--	--	--	--	--	--	187	2.1
P32	11	--	--	--	--	--	--	--	--	--	11	0.1
P33	11	--	--	--	--	--	--	--	--	--	11	0.1
P34	143	--	28	--	--	--	--	--	--	--	171	1.9
P35	195	--	--	--	--	--	--	--	--	--	195	2.2
P36	34	--	--	--	--	--	--	--	--	--	34	0.4
P37	19	--	--	--	--	--	--	--	--	--	19	0.2
Total	6,067	1,311	952	190	103	78	65	10	9	17	8,802	
Percent	68.9	14.9	10.8	2.6	1.2	0.9	0.7	0.1	0.1	0.2		

[1]Observation time (minutes).

[2]PW=perched watching, PH=perched hunting, PP=perched preening, CL=perched close to mate, PD=perched drying, PV=perched vocalizing, PI=perched interacting, PX=perched various, GM=gathering material, OT=other (includes perched with prey, standing on shore, perched on ground, perched eating).

APPENDIX T: WOODS CANYON BREEDING AREA SUMMARY

Table 95. Observed human activity and bald eagle behavior, Woods Canyon BA, Arizona, 2015.

Human Activity[1]	N[2]	W	R	F	L	B	U	Total	Percent
Hikers	26	7	--	--	--	2	--	35	60.3
Agency Worker	--	6	--	--	--	--	--	6	10.3
Small Plane	4	--	--	--	--	--	1	5	8.6
Fisherman	4	--	--	--	--	--	--	4	6.9
Helicopter	--	2	1	--	--	--	--	3	5.2
Dog	3	--	--	--	--	--	--	3	5.2
Photographer	1	--	1	--	--	--	--	2	3.4
Total	38	15	2	--	--	2	1	58	

[1]Includes only activities in or at the closure.
[2]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 96. Observed forage events and success, Woods Canyon BA, Arizona, 2015.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	19	16-3	19	16-3
Female	27	26-1	27	26-1
Tandem	2	1-1	2	1-1
Unknown	7	6-1	7	6-1
Total	55	49-6	55	49-6

[1]E=A single forage event, not the number of attempts during 1 event.
[2]S-U=Successful – Unsuccessful forage events.

Table 97. Observed prey types delivered to the nest, Woods Canyon BA, Arizona, 2015.

Sex	Fish	Unknown	Total	Percent
Male	41	5	46	53.5
Female	31	5	36	41.9
Unknown	3	1	4	4.6
Total	75	11	86	
Percent	87.2	12.8		

Table 98. Observed prey species delivered to the nest, Woods Canyon BA, Arizona 2015.

Sex	Fish		Total	Percent
	RT[1]	SF		
Male	23	1	24	58.5
Female	15	--	15	36.6
Unknown	2	--	2	4.9
Total	40	1	41	
Percent	97.6	2.4		

[1]RT=rainbow trout, SF=sunfish.

Table 99. Bald eagle habitat analysis at the Woods Canyon BA, Arizona, 2015 (continued next page).

Lake km[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.0	PS	Partial	2	RS	CF
0.2	PO	Partial	2	RS	CF
0.3a	PS	Partial	2	RS	CF
0.3b	PO	Partial	3	RS	CF
0.4	PO	Partial	1	RC	CF
0.5a	ST	No	1	RC	CF
0.5b	SG	Partial	1	RC	CF
0.6a	PO	Partial	3	RC	CF
0.6b	PO	Partial	4	RC	CF
0.6c	PS	Partial	1	RC	CF
0.6d	SG	Partial	1	RC	CF
0.7a	ST	Partial	3	RC	CF
0.7b	PS	Partial	4	RC	CF
0.7c	PO	No	5	RC	CF
0.7d	LG	No	1	RC	CF
0.7e	SO	No	1	RC	CF
0.7f	PO	Yes	1	RC	CF
0.8a	SG	No	1	RC	CF
0.8b	SO	No	1	RC	SO
0.8c	PO	Partial	2	RC	CF
0.8d	SG	No	6	RC	CF
0.9a	PO	No	1	RS	CF
0.9b	ST	Partial	1	RS	CF
0.9c	SO	Partial	1	RS	SO
0.9d	LG	Yes	1	RS	CF
1.0a	SC	Partial	5	RS	CF
1.0b	ST	No	1	RS	CF
1.0c	PS	Partial	1	RS	CF
1.0d	PO	Partial	3	RS	CF
1.0e	ST	No	5	RS	CF
1.0f	HS	Partial	1	RS	CF
1.0g	HS	Partial	5	RS	CF
1.1a	RW	Yes	1	RS	SO
1.1b	ST	No	1	RS	CF
1.1c	PS	Yes	1	RS	CF
1.1d	HS	No	1	RS	CF
1.1e	PO	Partial	2	RS	CF
1.2a	PO	Yes	5	RS	CF
1.2b	PS	Partial	1	RS	CF
1.2c	ST	Partial	1	RS	CF
1.2d	ST	Partial	2	RS	CF
1.2e	HS	No	1	RS	CF
1.2f	HS	No	2	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]HS=hard snag, LG=log, PO=pine/conifer, old growth/20-30+ m., PS=pine/conifer, 2nd growth/10-20+ m, RW=rock in water, SC=conifer snag, SG=soft snag, SO=shore, ST=Snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RC=reservoir cove, RS=reservoir main body.
[5]CF=conifer forest SO=shore.

Table 99. continued.

Lake km[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
1.2g	HS	No	5	RS	CF
1.3a	HS	Partial	1	RS	CF
1.3b	HS	No	3	RS	CF
1.4a	PO	Partial	1	RS	CF
1.4b	SO	No	1	RS	SO
1.7a	SO	Partial	1	RC	SO
1.7b	PO	Partial	1	RC	CF
1.8	PS	Yes	1	RS	CF
2.0	PO	Partial	3	RS	CF
4.2	PS	Yes	1	RS	CF
4.5a	SC	Partial	1	RS	CF
4.5b	PS	Partial	1	RS	CF
4.5c	PO	Partial	2	RS	CF
4.6a	PO	Partial	1	RS	CF
4.6b	PO	Partial	4	RS	CF
4.7a	ST	Partial	1	RS	CF
4.7b	PO	Partial	1	RS	CF
4.7c	PO	Partial	4	RS	CF
4.8a	ST	Partial	1	RS	CF
4.8b	PO	Partial	3	RS	CF
4.8c	PS	Partial	1	RS	CF
4.9a	PO	Partial	1	RS	CF
4.9b	SG	Partial	1	RS	CF
4.9c	PS	Partial	1	RS	CF
4.9d	HS	No	1	RS	CF
5.0	PO	Partial	1	RS	CF
5.1a	PS	Partial	1	RS	CF
5.1b	PO	Partial	1	RS	CF
5.2	PS	No	1	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]HS=hard snag, LG=log, PO=pine/conifer, old growth/20-30+ m., PS=pine/conifer, 2nd growth/10-20+ m, RW=rock in water, SC=conifer snag, SG=soft snag, SO=shore, ST=Snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RC=reservoir cove, RS=reservoir main body.
[5]CF=conifer forest SO=shore.

Table 100. Bald eagle habitat use at the Woods Canyon BA, Arizona, 2015.

Lake km[1]	PW[2,3]	PX	PH	CL	PV	PP	DW	PG	PE	ES	OT	Total	Percent
0.0	--	--	30	--	--	--	--	--	--	--	--	30	0.3
0.2	155	--	--	--	--	--	--	--	--	--	--	155	1.7
0.3	58	--	--	--	2	12	--	--	--	--	--	72	0.8
0.4	18	--	--	--	--	--	--	--	--	--	--	18	0.2
0.5	12	--	70	--	5	--	--	--	--	--	--	87	1.0
0.6	68	1	51	--	--	6	--	--	--	--	--	126	1.4
0.7	62	1	20	--	17	--	--	--	13	5	17	135	1.5
0.8	24	1	--	--	--	--	23	--	--	7	--	55	0.6
0.9	1,036	236	21	54	--	19	--	27	13	--	11	1,417	15.6
1.0	153	--	--	--	--	28	--	--	--	--	--	181	2.0
1.1	209	11	98	--	--	--	--	1	--	--	--	319	3.5
1.2	125	1	1	--	--	--	--	--	--	--	3	130	1.4
1.3	25	--	--	--	--	--	--	--	--	--	13	38	0.4
1.4	28	--	12	--	--	--	1	--	1	--	--	42	0.5
1.7	72	--	--	--	--	--	7	--	--	--	--	79	0.9
2.0	74	--	--	--	1	--	--	--	--	--	--	75	0.8
4.2	24	--	--	--	--	--	--	--	--	--	--	24	0.3
4.5	3	11	33	27	--	--	--	--	--	--	--	74	0.8
4.6	231	--	--	--	132	--	--	--	--	--	--	363	4.0
4.7	1,644	263	--	134	--	9	--	--	--	--	--	2,050	22.5
4.8	713	--	2	--	--	--	--	--	--	7	--	722	7.9
4.9	2,256	56	33	47	2	--	--	--	--	--	--	2,394	26.3
5.0	228	1	70	5	7	--	--	--	--	--	--	311	3.4
5.1	55	138	--	--	--	--	--	--	--	--	--	193	2.1
5.2	--	--	2	--	--	--	--	--	--	--	--	2	<0.1
Total	7,273	720	443	267	166	74	31	28	27	19	44	9,092	
Percent	80.0	7.9	4.9	2.9	1.8	0.8	0.4	0.3	0.3	0.2	0.5		

[1]Lake kilometer (counterclockwise from middle of dam).
[2]Observation time (minutes).
[3]PW=perched watching, PX=perched various/other, PH=perched hunting, CL=perched very close to mate, PV=perched vocalizing, PP=perched preening, DW=drinking water, PG=perched ground, PE=perched eating, ES=eating on shore, OT=other (includes perched with prey, standing on shore, perched drying, bathing.