ARIZONA BALD EAGLE MANAGEMENT PROGRAM
2017 SUMMARY REPORT

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Photo by Kyle McCarty

Technical Report 311
Nongame and Endangered Wildlife Program
Terrestrial Wildlife Branch
Wildlife Management Division
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086
December 2017

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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 (U.S. Fish and Wildlife Service); Salt River Pima-Maricopa Indian Community; Salt River Project; Scorpion Bay Marina; 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, Prescott, and Tonto National Forests); and Verde Canyon Railroad.

Recommended Citation

McCarty, K.M., K.L. Licence, and K.V. Jacobson. 2017. Arizona bald eagle management program 2017 summary report. Nongame and Endangered Wildlife Program Technical Report 311. Arizona Game and Fish Department, Phoenix, Arizona.

ACKNOWLEDGMENTS

The authors acknowledge and appreciate the assistance of the following people: Arizona Department of Transportation; Nicole Rodriguez, Arizona Public Service; Sarah Kirk, Arizona State Parks Department; Arizona Army National Guard; Forest Highlands Golf Club; Mark Frank and Karen Shaw, Ft. McDowell Yavapai Nation; Damien Smith and Brendan Kinyon, Gainey Ranch Golf Club; Russell Benford and Charles Enos, Gila River Indian Community; The Hopi Tribe; Jan Miller, Joe Miller, Megan Mosby, and Alex Stofko, Liberty Wildlife Rehabilitation Foundation; Terry Gerber, David Jordan, and Kyle Randall, Maricopa County Parks and Recreation Department (and Desert Outdoor Center at Lake Pleasant); Arthur Benally and Mike Wrigley, National Park Service; Chad Smith, Navajo Department of Fish and Wildlife; Ann George and Duff Sorrels, Freeport McMoRan; Ross Goulet, Scott Mahon, Scott Maiden, Borden Miller, and Mandy Turner, Papillon Helicopters, Inc.; Christopher Horan and Gina Leverette, Salt River Pima-Maricopa Indian Community; Jeff Campbell, Nina Grimaldi, Mike Houser, John Knotts, Shea Meyer, Lesly Swanson, Marc Wicke, and Ruth Valencia, Salt River Project; Daniel Juan, San Carlos Apache Tribe; Tonto Apache Tribe; Aaron, Alvidrez, U.S. Air Force (Luke Air Force Base); Wade Eakle, U.S. Army Corps of Engineers; Chip Lewis, U.S. Bureau of Indian Affairs; Elroy Masters, U.S. Bureau of Land Management; Carol Evans and Nichole Olsker, U.S. Bureau of Reclamation; Greg Beatty, Kathleen Blair, Shaula Hedwall, Carrie Marr, and Mary Richardson, U.S. Fish and Wildlife Service; Carol Beardmore, U.S. Fish and Wildlife Service Sonoran Joint Venture; Janie Agyagos, Tony Bush, Charles Denton, Noel Fletcher, Jill Holderman, Travis Largent, Loren LeSueur, Roger Joos, Kelly Kessler, Ariel Leonard, Jacob Naranjo, Steve Plunkett, and Justin Schofer, U.S. Forest Service; Robin Brean and Teresa Propeck, Verde Canyon Railroad; Cynthia Dale and Tim Gatewood, White Mountain Apache Tribe; George Andrejko, Donna Bailloux, James Driscoll, Suzanne Ehret, Nathan Gonzalez, Dan Groebner, Susi MacVean, David Majure, Gloria Morales, Lin Piest, and Tim Snow, Arizona Game and Fish Department. A special thanks goes out to the winter count surveyors and coordinators for their hard work and dedication, and volunteers Claudia Kirscher, Melanie Herring, and Marta Peddie.

This report, in part, summarizes the results of monitoring by the Arizona Bald Eagle Nestwatch Program using the breeding area reports submitted in 2017. Those include: Dwight Jones and Katy Hudler, Box Bar, Orme, and Granite Reef Breeding Areas (BA); Joe Peddie and Marta Peddie, Luna and Crescent BAs; Lindy Gasta and Nic Riso, Cliff and Tonto BAs; Zoe Johnston and Kumara MacLeod, Pinto BA; Leah Vader and Jen Ottinger, Doka, Sycamore, and Ft. McDowell BAs; Matthew Pierle and Eduardo Martinez Leyva, Goldfield & Kerr BAs; Larrea Cottingham and Ryan Gillespie, Pleasant and Rodeo BAs; Courtney Ross and Peter Rebholz, Whiskey Spring BA; Colton Langell and Wyatt Nimitz, Armer Gulch and White Horse Lake BAs; Eduardo Martinez Leyva and Zoe Johnston, Woods Canyon BA.

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ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2017 SUMMARY REPORT

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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 2012a). The 2012 finding was upheld by a U.S. District Court in 2014, and that decision was affirmed by an appellate court in 2017.

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. In April 2012, the USFWS proposed revisions to eagle take permits which would have extended programmatic permits to a maximum of 30 years (USFWS 2012b), a rule which was challenged in court and overturned. As a result, the USFWS developed a new rule in 2016 to reinstate a 30-year permit and other revisions to take permit implementation (USFWS 2016, 2017).

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 2017 results

for the following projects: Arizona Bald Eagle Winter Count, Occupancy and Reproductive Assessment, Nest Survey, and Arizona Bald Eagle Nestwatch Program.

STUDY AREA

Monitoring and surveys were conducted statewide, and Arizona bald eagle breeding areas (BAs) were located within six biotic communities (Brown 1994, The Nature Conservancy 2004): Sonoran Desertscrub (n=51 BAs) [Arizona Upland Subdivision (n=43); Lower Colorado River Valley Subdivision (n=8)], Rocky Mountain (Petran) Montane Conifer Forest (n=10), Semidesert Grassland (n=8), Plains and Great Basin Grasslands (n=7), Interior Chaparral (n=4), Great Basin Conifer Woodland (n=3), Mohave Desertscrub (n=1), and Subalpine Grassland (n=1). Other biotic communities visited included Chihuahuan Desertscrub and Madrean Evergreen Woodland.

The majority of bald eagle BAs in 2017 (69.4%, n=59) occurred between elevations of 142 m (466 ft.) and 1,024 m (3,360 ft.), and were located primarily in central Arizona within the riparian areas of the Sonoran Riparian Scrubland and Sonoran Interior Strands as described in Brown (1994) (Figure 1). Representative riparian vegetation included Fremont cottonwood (*Populus fremonti*), Goodding willow (*Salix gooddingii*), Arizona sycamore (*Platanus wrightii*), and nonnative salt cedar (*Tamarix* spp.). Surrounding uplands included the Sonoran Desertscrub-Arizona Upland subdivision, Interior Chaparral, Semidesert Grassland and Great Basin Conifer Woodland. These areas are commonly vegetated with blue palo verde (*Parkinsonia florida*), mesquite (*Prosopis* spp.), ironwood (*Olneya tesota*), saguaro (*Carnegiea gigantea*), teddy bear cholla (*Cylindropuntia bigelovii*), juniper (*Juniperus* spp.), and pinyon pine (*Pinus edulis*).

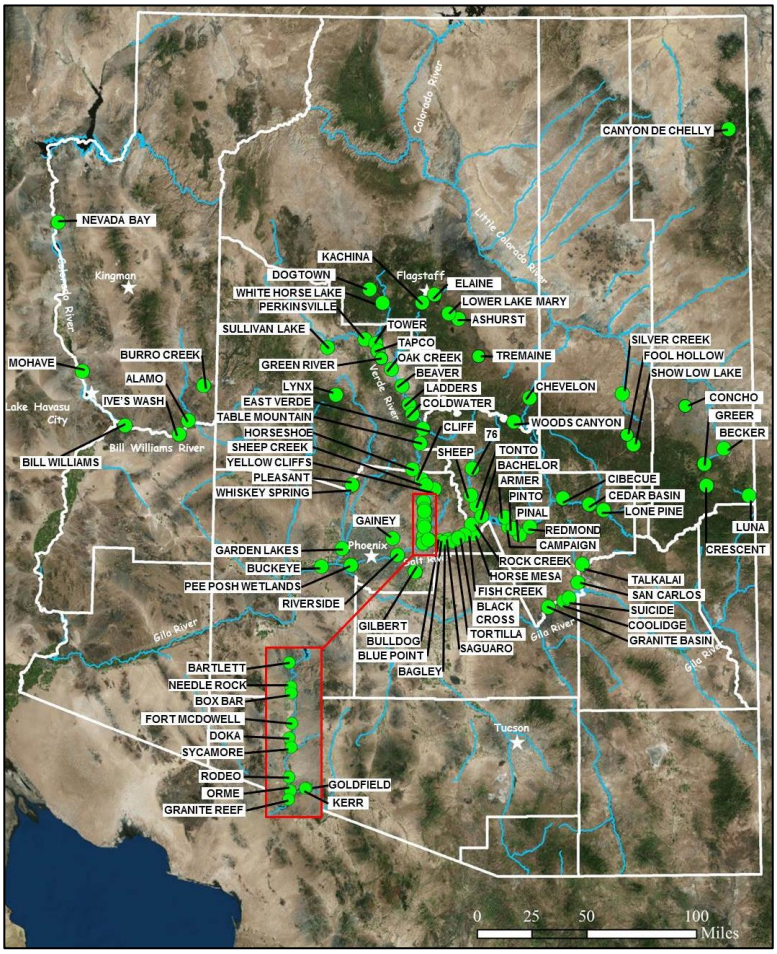

Figure 1. Location of known bald eagle breeding areas in Arizona, 2017.

In northwestern Arizona, two bald eagle BAs (Black Canyon and Nevada Bay) were located adjacent to the Colorado River within Mohave Desertscrub, where riparian vegetation was similar and uplands included creosote bush (*Larrea tridentata*), blackbrush (*Coleogyne ramosissima*), saltbush (*Atriplex spp.*), catclaw acacia (*Acacia sp.*), and a variety of cacti (e.g. silver cholla, *Cylindropuntia echinocarpa*). However at the Black Canyon BA, the eagle pair has only built a nest on the Nevada side of the river and is not included in regular monitoring by the Department.

Grassland communities contained a suite of mixed grasses and vegetation such as grama (*Bouteloua spp.*), agave (*Agave spp.*), yucca (*Yucca spp.*), and prickly pear cacti (*Opuntia spp.*), with degrees of invasion by scrubs, shrubs, and nonnative plants. In these areas, bald eagle nests occurred in stands of cottonwoods, ponderosa pine (*Pinus ponderosa*), or riverine cliffs. At higher elevations, BAs were found in Rocky Mountain Montane Conifer Forest, dominated by ponderosa pine, where riparian vegetation included narrow-leaf cottonwood (*Populus angustifolia*), thin-leaf alder (*Alnus tenuifolia*), Bebb's willow (*Salix bebbiana*), and coyote willow (*S. exigua*) (Brown 1994). Interior Chaparral consisted of pinyon-juniper woodland, shrub live oak (*Quercus turbinella*), and pointed (*Arctostaphylos pungens*) and pringle manzanita (*A. pringlei*).

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. Terrestrial prey comprises a substantial dietary proportion at some BAs, most notably Gunnison's prairie dogs (*Cynomys gunnisoni*) at Canyon de Chelly and Silver Creek, and may also influence habitat selection. Several BAs are located in the Phoenix metropolitan area but include no natural riparian communities, primarily containing artificial water formations such as recharge basins, urban ponds and lakes, and canals.

In 2017, BAs were located along: Burro, Cibecue, Oak, Pinal, Silver, Tonto, and Walnut creeks; Alamo, Apache, Ashurst, Bartlett, Canyon, Chevelon Canyon, Crescent, Dogtown, Fool Hollow, Greer, Horseshoe, Lower Lake Mary, Luna, Lynx, Pleasant, Roosevelt, Saguaro, San Carlos, Show Low, Talkalai, Tremaine, 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 have also occurred in ponderosa pine, sycamore, juniper, pinyon pine, willow, eucalyptus (*Eucalyptus sp.*), snags, and artificial structures (Grubb 1980, Hunt et al. 1992, McCarty and Jacobson 2012, McCarty et al. 2016).

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). The knowledge of wintering bald eagle habitat use allows for the consideration and implementation of management actions 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).

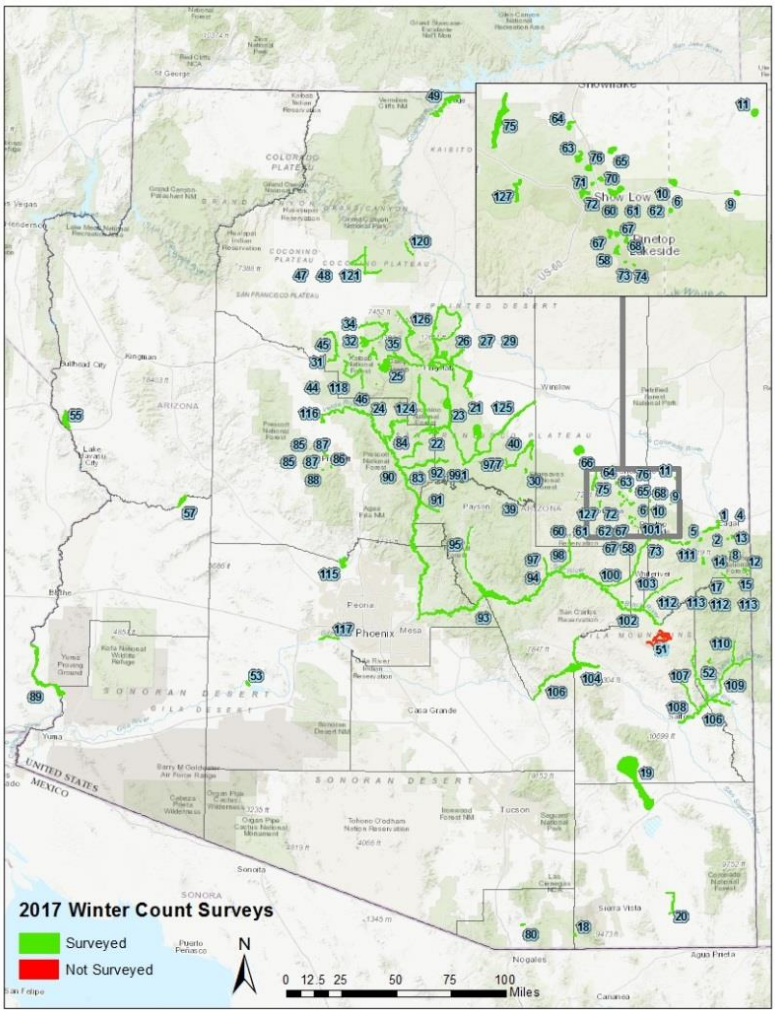

Figure 2. Map of the 2017 Arizona Bald Eagle Winter Count survey routes. See Appendix A for the associated route names.

Arizona's statewide winter counts resumed in 1992 using a combination of terrestrial (foot, snowmobile, vehicle), boat, and aircraft surveys. 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 guidance. 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 Raptor Survey (Figure 2).

METHODS

We continued to use, and strived to complete, the established 102 standardized survey routes for the 2017 Arizona bald eagle winter count. Additionally, six non-standard routes were completed and integrated into this document for management purposes and were included as non-standard routes in the results submitted to the ACE. We scheduled the winter count for January 9 to 15, 2017, 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 most effective 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 five days of helicopter time for 2-3 biologists and a pilot to fly 26 of the winter count routes. The helicopter's altitude and speed were dependent upon terrain, height, density of power lines, and wind speed. In general, 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*) and other raptors were also recorded during the survey, but are 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. Additionally, due to lack of surveyors the one route representing Graham County has not been surveyed in multiple years. This route will now be covered by air to ensure completion.

RESULTS AND DISCUSSION

The 2017 Arizona bald eagle winter count tallied 261 bald eagles, including 169 adults (65%), 84 subadults (32%), and 8 unknown eagles (3%) (Tables 1 and 2). Participants covered 101 of 102 standardized routes (99%) with a total survey effort of 9,522 minutes (159 hours) (Tables 1 and 2).

The highest total number of bald eagles observed during ground surveys occurred in Coconino County (n=34) (Table 1), and the largest concentration on a single ground survey occurred at Rainbow Lake in Pinetop, AZ (n=17) (Appendix A). Also, a large number of bald eagles were observed by helicopter along the lower Salt River (n=46).

An additional 30 bald eagles were counted on four non-standard routes (Appendix A). Two of these four non-standard routes resulted in 29 bald eagles observed, Buckhead Mesa Landfill and Point of Pines Lake (aerial). The Point of Pines route was historically surveyed by ground, but due to difficulty conducting ground based surveys, it was surveyed via helicopter this year. As recommended by the national coordinators, Point of Pines Lake (aerial) was assigned a new route number. These two new routes will be included in the standardized route analysis of future Department technical reports, and will be included in the national trend analysis after four consecutive years of survey.

Table 1. Summary of the Arizona bald eagle winter count 2017.

Survey areas	Routes	Minutes	Adults	Subadults	Unknown[1]	Total	Total/ Hr.
Apache County	15	641	13	7	0	20	1.9
Cochise County	2	300	1	0	0	1	0.2
Coconino County	34	4,851	47	25	8	80	1.0
Graham County	Not surveyed.						
Mohave County	1	121	3	1	0	4	2.0
Navajo County	16	548	16	8	0	24	2.6
Santa Cruz County	1	60	0	0	0	0	0.0
Yavapai County	6	1,710	8	3	0	11	0.4
Yuma and La Paz County	1	370	0	4	0	4	0.6
Verde River drainage	3	267	17	7	0	24	5.4
Salt River drainage	9	412	45	25	0	70	10.2
Gila River drainage	8	194	10	3	0	13	4.0
Various helicopter	5	48	9	1	0	10	12.5
Totals	101	9,522	169	84	8	261	1.6

[1] Unknown age bald eagles and unidentified eagles.

Table 2. Summary of Arizona bald eagle winter counts 2005-2017.

Year	Survey time (min)	Surveys completed	Birds/hour	Adults	Subadults	Unknown[1]	Total Birds
2005	8,910	97 (84%)	1.5	153 (68%)	56 (25%)	15 (7%)	224
2006[2]	10,074	104 (100%)	1.9	239 (74%)	77 (24%)	7 (2%)	323
2007	11,632*	100 (96%)	1.4	192 (68%)	81 (29%)	8 (3%)	281
2008[3]	9,362	96 (94%)	1.2	152 (82%)	29 (16%)	4 (2%)	185
2009	9,357	94 (92%)	1.3	139 (68%)	62 (30%)	3 (2%)	204
2010	9,138*	96 (94%)	1.7	159 (63%)	81 (32%)	12 (5%)	252
2011	8,713*	93 (91%)	1.5	157 (71%)	57 (26%)	8 (4%)	222
2012	10,320	100 (98%)	1.7	189 (63%)	94 (32%)	15 (5%)	298
2013	9,902*	98 (96%)	1.5	169 (66%)	76 (30%)	10 (4%)	255
2014	9,325	98 (96%)	1.7	188 (71%)	77 (29%)	1 (0.4%)	266
2015	8,989	93 (91%)	1.4	141 (69%)	53 (26%)	10 (5%)	204
2016	8,814	98 (96%)	1.7	161 (65%)	71 (29%)	17 (7%)	249
2017	9,522	101 (99%)	1.6	169 (65%)	84 (32%)	8 (3%)	261
Average	9,408	98 (96%)	1.5	170 (69%)	69 (28%)	9 (4%)	248

[1]Unknown age bald eagles and unidentified eagles.
[2]Beginning of 104 standardized routes derived from the analysis of 1995-2005 surveys.
[3]Beginning of 102 standardized routes with Lake Meade and Lake Mohave routes dropped.
*Some survey times not recorded. Times averaged from reported times of previous counts.

The total of 261 bald eagles in 2017 was above the average of 248 birds observed annually during standardized counts, 2005-2016. Although the 2017 winter count was above the 10-year average, long-term winter count trends in the Southwest have decreased by 2.2% per year over 25 years (Eakle et al. 2015). While the number of bald eagles counted this year was about 5% greater than bald eagles counted last year, some of the difference this year can be attributed to a relatively high number of eagles on the lower Salt River, and in Coconino county. Another likely contributor was increased route coverage this year compared to last year (Table 2). The age composition of this year's count (65% adult, 32% subadult) approximated the average ratio of adults to subadults in Arizona's winter counts since 2005 (Table 2).

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 weather conditions (n=96), most responded that this year's weather was normal (51.0%), followed by mild (42.7%), very mild (5.2%), and harsh (1.0%). There were no responses for very harsh weather. Similarly, of those that rated ice cover (n=91), most responded that it was normal (50.5%), less than normal (27.5%), and much less than normal (22.0%). There were no responses for more than normal or much more than normal ice cover. 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 four bald eagles. The national coordinators require at least four years of data before a route is included in trend analyses, although highly productive routes will be added to Department standardized route analysis immediately.
3. Maintain winter count consistency by following established routes and methods to enable long-term analysis.
4. Continue updating the Terrestrial 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. Continue to collect data on wintering raptors along survey routes in addition to eagles.
7. Investigate potential to standardize methods for wintering raptor data collection with other states and organizations.
8. Work with partners and volunteers to improve route coverage, especially in underrepresented areas of the state. Investigate assigning new routes in nontraditional bald eagle wintering locations in urban areas.

OCCUPANCY AND REPRODUCTIVE ASSESSMENT AND NEST SURVEY

INTRODUCTION

The 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 and alternate nests also helps the SWBEMC to identify 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. Glinski 1985, Hildebrandt and Glinski 1987, McCarty et al. 2016). The Department administered and performed the 2017 surveys in cooperation with the SWBEMC.

METHODS

We monitored breeding activity at current and historic BAs, nest sites discovered between 1992 and 2016, and also investigated reports of bald eagles and nests by other agencies, biologists, and the public. Outside of known BAs, habitat quality, the presence of nests, previous sightings of bald eagles, and spacing between BAs prioritized survey effort. A two to three-person team conducted surveys between January and June 2017. Winter count flights (January), monthly ORA flights (February to May), and nest search flights (March 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-June).

Helicopters, provided by Arizona Public Service (APS), SRP, and USBR, were flown 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. Boats, Off-Highway Vehicles (OHVs), and vehicles were used to access survey areas. We used Questar® spotting scopes (40-160x), binoculars (10x), nest map atlases from Hunt et al. (1992) and SRP (2015), and handheld GPS units to relocate historic 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. 2016).

Determination of breeding status followed operational definitions derived from Postupalsky (1974, 1983), Steenhof and Kochert (1982), and Driscoll (2010) (Appendix B). Additionally, we used 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.

Due to the increase in the number and proximity of BAs in the last decade, some territories have been segmented into multiple smaller territories as pairs of eagles move in and create occupancies. Breeding area names are assigned to each of the new segments. In the event of a reduction in the number of occupied BAs, leaving one pair in an area previously occupied by two or more pairs, then occupancy status will be assigned to the breeding area that existed first.

RESULTS

All known BAs (n=85) were examined for breeding activity (Figure 1). Of 68 occupied BAs, 60 were active, and 35 pairs successfully produced 63 fledglings (Table 3; Appendix C). Noteworthy findings of the 2017 nest survey include four new bald eagle BAs, 13 new alternate nests within BAs (Box Bar #6, Dogtown #3, Gainey #2, Garden Lakes #2, Lynx #6, Pee Posh Wetlands #7, Pinal #11, Pinto #10, Saguaro #3, Tonto #6 and #7, Woods Canyon #10 and #11), 7 fallen nests within BAs (Chevelon #3 and #4, Dogtown #2, Fool Hollow #1, Horseshoe #16, Lone Pine #8, Lower Lake Mary #2), and 41 new potential nests at 20 sites (Big Sand Bar #1, Blue Ridge Reservoir #8, Buckskin 1 #1, Buckskin 2 #1-2, Buckskin 3 #1-2, Buckskin 4 #1, Buckskin 5 #1-5, Buckskin 6 #1-4, Buckskin Mesa #1-5, Cross Current #1, Indian Rapids #1, Knoll Lake #6-7, Malpais #1-2, Mile 320 #1-5, Mount Davis #4-5, Needles Eye #2, Rawhide 1 #3, Roaring Rapids #1-2, Scholtz Lake #1, and Upper Lake Mary #11).

Table 3. Summary of Arizona bald eagle productivity 2017.

Number of BAs	85	Number of Active BAs	60
Number of Occupied BAs	68	Number of Failed Breeding Attempts	25
Number of Eggs (minimum)	97	Number of Successful Breeding Attempts	35
Nest Success = 35/68	0.51	Number of Young Hatched	82
Mean Brood Size = 63/35	1.8	Number of Young Fledged	63
		Productivity = 63/68	0.93

Results of the individual flights are located in Appendix D. Areas worthy of further discussion (new nests, potential nest sites, historic BAs, new breeding areas, bald eagle observations, fallen nests) 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)

Big Sand Bar (Colorado River). – On March 20, a new large nest (#1) was found on a cliff.

Buckskin 1 (Bill Williams River). – On March 20, a new large nest (#1) was found on a cliff.

Buckskin 2 (Bill Williams River). – On March 20, two new large nests (#1 and #2) were found on cliffs.

Buckskin 3 (Bill Williams River). – On March 20, two new large nests (#1-2) were found on cliffs.

Buckskin 4 (Colorado River). – On March 20, a new large nest (#1) was found on a cliff.

Buckskin 5 (Colorado River). – On March 20, five new large nests (#1-5) were found on cliffs. A red-tailed hawk was incubating in nest #1.

Buckskin 6 (Colorado River). – On March 20, four new large nests (#1-4) were found on cliffs.

Concho (new BA). – In March, the Department received confirmation of an adult bald eagle incubating in a tree nest in the Concho area. On April 17, the nest (#1) was empty.

Cross Current (Colorado River). – On March 20, a new large nest (#1) was found on a cliff.

Indian Rapids (Colorado River). – On March 20, a new large nest (#1) was found on a cliff.

Malpais (Colorado River). – On March 20, two new large nests (#1-2) were found on cliffs.

Mile 320 (Colorado River). – On March 20, five new large nests (#1-5) were found on cliffs.
Roaring Rapids (Colorado River). – On March 20, two new large nests (#1-2) were found on cliffs.

Green River (new BA). – In late May 2016 the USFS provided the Department with a report from the public of a possible bald eagle nest on private property along the Verde River in the Cottonwood area. Early in January 2017, the USFS forwarded a photo from the landowner of a pair of adults standing in a nest. On January 6, the nest (#1) was found in a cottonwood tree and one adult bald eagle was perched downstream. On January 30, an adult was incubating in the new nest, and two nestlings were seen on March 22.

Table 4. 2017 Arizona bald eagle nest survey summary, new locations.

Location (*)	Date(s)	Survey Method	Results
Big Sand Bar (3NE123)	3/20	Helicopter	New large nest (#1) found on cliff. No eagles.
Buckskin 1 (4NE083)	3/20	Helicopter	New large nest (#1) found on cliff. No eagles.
Buckskin 2 (4NE084)	3/20	Helicopter	Two new large nests (#1, #2) found on cliff. No eagles.
Buckskin 3 (4NE085)	3/20	Helicopter	Two new large nests (#1, #2) found on cliff. No eagles.
Buckskin 4 (4NE087)	3/20	Helicopter	New large nest (#1) found on cliff. No eagles.
Buckskin 5 (4NE088)	3/20	Helicopter	Red-tailed hawk incubating in large nest (#1) on cliff. Four other new large nests (#2-5) on cliffs. No eagles.
Buckskin 6 (4NE089)	3/20	Helicopter	Four new large nests (#1-5) on cliffs. No eagles.
Buckskin Mesa (4NE086)	3/20	Helicopter	Five new large nests (#1-5) on cliffs. No eagles.
Concho	4/17	Helicopter	Nest #1 empty.
Cross Current (3NE122)	3/20	Helicopter	At least one new large nest (#1) on cliff. No eagles.
Green River	1/6, 1/30, 3/22, 4/20, 5/2, 5/17	Helicopter	1/6: New nest #1 found. One adult in area. 1/30: Adult incubating in nest #1.
Indian Rapids (3NE124)	3/20	Helicopter	New large nest (#1) found on cliff. No eagles.
Malpais (3NE126)	3/20	Helicopter	Two new large nests (#1, 2) found on cliff. No eagles.
Mile 320 (3NE127)	3/20	Helicopter	Five new large nests (#1-5) found on cliff. No eagles.
Roaring Rapids (3NE125)	3/20	Helicopter	Two new large nests (#1, 2) found on cliff. No eagles.
Kinnikinick Lake	5/2	Helicopter	No nests or eagles.
Scholtz Lake	5/2	Helicopter	New nest (#1) in pine tree. No eagles.

*Parentheses indicates site identification number in AGFD's golden eagle database.

Potential Nest Sites (Table 5)

Bear Canyon Lake. – On May 2, ospreys (*Pandion haliaetus*) were incubating in nests #3 and #5. Nests #1, #2, and #4 were not found. No bald eagles were seen.

Blue Ridge Reservoir. – On May 2, nest #2 was not seen and nest #6 was fallen. Nest #7 and a new large nest (#8) in a snag both had greenery.

Fool Hollow Lake (new BA). – On January 31, nest #1 was fallen and an adult bald eagle was perched near a new nest (#3) in a live pine tree. On February 24 and March 13, an adult was incubating in nest #3 (Figure 3).

George's Basin. – On January 11 and 31, one adult was perched by nest #1.

Granite. – On March 22, a golden eagle was incubating in nest #2.

JD Dam Lake. – On May 2, ospreys were incubating in nests #1 and #3. Nest #2 was fallen. No bald eagles were seen.

Kaibab Lake. – On May 2, ospreys were incubating in nests #1, #2, #3, and #5, and standing in nest #6. All other known nests were empty and no bald eagles were observed.

Knoll Lake. – On May 2, an osprey was incubating in nest #5, and ospreys were standing in two new nests (#6 and #7) in snags. No bald eagles were seen.

Lost Mule. – On January 11, a golden eagle soaring over the area. Greenery was noted in nest #2 on January 11 and March 16.

Mount Davis. – On March 20, two new nests were found (#4 and #5).

Mormon Pocket. – On March 22, an adult golden eagle was incubating in nest #1.

Needles Eye. – On March 8, a new nest (#2) was found on a cliff.

Pineasco Creek. – On January 11 and April 17, two adults were perched in the area. One adult was seen on January 31.

Rawhide 1. – On March 20, a new large nest (#3) was found.

Sunflower Flat. – On May 2, an osprey was incubating in nest #1.

Tremaine (new BA). – On May 2 and June 5, an adult was incubating in nest #2 (Figure 3). On June 26, the USFS reported that no eagles were observed and the nesting attempt had failed.

Two Bar. – On January 10 and February 16, a pair of adults was seen perched near nest #2.

Figure 3. Fool Hollow (left) and Tremaine (right) breeding areas.

Upper Lake Mary. – On May 2, ospreys were incubating in nests #1-3 and #7, and an osprey was standing in nest #9. Nests #4 and #6 were not found. A new nest (#11) was found in a snag.

Willow Springs Lake. – On May 2, ospreys were incubating in nests #4 and #5, and standing in nests #2 and #7. Nests #1 and #3 were not found, and nest #6 was mostly fallen.

Table 5. 2017 Arizona bald eagle nest survey summary, potential nest sites.

Location*	Date(s)	Survey Method	Results
Bear Canyon Lake	5/2	Helicopter	Ospreys incubating in nest #3 and #5. Nests #1, 2, 4 not found.
Blue Ridge Reservoir	5/2	Helicopter	Nest #2 not seen, #6 fallen. Nest #7 with greenery. New snag nest (#8) with greenery.
Fool Hollow Lake	1/31, 2/24, 3/13, 3/27	Helicopter, Ground	1/31: Nest #1 fallen. New nest #3 found. One adult perched. 2/24: Adult incubating in nest #3.
George's Basin	1/11, 1/31, 3/16, 4/17	Helicopter	1/10 & 1/31: One adult perched by nest #1.
Granite (2GE049)	3/22, 4/20	Helicopter	3/22: Golden eagle incubating in nest #2. 4/20: At least one golden eagle nestling, 3 weeks old.
Hidden Valley	1/30	Helicopter	All known nests empty. No eagles.
JD Dam Lake	5/2	Helicopter	Ospreys incubating in nests #1, 3. Nest #2 fallen.
Kaibab Lake	5/2	Helicopter	Ospreys incubating in nests #1, 2, 3, and 5. Nests #4 and #7 empty. Osprey pair standing in nest #6.
Knoll Lake	5/2	Helicopter	Osprey incubating in nest #5. Ospreys standing in new snag nests #6 and #7.
Lost Mule (1GE056)	1/11, 1/31, 3/16	Helicopter	All known nests empty. No bald eagles.
Mount Davis (3NE119)	3/20	Helicopter	Nests #1-3 empty. Two new nests found (#4-5). No eagles.
Mormon Pocket (2GE031)	1/10, 3/22, 4/20	Helicopter	3/22: Golden eagle incubating in nest #1. 4/20: One golden eagle nestling, 2 weeks old.
Needles Eye	3/8	Helicopter	New nest #2 found. Nest #1 not checked.
Pineasco Creek	1/11, 1/31, 3/16, 4/17	Helicopter	1/10: Two adults in area. 1/31: One adult in area. 4/17: Pair of adults perched.
Porphyry Gulch (6NE129)	1/10, 3/8	Helicopter	All known nests empty. No eagles.
Rankin Ranch (3NE118)	3/20	Helicopter	All known nests empty. No eagles.
Rawhide 1 (3NE054)	3/20	Helicopter	New large nest (#3) found on cliff.
Sunflower Flat	5/2	Helicopter	Osprey incubating in nest #1.
Ringbolt Rapids (3NE115)	3/20	Helicopter	All known nests empty. No eagles.
Tremaine Lake	5/2, 6/5	Helicopter, Ground	5/2 & 6/5: Adult incubating in nest #2.
Two Bar	1/10, 1/31, 2/16, 3/7, 5/17	Helicopter	1/10 & 2/16: Two adults perched near nest #2.
Upper Lake Mary	5/2	Helicopter	Ospreys incubating in nests #1, 2, 3, 7, and standing in nest #9. Nests #4, 6 not found. Nest #8 empty. New nest #11 found.
Willow Springs Lake	5/2	Helicopter	Nests #1,3 not found, #6 mostly fallen, and #8 empty. Ospreys standing in nests #2 and #7. Ospreys incubating in nests #4 and #5.

*Parentheses indicates site identification number in AGFD's golden eagle database.

Historic Breeding Areas (Table 6)
No eagles were observed at any of the historic breeding areas surveyed in 2017.

Table 6. 2017 Arizona bald eagle nest survey summary, historic breeding areas.

Location	Date(s)	Survey Method	Results
Canyon	1/10	Helicopter	All known nests empty. No eagles.
Hell Point	1/6, 1/30, 3/22	Helicopter	All known nests empty. No eagles.
Mule Hoof	1/11, 1/31	Helicopter	All known nests empty. No eagles.
Winkelman	1/10	Helicopter	No nests or eagles.

Breeding Areas (Table 7)
Becker BA. – On March 16, an adult was perched in nest tree #2 and a subadult bald eagle (3-4 years old) was flying nearby. The public reported an immature and adult perching together earlier in March, which suggests a mate replacement occurred this year.

Bill Williams BA. – On March 20, we thoroughly searched the entire cottonwood grove along the river within the breeding area. No new nests and no bald eagles were found. Nest #2 was active with a red-tailed hawk incubating.

Black Canyon BA (Nevada). – On March 20, an adult was in nest #1 with one 3-week old nestling (Figure 4).

Box Bar BA. – On January 30, a new large nest (#6) was found in a sycamore tree and an adult was seen incubating in the nest on March 1 (Figure 4).

Figure 4. Black Canyon, Nevada (left) and Box Bar breeding areas (right).

Burro Creek BA. – An adult bald eagle was perched near nest #2 on February 21 and March 15.

Cedar Basin BA. – During three surveys (January 11 and 31, March 16) no eagles were seen and no new nests were found. None of the existing nests showed signs of occupancy, making 2017

the tenth consecutive year that this BA has been unoccupied. Cedar Basin will now be designated a historic BA, although it will be monitored during future aerial surveys.

Chevelon Canyon Lake. – On May 2, nests #3 and #4 were fallen. Two adult bald eagles were seen at the lake, however no new nests were discovered.

Coolidge BA. – On January 10, an adult was seen perched but no new nests were found. On January 31, an immature bald eagle was perched in the area.

Dogtown BA. – Nest #2 was discovered fallen on April 20. On May 2, an adult was seen brooding young in a new nest (#3).

Gainey Ranch. – In January, a new nest (#2) in a eucalyptus tree was reported by Joe Miller (for Liberty Wildlife) who monitored the nesting attempt throughout the season and observed incubation on January 14.

Garden Lakes. – In November 2016, a member of the public reported that eagles were building a new nest (#2) in a eucalyptus tree, and incubation behavior was seen by December 26. On January 6, an adult was confirmed incubating in the new nest.

Granite Basin BA. – On March 8, an adult bald eagle was perched in the area.

Kerr BA. – On January 10, an adult bald eagle flew to nest #1, and on January 31 an adult was perched by the nest. A pair of adults was regularly observed by nestwatchers throughout the season.

Lynx BA. – On January 30, an adult was incubating in a new nest (#6) in a live pine tree.

Orme BA. – On January 10, a pair of adults was perched on Coon Bluff. On January 30, two adults were in the area.

Pee Posh Wetlands BA. – In October 2016, the Gila River Indian Community observed eagles at a new large nest (#7) in a snag, and reported egg-laying sometime between December 20 and 25. On January 6, an adult was confirmed incubating in the new nest.

Pinal BA. – A new large nest (#11) was found on a cliff on January 10. On April 17, a common black hawk (*Buteogallus anthracinus*) was incubating on a cliff nest along Pinal Creek for the fourth straight year (Licence and McCarty 2015).

Pinto BA. – On January 10, an adult was perched by a new nest (#10) in a live cottonwood tree, and was seen incubating on January 31.

Redmond BA. – On January 31, two adults were seen perched by nest #5.

Saguaro BA. – On January 31, a new nest (#3) was found on a cliff between nest #1 and #2. On April 21, two adults were seen perched together.
Sheep Creek BA. – On January 30, two adults were seen standing in nest #1.

Suicide BA. – On January 10, one adult was standing in nest #2, and a second adult was flying. A single adult was observed near nest #1 on January 31, and standing in nest #1 on March 8.

Tonto BA. – On January 10, nest #5 was fallen. A new nest (#7) was found nearby in a broken snag. On January 31, an adult was incubating in a new nest (#6) in a live cottonwood tree.

Woods Canyon BA. – On April 6, Nestwatchers found an adult incubating in a new nest (#10) in a snag.

Table 7. 2017 Arizona bald eagle nest survey summary, breeding areas (continued next page).

Location	Date(s)	Survey Method	Results
Bill Williams	3/20	Helicopter	Red-tailed hawk incubating in nest #2. Nest #3 empty.
Black Canyon, NV	3/20	Helicopter	Adult in nest #1 with one nestling, 3 weeks old. Second adult perched.
Box Bar	1/6, 1/30, 3/1, 3/22	Helicopter, Ground	1/30: New nest #6 found. 3/1: Adult incubating in new nest.
Burro Creek	1/30, 2/21, 3/15	Helicopter	2/21 & 3/15: Adult perched near nest #2.
Chevelon Canyon Lake	5/2	Helicopter	Nests #3 an #4 fallen. No new nests. Two adults at lake.
Cedar Basin	1/11, 1/31, 3/16	Helicopter	All known nests empty. No eagles.
Coolidge	1/10, 1/31	Helicopter	1/10: One adult perched. 1/31: One immature perched.
Dogtown	4/20, 5/2, 5/19, 5/30, 6/19, 6/20	Helicopter, Ground	4/20: Nest #2 fallen. 5/2: Adult with ≥1 nestling in new nest (#3).
Garden Lakes	1/6, 1/30, 4/20, 4/29, 5/10	Helicopter, Ground	1/6: Adult incubating in new nest (#2). 1/30: Adult incubating or brooding.
Gainey	5/25	Ground	New nest (#2) reported in January.
Granite Basin	1/10, 1/31, 3/8	Helicopter	3/8: One adult perched.
Kachina	2/23, 3/13, 5/2	Helicopter	3/13: Osprey standing by nest #1. 5/2: Osprey incubating in nest #1.
Kerr	1/10, 1/31	Helicopter	1/10: One adult flew to nest #1. 1/31: One adult perched by nest #1.
Lynx	1/30, 3/22, 4/14, 4/20	Helicopter, Ground	1/30: Adult incubating in new nest (#6).
Nevada Bay	2/22, 3/20	Helicopter	3/20: Nest #1,4 empty. Nest #2 not found. Red-tailed hawk incubating in nest #3.
Orme	1/6, 1/10, 1/30, 1/31, 3/16, 3/22	Helicopter, Ground	1/10 & 1/30: Pair of adults in area.
Pee Posh Wetlands	1/6, 1/30, 3/22, 4/7	Helicopter, Ground	1/6: Incubating in new nest #7.
Pinal	1/10, 1/31, 3/16, 4/5, 4/17	Helicopter	1/10: New nest #11 found.

Table 7 continued.

Location	Date(s)	Survey Method	Results
Pinto	1/10, 1/31, 3/16, 4/11, 4/17, 5/17	Helicopter, Ground	1/10: Adult perched by new nest #10. 1/31: Adult incubating in nest #10.
Redmond	1/10, 1/31, 3/16, 4/17	Helicopter	1/31: Pair of adults perched.
Saguaro	1/10, 1/31, 3/16, 4/17	Helicopter, Boat	1/31: New nest #3 found. 4/21: Pair of adults in area.
Sheep Creek	1/6, 1/30, 3/22, 4/20	Helicopter	1/30: Two adults standing in nest #1.
Suicide	1/10, 1/31, 3/8	Helicopter	1/10: Two adults in area. 1/31: One adult in area. 3/8: One adult standing in nest #1.
Tonto	1/10, 1/31, 3/7, 3/16, 4/4, 4/17, 5/2	Helicopter, Ground	1/10: Nest #5 fallen. New nest #7 found. 1/31: Adult incubating in new nest #6.
Woods Canyon	5/2, 7/13	Helicopter, Ground	5/2: Adult brooding ≥1 nestling in new nest (#10).

Overview

Noteworthy findings of the 2017 ORAs and nest survey include four new bald eagle BAs, 13 new alternate bald eagle nests within BAs, 7 fallen or partially fallen nests within BAs, and 41 new potential nests at 20 sites. Two of the new BAs this year were on private land (Concho and Green River) that were reported by the public or through outside partners. Two other new BAs were on state and federal lands (Fool Hollow and Tremaine), occurring at lakes that had existing nest structures and have been surveyed in preceding years. The majority of the new potential bald eagle nest sites were found on the lower Bill Williams River, Colorado River (near Parker and between Lake Mohave and the Hoover Dam), and lakes along the Mogollon Rim.

Statewide productivity at Arizona bald eagle BAs in 2017 was 0.93 young fledged per occupied BA (Table 8), slightly lower than the ten-year average (0.98). Productivity varies from year to year, but the trend since 2004 has been stable (Figure 5). This year, productivity on the Verde River was relatively poor (0.44, n=16 BAs). The BAs on the regulated Verde River had higher productivity (0.67, n=9) compared to BAs on the unregulated portion of the river (0.14, n=7). Productivity on the Salt River (0.94, n=18) approximated the statewide average with the portion of the Salt River downstream of the Highway 288 bridge accounting for all of this year's production (1.21, n=14). At high-elevation lakes (>5,500 ft.), productivity was higher than the state average (1.0, n=15).

The continued creation of new breeding areas and discovery of new nests underscores the importance of ORA and survey flights as a means to consistently monitor bald eagle demography including population size, distribution, and reproductive success. The annual loss of alternate nests and the potential for further changes in the distribution further demonstrates the necessity of the surveys. Without the aid of these flights, we would not be able to accurately document important population parameters in the rugged terrain of Arizona.

Table 8. Arizona bald eagle 10-year productivity summary.										
	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Number of BAs	85	81	76	68	68	66	62	62	59	56
Number of occupied BAs	68	65	59	52	54	54	55	52	50	48
Occupancy rate (%)	80.0	80.2	77.6	76.5	79.4	81.8	88.7	83.9	84.7	85.7
Number of eggs (minimum)	97	97	90	73	79	80	80	69	78	71
Number of active BAs	60	60	56	47	49	50	51	48	48	44
Failed breeding attempts	25	19	17	17	14	19	17	21	19	14
Successful breeding attempts	35	41	39	30	35	31	34	27	29	30
Young hatched	82	79	75	58	71	66	66	57	68	65
Young fledged	63	65	66	43	58	52	56	44	47	53
Nest success	0.51	0.63	0.66	0.58	0.65	0.57	0.62	0.52	0.58	0.63
Mean brood size	1.8	1.6	1.7	1.4	1.7	1.7	1.6	1.6	1.6	1.8
Productivity	0.93	1.0	1.12	0.83	1.07	0.96	1.0	0.85	0.94	1.10

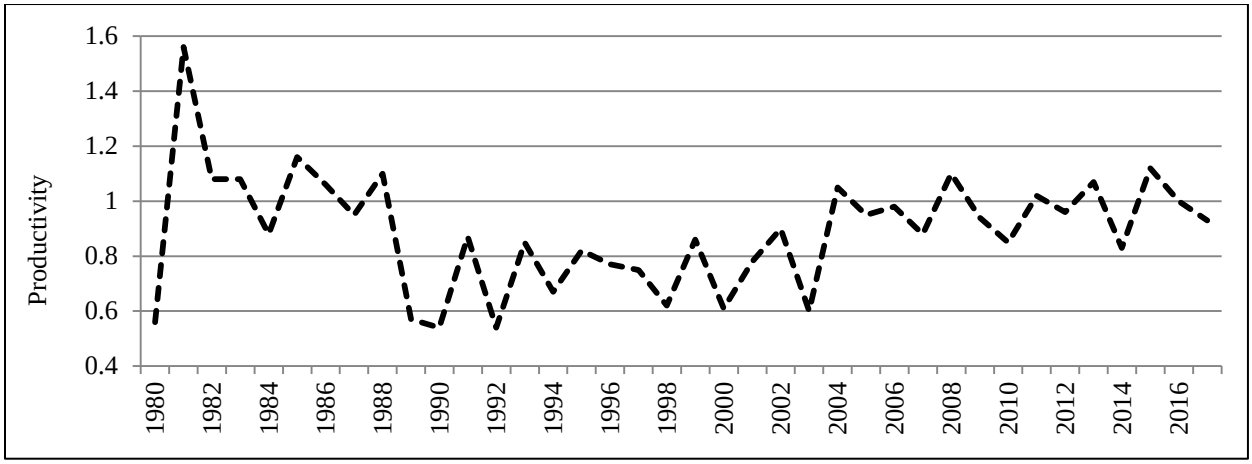

Figure 5. Productivity at bald eagle breeding areas in Arizona, 1980-2017.

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 recently discovered breeding areas, including Ashurst, Bachelor Cove, Black Cross, Chevelon, Concho, Dogtown, Elaine, Fool Hollow, Green River, Kachina, Mohave, Nevada Bay, Sheep Creek, Show Low Lake, and White Horse Lake.

4. Identify banded adults at sites where one or both of the pair has long tenure within the breeding area (e.g. Luna Lake) in order to detect when replacement of these important birds has occurred.
5. Examine the following areas for breeding bald eagles and/or nests:
   - Agua Fria River drainage – Up and downstream from Lake Pleasant.
   - Anderson Mesa and area lakes – Deep Lake, Horse Lake, Kinnikinick Lake, Long Lake, Marshall Lake, Potato Lake, Prim 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; George's Basin; Tanks Canyon.
   - Central and Eastern Mountain Lakes – Bear Canyon, Black Canyon, Blue Ridge, Cholla, Dry, JD Dam, Kaibab, Knoll, Lyman, Nash Creek, Point of Pines, Rogers, Willow Springs.
   - Colorado River drainage – Havasu National Wildlife Refuge, Topock Marsh, Black Canyon (Lake Mohave to Lake Mead), Lake Mead (Grand Wash), Nankoweap Creek.
   - 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 – Search at least two miles upstream on major washes and creeks around Roosevelt Lake (e.g., Salome Creek, Pinto Creek); Tonto Creek north of Tonto BA; Cherry Creek; Redmond BA to Canyon BA; Cibecue BA to Cedar Basin BA, side drainages above Highway 60 bridge (e.g., Sawmill Canyon, Carrizo Creek).
   - Verde River drainage – Wet Bottom Creek, Red Creek, Canyon Creek, Houston Creek, Fossil Creek, Camp Verde to Cottonwood, West Clear Creek, Beaver Creek, Oak 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 noteworthy discoveries at each BA monitored by the ABENWP in 2017. 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, Ladders, Luna, Pinto, Pleasant, Whiskey Spring, White Horse Lake, and Woods Canyon), those without (Armer Gulch, Granite Reef, Orme, Rodeo, Sycamore), and those monitored opportunistically for information (Bachelor Cove, Doka, Fort McDowell, Kerr). In the fall of 2016, 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 this year's pool of 48 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 5 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 ten days on/four 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 with 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 (3,281 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.

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.

At the Pleasant, Rodeo, Tonto, Whiskey Spring, White Horse, and Woods Canyon BAs, nestwatchers recorded human activity differently than described above. At the Pleasant and Rodeo BAs, nestwatchers recorded aircraft only if they were flying below 1,000 ft. above ground level. Also at the Rodeo BA, nestwatchers did not record the regular traffic passing on Highway

87. At the Tonto BA, nestwatchers had a limited view of the area surrounding the nest and ground-based activities were difficult to observe. At the Whiskey Spring BA, nestwatchers monitored compliance with the closure by documenting the number of boats and jet skis approaching the buoy line and those that entered. If the watercraft entered the closure and proceeded past the nestwatchers, they were documented as "inside the closure." They recorded compliance with the closure or those who were contacted by the nestwatchers as "at the closure." At the White Horse BA, neswatchers were only able to record human activity visible from the lake, generally a few hundred meters out from shore. At the Woods Canyon BA, there was a high volume of recreationists at the lake. There, nestwatchers only recorded eagle responses to activities within about 200 m of the nest or an eagle, as well as visitors to the observation point and any activity that elicited a significant response from an eagle.

RESULTS AND DISCUSSION

The ABENWP monitored 21 breeding areas in 2017 including Armer Gulch, Bachelor Cove, 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, 2 occupied-only, and 22 young fledged (Appendix C).

The Bachelor Cove, Box Bar, Cliff, Doka, Fort McDowell, Granite Reef, Kerr, Orme, and Tapco 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.

Armer Gulch Breeding Area (Appendix E, Figure 6)

Observation Period. – February 24 to March 17 (part-time), March 17 to May 9 (full-time). Total monitoring 43 days/359.1 hours.

Bald Eagle Identification. – The male was reported by nestwatchers as unbanded and in adult plumage (unknown origin). The female had a blue visual identification (VID) band on the left leg, no band present on the right leg, and was in adult plumage (unknown origin, but blue VID band consistent with Arizona).

Management Activities. – 1) The USFS placed "No Entry" signs around the nest area.

Human Activity. – Nestwatchers recorded 140 human activities. Terrestrial activity of five types represented 94.3% and aircraft activity (helicopters, small planes, and jets) 5.7%. One type of activity elicited one significant response from the breeding pair. The bald eagles flushed in response to one AGFD biologist.

Food Habits. – The nestwatchers observed three forage events, with fish accounting for 66.7%, and reptiles 33.3%. The male was successful in 100% (n=1), the female in 100% (n=1), and an unknown adult in 100% (n=1) of forage events. The breeding pair was observed delivering 50 prey items to the nest, of which the male delivered 36.0%, the female 36.0%, and an unidentified adult 28.0%. Fish comprised 62.0% of these deliveries, mammals and reptiles 2.0% each, and

unknown prey types 34.0%. Of the 20 prey items further identified, 65.0% were common carp (*Cyprinus carpio*), 20.0% were suckers (*Catostomus sp.*), 5.0% were catfish species (channel catfish [*Ictalurus punctatus*], flathead catfish [*Pylodictis olivaris*], or yellow bullhead [*Ameiurus natalis*]), 5.0% were ground squirrel species (*Spermophilus sp.*), and 5.0% were diamondback rattlesnake (*Crotalus atrox*).

Habitat Use. – The Armer Gulch nestwatchers identified ten separate perch locations, spanning 0.7 km of Cottonwood Wash ranging from river kilometer (rk) 4.3 to 5.0, and 10.4 km of Roosevelt Lake ranging from lake kilometer (lk) 20.0 to 30.4. The bald eagle pair spent 34.9% of the observed time at rk 4.3, 16.1% at lk 30.4, 12.1% at rk 4.5, 9.0% at lk 20.0, 8.8% at lk 30.2, 8.5% at lk 30.3, and 10.7% at the remaining locations.

Figure 6. Armer Gulch (left) and Crescent (right) breeding areas, Maricopa and Apache Counties. Photos by K. McCarty.

Crescent Breeding Area (Appendix F, Figure 6)
Observation Period. – June 23 to July 16. Total monitoring 20 days/189 hours.

Bald Eagle Identification. – The band status of the resident adult eagles at Crescent Lake was not determined.

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

Human Activity. – Nestwatchers recorded 422 human activities during the monitoring period. Terrestrial activity of 13 different types represented 83.6%, water pursuits (boaters, float tubers, kayaks/canoes) 16.1%, and aircraft (small planes) 0.2%. Three types of activity elicited three significant responses from the breeding pair. The bald eagles flushed in response to one canoe/kayak, one hiker, and one photographer.

Food Habits. – The nestwatchers observed 15 forage events, with fish accounting for 93.3% and birds 6.7%. The male was successful in 100% (n=6) and the female in 100% (n=9) of forage events. The breeding pair was observed delivering 15 prey items to the nest, of which the male delivered 40% and the female 60%. Fish comprised 93.3% and birds 6.7% of these deliveries. Of

the 15 prey items further identified, 80.0% were rainbow trout (*Oncorhynchus mykiss*), 13.3% were brook trout (*Salvelinus fontinalis*), and 6.7% were American coots (*Fulica americana*).

Habitat Use. – The Crescent nestwatchers identified 12 perch locations around Crescent Lake. The bald eagle pair spent 39.1% of the observed time at lake kilometer (lk) 2.15, 29.9% at lk 2.3, 13.7% at lk 2.25, 5.9% at lk 2.5, 5.6% at lk 2.1, and 5.7% at the remaining locations.

Goldfield Breeding Area (Appendix G, Figure 7)
Observation Period. – February 3 to April 23. Total monitoring 63 days/596 hours.

Bald Eagle Identification. – 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). The female was unbanded and in adult plumage (unknown origin).

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.

Human Activity. – Nestwatchers recorded 1,465 human activities during the observation period. Terrestrial activity of ten different types represented 90.3%, aircraft (helicopters, small planes, drones, motorized parachutes) 5.3%, and water activities (canoe/kayak, swimmer, tuber) 4.4%. Eight types of activities elicited 23 significant responses from the breeding pair. The bald eagles were restless in response to four motorized parachutes and two helicopters. The birds flushed in response to six hikers, four nestwatchers, two photographers, two helicopters, two motorized parachutes, and one small plane.

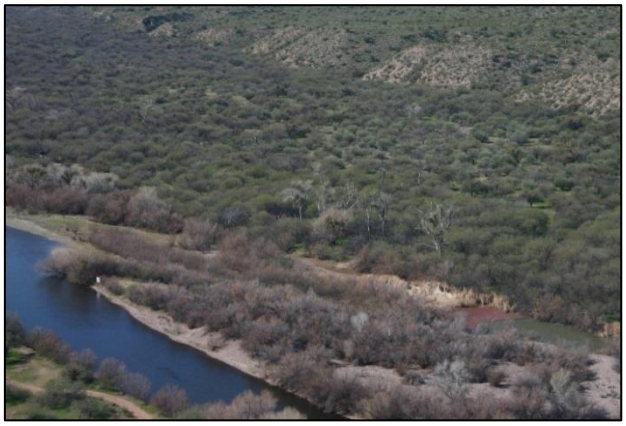

Figure 7. Goldfield breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Food Habits. – The nestwatchers observed nine forage events, with fish accounting for 88.9%, and birds 11.1%. The male was successful in 75.0% (n=4) and the female in 20.0% (n=5) of forage events. The breeding pair was observed delivering 54 prey items to the nest, of which the male delivered 59.3% and the female 40.7%. Fish comprised 55.6% of these deliveries, mammals 7.4%, and unknown prey types 37.0%. None of the prey items were further identified.

Habitat Use. – The Goldfield nestwatchers identified 33 perch locations, spanning a 4.1 km stretch of the Salt River ranging from rk 9.0 to 13.1. The bald eagle pair spent 30.6% of the observed time at rk 9.3, 24.6% at rk 9.1, 18.2% at rk 10.0, 10.5% at rk 10.1, 9.3% at rk 11.4, and 6.8% at the remaining locations.

Luna Breeding Area (Appendix H, Figure 8)
Observation Period. – February 3 to June 18. Total monitoring 100 days/997 hours.

Bald Eagle Identification – The male had a black VID band "Δ/A" on his right leg, USFWS band on the left leg, and was in adult plumage (1988 Texas nestling). The female had a black VID band "Δ/B" on her right leg, USFWS band on the left leg, and was in adult plumage (unknown origin).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) Nestwatchers were stationed at the boat ramp to talk to visitors. 3) On April 12, one nestling was blue VID banded "34/D" at 4.5 weeks of age.

Human Activity. – The nestwatchers recorded 1,630 human activities. Terrestrial activity of 12 different types accounted for 79.4%, water pursuits (fishing boats, kayaks/canoes, float tubers, swimmers, paddleboards) for 19.4%, and aircraft (helicopters, military jets, small planes) 1.0%. Four types of activity elicited five significant responses from the breeding pair. The bald eagles were restless in response to one hiker and one agency worker (emergency vehicles), and flushed in response to one hiker. The birds left the area in response to one driver and one agency worker.

Food Habits. – The nestwatchers observed 80 forage events, with birds accounting for 60.0%, fish 32.5%, mammals 1.3%, and unknown prey types 6.3%. The male was successful in 97.4% (n=38), the female in 95.1% (n=41), and tandem 100% (n=1) of forage events. The breeding pair was observed delivering 65 prey items to the nest, of which the male delivered 50.7% and the female 49.3%. Birds comprised 55.4%, fish 32.3%, mammals 3.1%, and unknown prey 9.2% of the deliveries. Of the 59 prey items further identified, 59.3% were American coots, 33.9% were rainbow trout, 3.4% were black-tailed jackrabbit (*Lepus californicus*), and 1.7% each were common merganser (*Mergus merganser*) and cutthroat trout (*Oncorhynchus clarkii*).

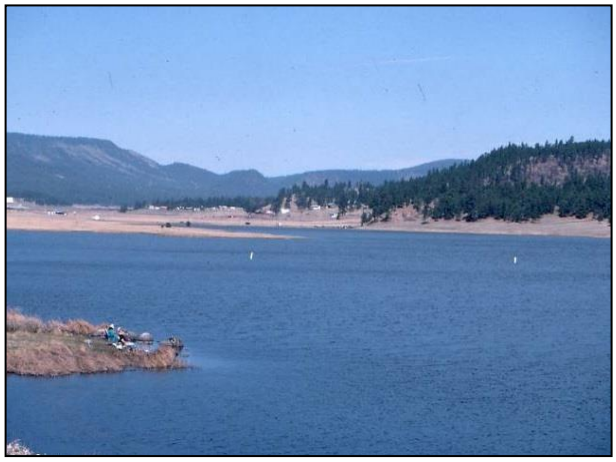

Figure 8. Luna breeding area. Apache County, Arizona. Photo by J. Driscoll.

Habitat Use. – The Luna nestwatchers identified 27 separate habitat use areas around Luna Lake. The bald eagle pair spent 64.3% of the observed time at lk 2.4, 8.8% at lk 2.3, 6.4% at lk 3.5, 6.0% at lk 2.6, 3.4% at lk 2.2, and 11.2% at the remaining locations.

Pinto Breeding Area (Appendix I, Figure 9)
Observation Period. – February 3 to May 4. Total monitoring 60 days/583 hours.

Bald Eagle Identification. – The male was unbanded and in adult plumage (unknown origin). The female had a blue VID band and was in adult plumage (unknown, but blue band consistent with Arizona origin).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) On April 11, two nestlings was blue VID banded "34/B" and "34/C" at 5 weeks of age. Monofilament fishing line and a small piece of rope were removed from the nest during banding.

Interventions. – During the banding event on April 11, a large fishing hook was removed from the neck of one of the nestlings.

Human Activity. – Nestwatchers recorded 18 human activities. Aircraft (helicopters, small planes) represented 88.9%, and terrestrial activities (gunfire) 11.1%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – The nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 29 prey items to the nest, of which the male delivered 31.0%, the female 37.9%, and an unidentified adult 31.0%. Fish comprised 48.3% and unknown prey 51.7% of the deliveries. None of the prey items were further identified.

Habitat Use. – The Pinto nestwatchers identified 14 habitat use locations along the Salt River spanning a total of 1.4 km ranging from rk 104.3 to 105.7. The bald eagle pair spent 89.5% of the observed time at rk 105.5, 7.3% at rk 105.4, and 3.2% at the remaining locations.

Figure 9. Pinto (left) and Pleasant (right) breeding areas. Gila and Maricopa Counties, Arizona. Photos by K. McCarty.

Pleasant Breeding Area (Appendix J, Figure 9)
Observation Period. – February 4 to March 19. Total monitoring 32 days/262 hours.

Bald Eagle Identification. – Nestwatchers reported both eagles as unbanded and in adult plumage (unknown origins).

Management Activities. – 1) The Maricopa County Parks and Recreation Department (MCPRD) enacted a seasonal bald eagle closure. 2) MCPRD marked closure boundaries with buoys and signs. 3) Nestwatchers were supplied kayaks by the Department and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 124 human activities. Aircraft of five types accounted for 70.2%, terrestrial activities of six types for 19.4%, and watercraft (boats, kayaks/canoes) for 10.5%. Four types of activity elicited five significant responses from the breeding pair. The bald eagles were restless in response to two horseback riders and one small plane, and flushed from a perch in response to one helicopter (sheriff). The bald eagles left the area in response to one angler. Of the 13 watercraft that approached the closure, 2 (15.4%) did not comply (agency boats omitted). Boats represented 100% of those non-complying. Of these violations, 50% occurred on a weekend, and 50% during a weekday.

Food Habits. – The nestwatchers observed 11 forage events, with fish accounting for 36.4% birds 9.1%, and unknown prey types 54.5%. The male was successful in 42.9% (n=7), the female in 100% (n=2), and an unidentified adult in 100% (n=2) of forage events. The breeding pair was observed delivering 16 prey items to the nest, of which the male delivered 50%, the female 37.5%, and an unidentified adult 12.5% Fish comprised 43.8% and unknown prey 56.3% of the deliveries. None of the prey items were further identified.

Habitat Use. – Nestwatchers identified 29 separate habitat use areas along the Agua Fria River, spanning a total of 4.4 km and ranging from rk 75.7 to 80.1. The Pleasant bald eagle pair spent 43.8% of the observed time at rk 78.8, 22.5% at rk 78.4, 7.0% at rk 78.9, 5.3% at rk 79.2, 5.2% at rk 79.5, and 16.2% at the remaining locations.

Rodeo Breeding Area (Appendix K, Figure 10)
Observation Period. – February 3 to March 20 (part-time), March 21 to May 8 (full-time). Total monitoring 47 days/344 hours.

Bald Eagle Identification. – Both adults were in adult plumage, but band status was unknown.

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. 3) On March 28, two nestlings were blue VID banded “33/U” and “33/V” at 5.5 weeks old.

Interventions. – On May 6, one nestling was recovered from the ground (pre-fledged) and taken to Liberty Wildlife Rehabilitation Foundation for examination. The nestling was successfully returned to the nest on May 8.

Human Activity. – Nestwatchers recorded 180 human activities. Aircraft (helicopters and small planes) accounted for 78.3%, and terrestrial activities of seven types represented 21.7%. Three types of activity elicited five significant responses from the breeding pair. The bald eagles were restless in response to one nestwatcher. They flushed in response to two helicopters, one nestwatcher, and one vehicle.

Food Habits. – The nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 15 prey items to the nest, of which the male delivered 26.7% (n=4) and the female 73.3% (n=11). Fish comprised 26.7% , birds 13.3%, and unknown prey 60% of the deliveries. None of the prey items were further identified.

Figure 10. Rodeo breeding area. Maricopa County, Arizona. Photo by K. McCarty.

Habitat use. – The Rodeo nestwatchers identified 20 separate habitat use areas, spanning a total of 3.9 km along the Verde River ranging from rk 2.5 to 6.4. The bald eagle pair spent 96.4% of the observed time at rk 4.0 and 3.6% at the remaining locations.

Sycamore Breeding Area (Appendix L, Figure 11)
Observation Period. – February 3 to May 8. Total monitoring 73 days/539 hours.

Bald Eagle Identification. – The male and female were both 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. 3) On April 10, two nestlings were blue VID banded “33/Z” and “34/A” at 5 weeks old.

Human Activity. – Nestwatchers recorded 119 human activities. Aircraft (helicopters and small planes) accounted for 70.6%, terrestrial activities of seven types 21.8%, and water pursuits (swimming, kayak) 7.6%. Eight types of activities elicited ten significant responses from the breeding pair. The bald eagles were restless in response to two helicopters and one AGFD worker, and flushed in response to two drivers, one horseback rider, one farmer, one cyclist, and one tree-trimmer (SRP). The birds left the area in response to one helicopter.

Figure 11. Sycamore (left) and Tonto (right) breeding areas. Maricopa and Gila Counties, Arizona. Photos by K. McCarty.

Food Habits. – The nestwatchers observed two forage events, with carrion accounting for 100%. The male was successful in 100% of forage events. The breeding pair was observed delivering 36 prey items to the nest, of which the male delivered 38.9% and the female 61.1%. Fish comprised 36.1% and unknown prey types 63.9% of the deliveries. None of the prey items were further identified.

Habitat use. – The Sycamore nestwatchers identified 19 separate habitat use areas, spanning a total of 3.5 km along the Verde River ranging from rk 7.9 to 11.4. The bald eagle pair spent 58.2% of the observed time at rk 10.3, 18.8% at rk 10.1, 8.0% at rk 10.0, 4.1% at rk 10.2, and 11.0% at the remaining locations.

Tonto Breeding Area (Appendix M, Figure 11)
Observation Period. – March 8 to May 7. Total monitoring 37 days/214 hours.

Bald Eagle Identification. – 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 consistent with Arizona). The female had no bands and was in adult plumage (unknown origin).

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) On April 4, two nestlings were blue VID banded "33/W" and "33/X" at six weeks old.

Human Activity. – Nestwatchers recorded 32 human activities. Aircraft (helicopters, small planes, motorized parachutes, ultralights) represented 75.0% and terrestrial activities of four types 25.0%. One type of activity elicited one significant response from the breeding pair. The eagles were restless in response to one ultralight aircraft.

Food Habits. – The nestwatchers observed six forage events, with fish accounting for 33.3%, and unknown prey 66.7%. The female was successful in 100% (n=1) and an unknown adult in 40.0% (n=5) of forage events. The breeding pair was observed delivering four prey items to the nest, of

which an unidentified adult delivered 100%. Fish comprised all of the delivered items. None of the prey items were further identified.

Habitat use. – The Tonto nestwatchers identified eight separate perch locations along Tonto Creek, spanning 1.7 km and ranging from rk 16.2 to 17.9. The bald eagle pair spent 85.0% of the observed time at rk 17.5, 13.5% at rk 17.3, and 1.5% at the remaining locations.

Whiskey Spring Breeding Area (Appendix N, Figure 12)
Observation Period. – February 3 to April 29. Total monitoring 63 days/640 hours.

Bald Eagle Identification. – The male had a blue VID band and was in adult plumage (unknown, but blue band consistent with Arizona origin). The female had no bands and was in adult plumage (unknown origin).

Figure 12. Whiskey Spring breeding area. Maricopa County, Arizona. Photo by J. Driscoll.

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. 4) On March 27, one nestling was blue VID banded "33/S" at 5 weeks old. 5) On May 1, the Department collected the carcass of the nestling which was found with several larval ticks on it.

Human Activity. – Nestwatchers recorded 589 human activities. Water pursuits (boats, jet skis, tuber/rafter) accounted for 54.7%, terrestrial activities of six types for 38.9%, and aircraft (jets, small planes, helicopters) for 6.5%. Four types of activities elicited four significant responses from the breeding pair. The bald eagles were restless in response to one helicopter, and flushed from a perch in response to one boater, one gunshot, and one AGFD biologist. Of the 2,134 watercraft that approached the southern closure buoy line, a total of 284 (13.3%) did not comply and entered the closure (agency boats omitted).

Food Habits. – The nestwatchers observed 20 forage events, with fish accounting for 90.0%, reptiles 5.0%, and mammals 5.0%. The male was successful in 86.7% (n=15), and the female 80.0% (n=5) of forage events. The breeding pair was observed delivering 64 prey items to the nest, of which the male delivered 70.3% and the female 29.7%. Fish comprised 75.0%, mammals 4.7%, birds 1.6%, reptiles 1.6%, and unknown prey types 17.2% of delivered items. Of the 15 prey items further identified, 53.3% were largemouth bass (*Micropterus salmoides*), 13.3% were black crappie (*Pomoxis nigromaculatus*), 13.3% were sucker species, and 6.7% each were common carp, bluegill (*Lepomis macrochirus*), and American coot.

Habitat use. – The Whiskey Spring nestwatchers identified 35 separate habitat use areas along the Agua Fria River arm of the lake, spanning a total of 4.3 km and ranging from rk 67.8 to 72.1.

The bald eagle pair spent 44.8% of the observed time at rk 68.8, 25.9% at rk 69.0, 17.1% at rk 68.7, 8.2% at rk 69.1, and 4.0% at the remaining locations.

White Horse Lake Breeding Area (Appendix O, Figure 13)
Observation Period. – April 28 to July 16. Total monitoring 62 days/593 hours.

Bald Eagle Identification. – The male had a blue band on the left leg (partial read 20/?), USFWS band on the right leg, and was in adult plumage (unknown origin but likely the same bird as identified in previous years). The female was unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The USFS established a closure around the nest area and placed closure signs. 2) Nestwatchers educated recreationists about the closure and bald eagles. 3) On May 31, two nestlings were blue VID banded "34/X" and "34/Y" at 6 weeks old. 4) On June 19, the remaining 9-week old nestling was fitted with a solar-powered GSM/GPS transmitter.

Interventions. – On June 14, an injured nestling (34/Y) was recovered below the nest by AGFD and taken to Liberty Wildlife.

Human Activity. – Nestwatchers recorded 173 human activities. Watercraft of four types accounted for 62.4%, terrestrial activities of four types 26.6%, and aircraft (helicopters, small planes) for 11.0%. Five types of activities elicited 15 significant responses from the breeding pair. The bald eagles were restless in response to one angler, and flushed in response to six kayaks/canoes, three boats, two hikers, two helicopters, and one angler.

Food Habits. – The nestwatchers observed 11 forage events, with fish accounting for 27.3%, mammals, amphibians, and birds 9.1% each, and unknown prey 45.5%. The male was successful in 28.6% (n=7) and the female in 75.0% (n=4) of forage events. The breeding pair was observed delivering 50 prey items to the nest, of which the male delivered 44.0% and the female 56.0%. Fish comprised 66.0%, mammals 6.0%, birds and amphibians 2.0% each, and unknown prey 24.0% of the delivered items. Of 8 prey items further identified, 37.5% were catfish species, 25.0% were ground squirrel species, and 12.5% each were yellow bullhead (*Ameiurus natalis*), gopher species, and American bullfrog (*Lithobates catesbeianus*).

Figure 13. White Horse breeding area. Coconino County, Arizona. Photo by K. McCarty.

Habitat Use. – The White Horse nestwatchers identified 24 separate habitat use areas around the lake. The bald eagle pair spent 24.6% of the observed time at lk 0.56, 18.3% at lk 1.30, 17.5% at

lk 0.77, 7.2% at lk 0.72, 5.5% at lk 0.84, 4.9% at lk 0.58, 4.3% at lk 0.68, 4.0% at lk 0.70, and 13.8% at the remaining locations.

Woods Canyon Lake Breeding Area (Appendix P, Figure 14)
Observation Period. – April 14 to July 16. Total monitoring 83 days/716 hours.

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

Management Activities. – 1) Nestwatchers were supplied a kayak by AGFD and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 1,094 human activities. Terrestrial activities of ten types accounted for 93.0%, watercraft 5.9%, and aircraft (recreational drones, helicopters) for 1.2%. Six types of activity elicited eleven significant responses from the breeding pair. The bald eagles flushed in response to five recreational drones, three helicopters, and one each of kayak, nestwatcher, and gunshot.

Food Habits. – The nestwatchers observed 14 forage events, with fish accounting for 100%. The male was successful in 55.6% (n=9) and the female in 60.0% (n=5) of forage events. The breeding pair was observed delivering 122 prey items to the nest, of which the male delivered 53.3%, the female 42.6%, and an unknown adult 4.1%. Fish comprised 90.2%, mammals 1.6%, birds 1.6%, and unknown prey 6.6% of the delivered items. Of 110 prey items further identified, 100% were rainbow trout.

Habitat Use. – The Woods Canyon nestwatchers identified 24 separate habitat use areas around the lake. The bald eagle pair spent 15.9% of the observed time at lk 4.8, 14.2% at lk 3.8, 13.1% at lk 4.5, 11.9% at lk 4.6, 10.4% at lk 0.3, 7.3% at lk 0.9, 6.9% at lk 3.7, 6.1% at lk 2.2, 5.2% at lk 3.9, and 9.0% at the remaining locations.

Figure 14. 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 the Department. We have included them as informational material for land and wildlife management agencies reviewing this report, and for further discussion at SWBEMC meetings.

Crescent

1. Consider changing the closure boundary lines. There have been severe environmental changes on SU Knoll due to fire, wind and drought. We recommend that the boundary on the east (lake) side be moved lower to just above the trail along the shoreline. This would eliminate visual access to the nest tree and help prevent birds being flushed by human activity. On the north and west sides, there are few standing trees remaining and our recommendation is to re-align this side of the closure boundary directly with the existing fence line until it reaches the remaining stand of timber on the southwest side. At the remaining tree line on the west side, maintain the closure boundary around the timber continuing south until the boundary connects on the south end. Additional closure signs will need to be purchased.

Goldfield

1. Place informational signage about the program at nearby parking areas. This could include a durable map of the closure and a brochure dispenser.
2. If Cottonwood and other nest tree species are not effectively recruiting naturally this may threaten the long-term viability of the Arizona population of bald eagles. Restoration efforts in coordination with the appropriate land management agencies could include identifying suitable habitat, planting, monitoring and maintaining seedlings of future nest trees. Nestwatchers could be involved with these efforts one to two days per ten-day session or by other arrangement.
3. Either SRP, USFS, and/or AGFD should work with the Salt River tubing company to do a better job at cleaning up the river which accumulates along the shores after the summer season.

Luna

1. Perhaps the addition of more closure posters and boundary map signs would be effective near the walk-through in the fence.
2. Place more carsonite posts with banner signs along the west campground boundary.

Pinto

1. We recommend future nestwatchers use habitat days to survey from vantage points along the west bank of the Salt River to see if it is possible to see how target shooting is affecting the RAs use of habitat for hunting and other activities. The dirt road to the area used for target shooting does not occur on current Tonto National Forest visitor maps, and is therefore possibly private or is a side road off of road 396 that is not open for public use. If it is determined that target shooting is disruptive in areas used by the Pinto RAs for hunting, we recommend closing these areas to the public if they are on public land, or contacting landowners if these areas are on private land.

Pleasant

1. Improve the signage at the boat launch with large signs that could be seen from horseback showing where the closure starts and advising recreators not to cross Boulder

Creek. When the lake is low, signs at the closure boundary at Boulder Creek should also be placed.

2. Place signs at the upper parking lot or at the boat ramp informing the prohibition of drone operation within the closure. As drones become more popular we anticipate their activity to increase, posing a significant risk to the bald eagles.
3. Inform the Maricopa County Sheriff's Department (MCSD) about the bald eagle breeding area, and advise flying above 1000 feet within one kilometer of the nest, unless absolutely necessary. Additionally, inform MCSD where the Nestwatcher observation point is located so they do not feel the need to investigate the presence of Nestwatchers, causing low flight near the nest.
4. Repair the fences on Cow Creek Road that leads to the base of Indian Mesa and to the shore of Lake Pleasant. OHVs were able to drive to the edge of the lake, within the closure.
5. More time and effort should be spent on locating the eagles away from the nest area. The use of a motorized boat would be necessary to reach other areas on Lake Pleasant the eagles are likely to use. Clarify with future Nestwatchers whether it is permitted to leave the observation point unattended during habitat days with low risk of human disturbance.
6. Add AGFD decals to the kayaks and create a better locking system (possibly drilling holes in the body) to better secure this property.

Rodeo

1. Implement a closure near the nest tree and post signage on N. Hiawatha Hood Road.
2. Restrict tree cutting and other potentially destructive human activities near the nest tree.
3. Continue to alert Boeing, U.S. Army, and SRP of the breeding area and advise them to fly 1,000 feet or higher within a kilometer of the nest tree.

Sycamore

1. Continue closures of any trail proximate to the Sycamore eagle nest from December to June. Advise Fort McDowell Adventures Stables of this closure prior to the breeding season and notify them of any changes.
2. Research options and funds for durable optics (e.g. binoculars, scopes) that are especially suited to young viewers and those with special needs.
3. Consult with staff at H'man Shawa ECDC to best plan and shape future field trips to the observation point for maximum learning and enjoyment.
4. Initiate discussion with council and cultural department regarding interpretive themes and goals for bald eagle educational exhibits.
5. Set a budget, timeline and basic design idea for a portable display. Contact Postersmith or other production vendor. Consult freely with nest watchers if desired.
6. Continue to emphasize protection of Sycamore BA by signage, law enforcement patrol and response, verifying the boundary fence in Sycamore Creek is intact and secure, and ongoing public awareness.
7. Continue community awareness of Sycamore and Fort McDowell bald eagle viewing opportunities. Possibly set specific dates and times and publicize via Facebook, The Yavapai News or other sources.

8. Consider selecting or recruiting FMYN youth, interested retiree, or other community member to learn about the bald eagle breeding areas and nest watch methods. This is intended to increase monitoring capabilities when nest watchers or environmental staff are not available.
9. Initiate contact with SRP regarding low helicopter flights. FMYN Environmental staff, e.g. KRS, may offer to ride along on a survey to inform pilot and passengers of community concerns and eagle habitat particulars.
10. Encourage community members who are concerned about low flying MCSO helicopters to contact the MCSO. Comment/Complaint forms are available for printing or at the Fountain Hills Library.
11. Continue the established FMYN practice of excellent communication among all agencies, entities and individuals involved with or interested in the bald eagles: tribal council, education, public safety, environmental, public health, elder services, etc.
12. In the inadvisable event of zipline activity, a separate nest watch team should be dedicated full-time to the Rodeo BA.
13. Update education display materials with current bald eagle status and statistics. Explore new interpretive angles to compel interest in conservation given relatively robust eagle populations and current challenges to science, research, environmental regulations, etc.
14. Consult with the AGFD education department to design and create a lightweight and easy to transport bald eagle management display.
15. Continue to explore nestcam placement and the associated need for education/interpretation with that project.
16. Continue and expand education/outreach opportunities, both those at and away from the BAs. Offer those opportunities to nestwatchers whenever appropriate.

Tonto

1. It is the opinion of nestwatcher that the Tonto BA would not significantly benefit from a closure or additional signage at the new nest, and we believe that the addition of signage would only draw attention to the location of the new nest tree.

Whiskey Spring

1. It would be beneficial for the Nestwatchers and for the effectiveness of the closure line to have a law enforcement boat present at least one day every other weekend. Easter weekend was the first time we saw law enforcement officers handing out tickets to closure violators. The weekend after that, very few boats came in the closure.
2. Place a large sign on the west side of the southern closure line stating: NO BOAT ACCESS.
3. Create a pamphlet or map for boat and jet ski rental companies to hand out to their renters before they get into the water, stating the closure location and violation consequences. Additional information could include boating laws. We often had boat and jet ski renters come into the closure saying they did not know where they were.
4. Provide a Secchi disk to the Nestwatchers to better understand water clarity and record how it affects foraging behavior of the adults. Secchi disks are easy to understand and use, and are inexpensive. The Aqua Fria River got incredibly cloudy this season and we did not see any forage behavior at that time, and believe the clarity could have been a

factor. Adding water clarity levels to the chronology of events could be beneficial and could possibly be implemented at every Nestwatch site.

5. The Nestwatchers should be required to create a stronger relationship with the Desert Outdoor Center if the AGFD is to continue to dock their boat there. Scheduled nestwatch talks with schools who are visiting or even visits from children at the OP are possible ways to further engage the public.
6. In the event of an emergency, the radio provided by parks is incredibly helpful as we could contact multiple agencies. However, having the Nestwatcher car(s) parked in a closed gate inhibits access to an emergency vehicle in times of need. A new location to park Nestwatcher car(s) not within a gated closure would be a good idea.
7. Request that Terry Gerber, the naturalist for Lake Pleasant Regional Park, meet the Nestwatchers on their first day of observation, or at least once throughout the season. He requested updates after each week on how the breeding adults and chick were doing, and had great information about the surrounding area and history of the park.

White Horse

1. Nestwatchers recommend that the nest platform be expanded and stabilized at White Horse Lake before the RAs return for the next breeding season! The current platform that held the 2017 nest is better than it was after the nestling fell out of it, thanks to AGFD biologist efforts, but being able to provide more support for a larger nest may help the eagles in the incoming breeding season.
2. A buoy line with a water closure across the eastern portion of the lake would be helpful in keeping watercraft away from the nest.
3. Include the words “trail temporarily closed” on the trail closure signs to prevent more of the ground-based human disturbances.

Woods Canyon

1. Post signage at the boat dock and campgrounds warning recreationists about flying drones near the eagles nest and provide nestwatchers with current information about laws permitting (or not) flying drones inside the different recreational areas. Drone activity at the lake and elsewhere was relatively frequent and is likely to keep increasing over the years.
2. Provide nestwatchers with a campsite appropriate for tent camping that would include restroom facilities. Currently, nestwatchers are permitted to camp in the administrative site alongside the RVs belonging to Thousand Trails and camp store employees. If nestwatchers are located back at the administrative site, prior arrangements should be made between the USFS, Thousand Trails, or the store employees to ensure nestwatchers have their own site for the entire season. This will prevent nestwatchers from unnecessarily having to move camp and becoming displaced.

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APPENDIX A: 2017 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 9. 2017 Arizona bald eagle winter count volunteer survey results (continued next page).

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
Apache County						
1	Becker Lake	10	0	0	0	0
2	Little Colorado River (LCR)	10	0	0	0	0
3	S. Fork LCR – Campground	10	0	0	0	0
4	Casa Malpais – LCR	10	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	20	2	2	0	0
6	Sponseller Lake	20	0	0	0	0
7	Mexican Hay Lake	25	1	0	0	0
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	45	0	1	0	0
9	The Ranch Lake	30	0	0	0	0
10	Ortega Lake	30	0	0	0	0
11	Concho Lake	30	2	0	0	0
12	Luna Lake	180	2	1	0	0
13	Nelson Reservoir	42	6	3	0	0
14	Nutrioso Reservoir	24	0	0	0	0
16	San Francisco River (Luna Lake to New Mexico line)	155	0	0	0	0
Total		**641**	**13**	**7**	**0**	**0**
Cochise County						
18	Parker Canyon Lake	60	0	0	0	0
19	Willcox Playa	240	0	0	0	0
Total		**300**	**1**	**0**	**0**	**0**
Coconino County						
21	Long Lake Complex	280	1	0	0	0
22	Stoneman Lake	270	0	3	0	0
23	FH-3	46	1	1	0	0
24	I-17, Section to Flagstaff	192	3	1	0	0
25	Bellemont	298	4	1	0	0
26	Townsend/Winona A/B	450	1	0	0	0
27	HWY 89 North /Sunset Crater – Wupatki	322	5	3	0	0
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	480	7	7	0	1
29	Continental Country Club Lakes	200	0	1	0	0
30	Chevelon Canyon Lake	150	0	1	0	0
32	Spring Valley Wash	180	2	0	0	1
33	Red Lake Valley	60	0	0	0	1
34	Kaibab Lake	20	0	0	0	0
35	Pittman Valley	81	1	1	0	0
36	Davenport Lake	58	2	0	0	0
37	Scholz Lake	30	4	1	3	1
38	Cataract Lake	20	2	0	0	0
39	Willow Springs Lake	101	1	0	0	0

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
40	West Chevelon Canyon	75	0	2	0	0
41	Willow Creek	75	0	0	0	0
42	White Horse Lake – Pomeroy Tanks	150	1	0	0	1
43	JD Dam Lake	60	2	0	0	0
45	Steel/Stone Road	180	1	0	0	0
48	Blue Stem Wash-Babbit property	40	0	0	0	0
49	Glen Canyon Nat'l Rec. Area (Lake Powell to Lee's Ferry)	6	2	0	0	0
118	Bill Williams Loop Road	150	0	0	0	0
119	Johnson Canyon	130	1	0	0	0
120	Highway 64 east	20	0	0	0	0
121	Highway 64	20	0	0	0	0
122	Camp Navajo	195	2	1	0	0
123	Partridge Creek[1]	213	4	2	0	0
124	Odell Lake	55	0	0	0	0
125	Highway 87 north	64	0	0	0	0
126	Highway 180	180	0	0	0	0
Total		**4,851**	**47**	**25**	**3**	**5**
Graham County						
51	Point of Pines Lake area (ground)	Not surveyed.				
Mohave County						
57	Alamo Lake	121	3	1	0	0
Total		**121**	**3**	**1**	**0**	**0**
Navajo County						
58	Lake of the Woods	30	2	0	0	0
59	Rainbow Lake	30	10	7	0	0
61	Whipple Lake	30	0	0	0	0
62	Long Lake	20	0	0	0	0
63	Lone Pine Dam	35	0	0	0	0
64	Schoens Reservoir	30	0	0	0	0
65	White Mountain Lake	30	0	0	0	0
67	Jacques Marsh	30	1	0	0	0
68	Scott's Reservoir	20	0	0	0	0
69	Show Low Lake	35	0	0	0	0
70	Pintail Lake	57	1	0	0	0
71	Telephone Lake	25	1	0	0	0
72	Fool Hollow Lake	120	1	1	0	0
75	Cottonwood Wash/ Clay Springs	11	0	0	0	0
76	White Lake	15	0	0	0	0
127	Mortenson Wash	30	0	0	0	0
Total		**548**	**16**	**8**	**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	300	1	0	0	0
84	Oak Creek	450	1	0	0	0

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
85	Willow Lake	240	0	0	0	0
86	Lynx Lake	240	2	0	0	0
87	Watson Lake	240	2	0	0	0
88	Goldwater Lake	240	2	3	0	0
Total		**1,710**	**8**	**3**	**0**	**0**
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	370	0	4	0	0
Total		**370**	**0**	**4**	**0**	**0**

Table 10. 2017 Arizona bald eagle winter count helicopter survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
90	Verde River	229	16	7	0	0
91	Lower East Verde River	14	1	0	0	0
92	Lower West Clear Creek	24	0	0	0	0
93	Lower Salt River	121	26	20	0	0
94	Upper Salt River	64	1	0	0	0
95	Lower Tonto Creek	29	2	0	0	0
97	Lower Canyon Creek	9	0	0	0	0
98	Lower Cibecue Creek	13	0	0	0	0
100	White River	55	0	1	0	0
101	North Fork White River	41	1	1	0	0
102	Lower Black River	58	15	3	0	0
103	Big and Little Bonito Creeks	22	0	0	0	0
104	San Carlos River–Talkalai Lake	17	3	0	0	0
105	San Carlos Reservoir	26	2	3	0	0
106	Upper and Lower Gila River	24	2	0	0	0
107	Eagle Creek	41	1	0	0	0
108	Bonita Creek	16	0	0	0	0
109	Lower San Francisco River	34	0	0	0	0
110	Blue River	12	0	0	0	0
111	Sunrise Lake	1	0	0	0	0
112	Big Lake	3	2	0	0	0
114	Crescent Lake	2	0	0	0	0
115	Lake Pleasant	39	5	1	0	0
116	Del Rio Ponds	3	2	0	0	0
117	Tres Rios	24	2	0	0	0
Total		**921**	**81**	**36**	**0**	**0**

Table 11. 2017 Arizona bald eagle winter count non-standardized survey route results.

Route Number	Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
128	Point of Pines Lake area (aerial)	Graham	24	5	10	0	0
129	Buckhead Mesa Landfill	Gila	75	6	8	0	0
976	West Clear Creek	Yavapai	300	0	0	0	0
977	Blue Ridge Reservoir	Coconino	70	1	0	0	0
986	Kachina Wetlands	Coconino	50	0	0	0	0
991	Clint's Well	Coconino, Yavapai	102	0	0	0	0
Total			**621**	**12**	**18**	**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. Operationally, a BA is recognized only after an active nest has been documented. 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 historic (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: 2017 ARIZONA BALD EAGLE PRODUCTIVITY

Table 12. Arizona bald eagle breeding area productivity summary, 2017 (continued next page).

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs[3]	Hatch Date	Young	Fledged	Fledge Date
Alamo	S	4	<1/17	2	1/30-3/22	2	2	>4/20
Armer Gulch*	S	1	<1/10	3	1/31-2/7	3	3	>4/23
Ashurst	S	1	<3/13	1	3/13-4/13	1	1	>6/15
Bachelor Cove*	S	1	<1/10	2	1/31-2/16	2	2	5/2-5/9
Bagley	U							
Bartlett	U							
Beaver	F	1	1/6-1/30	1	Failed by 3/22.			
Becker	O							
Bill Williams	U							
Black Cross	F	1	1/10-1/31	1	1/31-3/16	1	Failed by 4/17.	
Blue Point	F	10	<1/10	3	1/10-3/16	3	Failed by 4/17.	
Box Bar*	F	6	1/30-3/1	1	3/13-3/16	1	Failed by 4/1.	
Buckeye	S	1	1/6-1/30	1	1/30-3/20	1	1	>4/20
Bulldog	S	2	1/10-1/31	2	1/31-3/16	2	1	>5/2
Burro Creek	U	One adult observed 2/21 and 3/15.						
Campaign Bay	U							
Canyon de Chelly	S	2	<5/25	1	<5/25	1	1	5/25-7/10
Cedar Basin	U							
Chevelon	O	Nest tree reported as fallen 4/24. Pair of adults observed on 5/2.						
Cibecue	F	2	1/31-3/16	1	3/16-4/17	1	Failed 6/13-6/21.	
Cliff*	F	7	2/3-2/12	1	Failed by 3/7.			
Coldwater	U							
Concho	F	1	<3/14	1	Failed by 4/17.			
Coolidge	U							
Crescent*	S	1	1/11-3/16	1	3/16-6/2	1	1	7/12
Dogtown	S	3	<4/21	2	<4/21	2	1	>6/19
Doka*	F	7	3/3-3/7	1	4/5-4/10	1	Failed by 4/24.	
East Verde	F	6	<1/6	1	Failed by 3/22.			
Elaine	S	1	<2/12	2	2/12-4/8	2	2	>5/23
Fish Creek	S	1	<1/10	3	1/31-3/16	3	3	>5/2
Fool Hollow	F	3	1/31-2/20	1	Failed by 3/27.			
Fort McDowell*	S	15	<1/6	2	1/6-1/30	2	2	4/28, 4/28-5/9
Gainey Ranch	S	2	1/14	2	2/13-2/17	2	2	5/5, 5/14-5/22
Garden Lakes	S	2	12/11-12/26	2	1/6-2/1	2	2	4/25
Gilbert	U							
Goldfield*	S	4	<1/10	2	1/10-1/31	2	2	4/15, 4/19
Granite Basin	U							
Granite Reef*	F	2	1/6-1/30	1	Failed by 2/13.			
Green River	S	1	1/6-1/30	2	1/30-3/22	2	1	>5/17
Greer Lakes	S	4	<3/16	3	3/16-4/12	3	3	>6/2

[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, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2016.

[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[3]	Hatch Date	Young	Fledged	Fledge Date
Horse Mesa	S	4	<1/10	2	1/31-3/16	2	2	>4/17
Horseshoe	U							
Ive's Wash	F	3	1/17-1/30	1	Failed by 3/20.			
Kachina Village	U	Osprey incubating in nest #1 on 5/2.						
Kerr*	O	Pair of adults regularly seen by nestwatchers.						
Ladders	F	3	1/30-3/22	1	Failed by 5/17.			
Lone Pine	F	8	1/11-1/31	1	1/31-3/16	1	Failed by 5/17.	
Lower Lake Mary	F	3	3/3-3/13	1	Failed by 5/19.			
Luna*	S	1	1/29-2/3	1	3/8	1	1	6/3
Lynx	S	6*	1/18-1/30	2	1/30-3/22	2	2	>5/18
Mohave	F	1	1/1-2/1	2	2/1-3/20	2	Failed by 4/28.	
Needle Rock	U							
Nevada Bay	U							
Oak Creek	U							
Orme*	O	Pair of adults regularly seen by nestwatchers.						
Pee Posh Wetlands	S	7*	12/20-12/25	1	1/6-1/30	1	1	4/15
Perkinsville	F	4	1/30-2/23	1	Failed by 4/20.			
Pinal	F	9	1/31-3/16	1	Failed by 4/5.			
Pinto*	S	10	1/10-1/31	2	1/31-3/16	2	2	>5/17
Pleasant*	F	4	1/6-1/30	1		1	Failed by 3/17.	
Redmond	O	Pair of adults observed by nest #5 on 1/31.						
Riverside	F	1	<1/6	2	1/6-1/30	2	Failed by 2/16.	
Rock Creek	U							
Rodeo*	S	5	1/6-1/30	2	2/12-2/17	2	2	5/6, >5/8
Saguaro	O	Pair of adults observed perched together on 4/21.						
San Carlos	S	7	<1/10	2	1/31-3/10	2	2	>4/26
76	S	6	1/31-3/16	2	1/31-3/16, 3/16-4/17	2	2	>6/2
Sheep	S	7	<1/10	2	1/31-3/16	2	2	4/17-5/2
Sheep Creek	O	Pair of adults at nest on 1/30.						
Show Low Lake	S	1	2/12-2/16	2	2/16-3/28	2	2	>5/26
Silver Creek	S	2	<2/2	1	2/24-3/13	1	1	>5/26
Suicide	O	Pair of adults observed on 1/10.						
Sullivan Lake	S	2	1/6-1/30	2	1/30-3/15	2	2	>4/20
Sycamore*	S	7	1/6-1/30	2	2/27-3/8	2	2	5/23-5/27, 5/27-5/30
Table Mountain	F	4	1/30-3/22	1	Failed by 4/20.			
Talkalai	S	9	<1/10	2	1/31-3/9	2	2	>4/26
Tapco*	F	3	1/6-1/30	1	Failed 2/17-2/26.			
Tonto*	S	6*	<1/31	2	1/31-3/7	2	2	>5/2
Tortilla Creek	S	1	<1/10	3	1/10-1/31	3	3	>4/17
Tower	U							
Tremaine	F	2	<5/2	1	6/26			
Whiskey Spring*	F	1	1/6-1/25	1	2/13-2/16	1	4/24- 4/27	

[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, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2016.

[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[3]	Hatch Date	Young	Fledged	Fledge Date
White Horse*	S	7	<3/13	2	3/13-4/20	2	1	7/14
Woods Canyon*	S	10	<4/7	2	4/7-5/2	2	2	7/8-7/9
Yellow Cliffs	F	1	1/30-3/22	1	1/30-3/22	1	Failed by 4/20.	

[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, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2016.
[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 2017 bald eagle winter count, ORA, and nest survey flights (continued next page).

Location	Time	Comments
January 6, 2017		
Riverside BA	0747	Adult incubating in nest #1.
Orme BA	0755	All known nests empty. No eagles.
Rodeo BA	0758	All known nests empty. Two adults in area.
Sycamore BA	0804	All known nests empty. One adult perched by nest #7.
Doka BA	0808	All known nests empty. Two adults perched.
Fort McDowell BA	0813	Adult incubating in nest #15. Second adult perched.
Box Bar BA	0819	All known nests empty. No eagles.
Needle Rock BA	--	Taken over by the Box Bar pair.
Bartlett BA	0826	All known nests empty. No eagles.
Yellow Cliffs BA	0841	All known nests empty. Two adults in area.
Sheep Creek BA	0855	All known nests empty. No eagles.
Cliff BA	0900	Nest #9 fallen. All known nests empty. No eagles.
Horseshoe BA	0910	All known nests empty. No eagles.
Table Mountain BA	0939	All known nests empty. No eagles.
East Verde River	1029	No nests. One adult flying.
East Verde BA	1045	Adult incubating in nest #6.
Coldwater BA	1058	All known nests empty. No eagles.
Ladders BA	1107	All known nests empty. No eagles.
West Clear Creek	1119	No new nests. One golden eagle flying.
Beaver BA	1200	All known nests empty. Two adults in area.
Oak Creek BA	1212	All known nests empty. No eagles.
Green River nest site	1222	All known nests empty. One adult perched.
Tapco BA	1425	All known nests empty. No eagles.
Tower BA	1433	All known nests empty. No eagles.
Perkinsville BA	1440	All known nests empty. No eagles.
Hell Point historic BA	1451	All known nests empty. No eagles.
Granite (golden eagle BA)	1459	All known nests empty. No eagles.
Sullivan Lake BA	1507	All known nests empty. Two adults perched.
Pleasant BA	1604	All known nests empty. One adult perched.
Whiskey Spring BA	1609	One adult standing in nest #1.
Buckeye BA	1705	One adult standing in nest #1.
Pee Posh Wetlands BA	1719	Adult incubating in new snag nest #7.
Garden Lakes BA	1725	Adult incubating in new tree nest #2.
January 10, 2017		
Granite Reef BA	0755	Nest #6 fallen. All known nests empty. No eagles.
Orme BA	0759	Pair of adults perched at Coon Bluff.
Kerr BA	0800	All known nests empty. One adult flew to nest tree #1.
Goldfield BA	0801	Adult incubating in nest #4. Second adult perched.
Bulldog BA	0809	One adult perched in nest #2.
Blue Point BA	0814	Adult incubating in nest #10.
Bagley BA	0815	All known nests empty. No eagles.
Saguaro BA	0821	All known nests empty. No eagles.
Tortilla BA	0826	Adult incubating in nest #1.
Black Cross BA	0832	One adult perched by nest #1. Second adult perched.
Fish Creek BA	0838	Adult incubating in nest #1. Second adult perched.

Table 13 continued.

Location	Time	Comments
Horse Mesa BA	0843	Adult incubating in nest #4. Second adult perched.
Bachelor Cove BA	0855	Adult incubating in nest #1.
Tonto BA	0904	All known nests empty. No eagles. Nest #5 fallen. New nest #7 found.
Sheep BA	0912	Adult incubating in nest #7.
76 BA	0923	All known nests empty. One adult perched.
Armer Gulch BA	1102	Adult incubating in nest #1.
Pinto BA	1110	One adult perched by new snag nest #10.
Pinal BA	1114	All known nests empty. No eagles. New cliff nest #11 found.
Redmond BA	1128	All known nests empty. No eagles.
Canyon historic BA	1144	All known nests empty. No eagles.
Campaign Bay BA	1232	No new nests or eagles.
Two Bar nest site	1319	All known nests empty. Pair of adults perched near nest #2.
Talkalai BA	1350	Adult incubating in nest #9.
San Carlos BA	1401	Adult incubating in nest #7. Second adult perched.
Suicide BA	1421	One adult standing in nest #2. Second adult flying.
Coolidge BA	1426	No new nests. One adult perched.
Porphyry Gulch nest site	1508	Nest #2 empty. No eagles.
Granite Basin BA	1510	All known nests empty. No eagles.
Winkelman historic BA	1520	No new nests or eagles.
January 11, 2017		
Pineasco Creek nest site	1002	All known nests empty. Two adults in area.
George's Basin nest site	1009	All known nests empty. One adult perched by nest #1.
Lost Mule (golden eagle BA)	1019	All known nests empty. Greenery in nest #2. One golden eagle soaring.
Cibecue BA	1315	All known nests empty. No eagles.
Mule Hoof historic BA	1326	All known nests empty. No eagles.
Cedar Basin BA	1340	All known nests empty. No eagles.
Lone Pine BA	1346	All known nests empty. No eagles.
Crescent BA	1452	All known nests empty. Two adults in area.
January 30, 2017		
Riverside BA	0730	Two nestlings, 1-2 weeks old. Two adults perched.
Granite Reef BA	0738	Adult incubating in nest #2.
Orme BA	0739	All known nests empty. Two adults in area.
Rodeo BA	0742	Adult incubating in nest #5. Second adult in area.
Sycamore BA	0745	Adult incubating in nest #7.
Doka BA	0747	All known nests empty. Two adults perched.
Fort McDowell BA	0750	One hatchling and one egg in nest. Both adults perched.
Box Bar BA	0754	All known nests empty. One adult perched. New tree nest #6 found.
Bartlett BA	0800	All known nests empty. No eagles.
Yellow Cliffs BA	0807	All known nests empty. No eagles.
Sheep Creek BA	0815	Two adults standing in nest #1.
Cliff BA	0817	Two adults standing at nest #7.
Horseshoe BA	0821	All known nests empty. No eagles.
Table Mountain BA	0833	All known nests empty. No eagles.
East Verde BA	0841	Adult incubating.
Coldwater BA	0844	All known nests empty. No eagles.
Ladders BA	0856	All known nests empty. No eagles.
Beaver BA	0910	Adult incubating in nest #1.
Oak Creek BA	0917	All known nests empty. No eagles.

Table 13 continued.

Location	Time	Comments
Hidden Valley nest site	0938	All known nests empty. No eagles.
Green River BA	1026	Adult incubating in nest #1. Second adult perched.
Tapco BA	1031	Adult incubating in nest #3.
Tower BA	1034	All known nests empty. No eagles.
Mormon Pocket nest site	1040	All known nests empty. No eagles.
Perkinsville BA	1042	All known nests empty. No eagles.
Hell Point historic BA	1050	All known nests empty. No eagles.
Granite golden eagle BA	1059	All known nests empty. No eagles.
Sullivan Lake BA	1104	Adult incubating in nest #2.
Lynx BA	1116	Adult incubating in new nest #6.
Goldwater Lake	1121	No nests. Two immature bald eagles seen.
Burro Creek BA	1320	All known nests empty. No eagles.
Alamo BA	1338	Adult in nest #4 with two eggs.
Ive's Wash BA	1343	Adult incubating in nest #3.
Pleasant BA	1420	Adult incubating in nest #4. Second adult perched.
Whiskey Spring BA	1423	Adult incubating in nest #1.
Buckeye BA	1443	Adult in nest #1 with one egg.
Pee Posh Wetlands BA	1453	Adult incubating or brooding. Possibly hatched.
Garden Lakes BA	1459	Both adults at nest, one incubating or brooding. Possibly hatched.
January 31, 2017		
Kerr BA	0749	All known nests empty. One adult perched by nest #1.
Goldfield BA	0750	Adult incubating or brooding.
Bulldog BA	0755	Adult incubating in nest #2.
Blue Point BA	0758	Adult incubating in nest #10.
Bagley BA	0759	All known nests empty. No eagles.
Saguaro BA	0800	All known nests empty. No eagles. New nest #3 found on cliff.
Tortilla Creek BA	0806	Adult feeding ≥2 nestlings, 1-2 weeks old.
Black Cross BA	0810	Adult incubating in nest #1.
Fish Creek BA	0814	Adult incubating in nest #1.
Horse Mesa BA	0817	Adult incubating in nest #4.
Two Bar nest site	0822	All known nests empty. No eagles.
Bachelor Cove BA	0828	Adult incubating in nest #1.
Tonto BA	0835	Adult incubating in new nest #6.
Sheep BA	0837	Adult incubating in nest #7.
76 BA	0848	All known nests empty. No eagles.
Armer Gulch BA	0910	Adult incubating in nest #1.
Pinto BA	0915	Adult incubating in nest #10. Second adult perched in nest.
Pinal BA	0920	All known nests empty. One adult perched by nest #9.
Redmond BA	0931	All known nests empty. Two adults perched by nest #5.
Fool Hollow Lake nest site	1005	All known nests empty. Nest #1 fallen. One adult perched by a new nest (#3) in tree.
Cibecue BA	1116	All known nests empty. No eagles.
Mule Hoof historic BA	1133	All known nests empty. No eagles.
Cedar Basin BA	1150	All known nests empty. No eagles.
Lone Pine BA	1159	Adult incubating in nest #8. Second adult perched in area.
Pineasco Creek nest site	1212	All known nests empty. One adult in area.
George's Basin nest site	1216	All known nests empty. One adult perched by nest #1.
Lost Mule (golden eagle BA)	1217	All known nests empty. No eagles.

Table 13 continued.

Location	Time	Comments
Show Low BA	1329	All known nests empty. Two adults perched together.
Talkalai BA	1417	Adult incubating in nest #9.
San Carlos BA	1424	Adult incubating in nest #7.
Suicide BA	1430	All known nests empty. One adult in area.
Coolidge BA	1440	All known nests empty. One immature perched.
Granite Basin BA	1519	All known nests empty. No eagles.
February 16, 2017		
Bachelor Cove BA	0853	Adult brooding unknown number of young.
Two Bar nest site	0856	All known nests empty. Pair of adults perched near nest #2.
February 21, 2017		
Burro Creek BA	1110	All known nests empty. One adult perched.
February 22, 2017		
Nevada Bay BA	1101	All known nests empty. No eagles.
February 23, 2017		
Kachina BA	1010	All known nests empty. No eagles.
Perkinsville BA	1032	Adult incubating in nest #4.
Elaine BA	1618	Adult incubating in nest #1.
February 24, 2017		
Lower Lake Mary BA	0807	All known nests empty. No eagles.
Silver Creek BA	1020	Adult incubating in nest #2. Second adult flew to nest.
Fool Hollow nest site	1148	Adult incubating in nest #3.
March 7, 2017		
Two Bar nest site	0828	All known nests empty. No eagles.
Tonto BA	0947	Adult with ≥1 nestling, 2 weeks old.
March 8, 2017		
Suicide BA	1054	All known nests empty. One adult standing in nest #1.
Granite Basin BA	1416	All known nests empty. One adult perched.
March 9, 2017		
Talkalai BA	0828	Two nestlings, 4 weeks old.
San Carlos BA	1234	Adult brooding ≥1 small nestling, age undetermined.
March 13, 2017		
Kachina BA	0857	All known nests empty. One osprey perched at nest #1.
White Horse Lake BA	0911	Adult incubating in nest #7.
Silver Creek BA	1440	Adult appeared to be brooding ≥1 nestling. Second adult perched.
Fool Hollow Lake BA	1535	Adult incubating.
Ashurst BA	1624	Adult incubating in nest # 1
Lower Lake Mary BA	1628	Adult incubating in nest #3.
March 15, 2017		
Sullivan Lake BA	0912	Adult with two nestlings, 6 weeks old.
Burro Creek BA	1119	All known nests empty. One adult perched.
March 16, 2017		
Sycamore BA	0803	Adult with two nestlings, 2 weeks old.
Rodeo BA	0806	Adult with two nestlings, 3.5 weeks old.
Orme BA	0810	All known nests empty. No eagles.
Granite Reef BA	0813	All known nests empty. One adult in area.
Goldfield BA	0816	Two nestlings, 6 weeks old.
Bulldog BA	0820	Two nestlings, 2-3 weeks old. Adult perched.
Blue Point BA	0823	Three nestlings, 6 weeks old.
Saguaro BA	0827	All known nests empty. No eagles.

Table 13 continued.

Location	Time	Comments
Tortilla Creek BA	0832	At least 2 nestlings, 7 weeks old.
Black Cross BA	0834	One nestling, 1-2 weeks old.
Fish Creek BA	0840	Two nestlings, 3-4 weeks old.
Horse Mesa BA	0844	Two nestlings, 4.5-5.5 weeks old.
Rock Creek BA	0848	All known nests empty. No eagles.
Bachelor Cove BA	0855	Two nestlings, 5-6 weeks old. One adult flying.
Tonto BA	0900	Adult with two nestlings, 3 weeks old.
76 BA	0913	Adult with one hatchling and one egg.
Armer Gulch BA	0927	Three nestlings, 4.5-6 weeks old.
Pinto BA	0932	Adult with two nestlings, 2 weeks old.
Pinal BA	0935	Adult incubating in nest #9.
Redmond BA	0940	All known nests empty. No eagles.
Cibecue BA	0953	Adult incubating in nest #2.
Cedar Basin BA	1004	All known nests empty. No eagles.
Lone Pine BA	1010	Adult brooding one nestling, 1-2 weeks old.
Show Low Lake BA	1057	Adult incubating in nest #1.
Pineasco Creek nest site	1113	All known nests empty. No eagles.
Lost Mule (golden eagle BA)	1118	All known nests empty. Greenery in nest #2. No eagles.
George's Basin nest site	1123	All known nests empty. No eagles.
Crescent BA	1144	Adult incubating in nest #1. Second adult at lake.
Greer Lakes BA	1152	Adult incubating in nest #4.
Becker BA	1159	All known nests empty. One adult perched near nest #2. One subadult (transitional plumage) flying.
Sheep BA	1336	Two nestlings, 5.5 weeks old. One adult perched.
March 20, 2017		
Alamo BA	0843	Adult in nest #4 shading two nestlings, 4.5-5 weeks old.
Ive's Wash BA	0850	All known nests empty. No eagles.
Buckskin 1 nest site	0906	New large nest (#1) on cliff. No eagles.
Buckskin 2 nest site	0919	Two new large nests (#1, #2) on cliff. No eagles.
Buckskin 3 nest site	0928	Two new large nests (#1, #2) on cliff. No eagles.
Bill Williams BA	0930	All known nests empty. No eagles.
Buckskin Mesa nest site	0944	Five new large nests (#1-5) on cliffs. No eagles.
Buckskin 4 nest site	0952	New large nest (#1) on cliff. No eagles.
Buckskin 5 nest site	0955	Red-tailed hawk incubating in large nest (#1) on cliff. Four other new large nests (#2-5) on cliffs. No eagles.
Buckskin 6 nest site	1003	Four new large nests (#1-5) on cliffs. No eagles.
Mohave BA	1155	Adult shading two nestlings, 3.5-4 weeks old.
Mount Davis (golden eagle BA)	1228	Nests #1-3 empty. Two new nests found (#4-5).
Nevada Bay BA	1233	All known nests empty. No eagles.
Black Canyon BA	1246	Adult with one nestling in nest #1, 3 weeks old.
Ringbolt Rapids nest site	1251	All known nests empty. No eagles.
Cross Current nest site	1254	At least one new large nest (#1) on cliff. No eagles.
Big Sand Bar nest site	1258	New large nest (#1) on cliff. No eagles.
Indian Rapids nest site	1301	New large nest (#1) on cliff. No eagles.
Roaring Rapids nest site	1315	Two new large nests (#1, 2) on cliff. No eagles.
Malpais nest site	1328	Two new large nests (#1, 2) on cliff. No eagles.
Mile 320 nest site	1334	Five new large nests (#1-5) on cliff. No eagles.

Table 13 continued.

Location	Time	Comments
March 22, 2017		
Pee Posh Wetlands BA	0752	One nestling, 7 weeks old in nest #7.
Alamo BA	0831	Two nestlings, 5.5 weeks old. Landed for banding.
Goldwater Lake	1057	No nests or eagles.
Lynx BA	1105	Adult with two nestlings, 2 weeks old.
Sullivan Lake BA	1240	Two nestlings, 6 weeks old. One adult flew to tree.
Granite nest site	1245	Golden eagle incubating in nest #2.
Hell Point historic BA	1247	All known nests empty. No eagles.
Perkinsville BA	1258	Adult incubating.
Mormon Pocket nest site	1259	Golden eagle incubating in nest #1.
Tower BA	1304	All known nests empty. No eagles.
Tapco BA	1308	All known nests empty. No eagles.
Green River BA	1312	Adult with two nestlings, 2 weeks old.
Oak Creek BA	1316	All known nests empty. No eagles.
Beaver BA	1323	All known nests empty. No eagles.
Ladders BA	1331	Adult incubating in nest #3.
Coldwater BA	1340	All known nests empty. No eagles.
East Verde BA	1349	All known nests empty. No eagles.
Table Mountain BA	1355	Adult incubating in nest #4.
Horseshoe BA	1415	All known nests empty. No eagles. Nest #16 submerged by lake.
Cliff BA	1429	All known nests empty. No eagles.
Sheep Creek BA	1431	All known nests empty. No eagles.
Yellow Cliffs BA	1433	Adult in nest #1 with one hatchling.
Bartlett BA	1455	All known nests empty. No eagles.
Box Bar BA	1458	Adult in new nest #6 brooding one nestling, 1 week old.
Fort McDowell BA	1501	Two nestlings, 6 weeks old. Adult perched.
Doka BA	1503	Adult incubating in nest #7.
Sycamore BA	1505	Two nestlings, 3 weeks old.
Rodeo BA	1507	Two nestlings, 5 weeks old. Adult perched.
Orme BA	1512	All known nests empty. No eagles.
Granite Reef BA	1514	All known nests empty. No eagles.
Riverside BA	1521	All known nests empty. No eagles.
April 17, 2017		
Goldfield BA	0745	Two nestlings, branching or fledged.
Bulldog BA	0749	One nestling, 7-8 weeks old.
Blue Point BA	0751	All known nests empty. No eagles.
Saguaro BA	0800	All known nests empty. No eagles.
Tortilla BA	0804	Three nestlings, 11 weeks old.
Black Cross BA	0807	All known nests empty. No eagles.
Fish Creek BA	0811	Adult with at least two nestlings, 8-9 weeks old.
Horse Mesa BA	0815	Two nestlings, 9.5-10.5 weeks old.
Bachelor Cove BA	0821	Two nestlings, 10 weeks old.
Tonto BA	0825	Two nestlings, 8 weeks old.
Sheep BA	0828	Two nestlings, 9-10 weeks old.
76 BA	0835	Two nestlings, 4 weeks old. Adult flew to nest.
Armer Gulch BA	0850	Three nestlings, 10-11 weeks old.
Campaign Bay BA	0853	No nests or eagles.
Pinto BA	0855	Two nestlings, 6-6.5 weeks old. One adult perched.
Pinal Creek	0900	Common black hawk incubating on cliff nest for fourth straight year.

Table 13 continued.

Location	Time	Comments
Pinal BA	0902	All known nests empty. No eagles.
Redmond BA	0907	All known nests empty. No eagles.
Show Low Lake BA	0936	Two nestlings, 2.5-3 weeks old. Two adults perched.
Cibecue BA	1036	Two adults in nests, appeared to be brooding or shading a nestling.
Seneca Lake	1043	No nests or eagles.
Cienega Creek	1048	No nests or eagles.
Lone Pine BA	1100	Adult with one nestling, 5 weeks old.
Pineasco Creek nest site	1108	All known nests empty. Pair of adults perched just downstream.
George's Basin nest site	1115	All known nests empty. No eagles.
Reservation Lake	1135	No nests or eagles.
Crescent BA	1141	Adult incubating.
Greer Lakes BA	1148	At least 2 nestlings, 3.5-4 weeks old.
Becker BA	1155	All known nests empty. No eagles.
Concho BA	1215	All known nests empty. No eagles.
Silver Creek BA	1246	Adult shading ≥1 nestling, 4.5-5 weeks old. Second adult perched.
April 20, 2017		
Rodeo BA	0735	Two nestlings, 8-8.5 weeks old.
Sycamore BA	0739	Two nestlings, 6 weeks old. Adult perched.
Doka BA	0740	Adult perched by nest #7. Nest empty.
Ft. McDowell BA	0744	Two nestlings, 10 weeks old. Adult perched.
Yellow Cliffs BA	0751	All known nests empty. No eagles.
Sheep Creek BA	0755	All known nests empty. No eagles.
Horseshoe BA	0800	All known nests empty. No eagles.
Table Mountain BA	0810	One egg in nest. No eagles.
Ladders BA	0820	Adult incubating.
Green River BA	0920	One nestling, 5.5 weeks old.
White Horse Lake BA	0933	Adult appeared to be brooding young.
Dogtown BA	0937	Nest #2 fallen. No eagles.
Mormon Pocket nest site	0950	One golden eagle nestling, 2 weeks old.
Perkinsville BA	0953	All known nests empty. No eagles.
Granite nest site	1000	Golden eagle with ≥1 nestling, 3 weeks old. Second adult golden eagle perched.
Sullivan Lake BA	1007	Two nestlings, 10 weeks old.
Lynx BA	1019	Two nestlings, 6-6.5 weeks old. One adult flying.
Alamo BA	1216	Two nestlings, 9.5 weeks old.
Buckeye BA	1339	One nestling, 9.5-10 weeks old.
Garden Lakes BA	1346	One nestling, 10.5 weeks old.
May 2, 2017		
Bulldog BA	0715	One nestling, 9-10 weeks old.
Blue Point BA	0751	Nest empty, no eagles.
Fish Creek BA	0801	Three nestlings, 10-11 weeks old.
Bachelor Cove BA	0809	Two nestlings, 12 weeks old (one perched above nest).
Tonto BA	0813	Two nestlings, 10 weeks old.
Sheep BA	0816	Nest empty. Two adults perched. Nestlings presumed fledged.
76 BA	0825	Two nestlings, 6 weeks old.
Black Canyon Lake	0845	No new nests or eagles.
Willow Springs Lake nest site	0905	Nests #1, 3 not found. Ospreys standing in nests #2, 7. Ospreys incubating in nests #4, 5. Nest #6 mostly fallen. Nest #8 empty.

Table 13 continued.

Location	Time	Comments
Woods Canyon Lake	0912	Nests #4, 5 not found. Ospreys incubating in nests #6, 7. Osprey incubating in new snag nest (#11).
Woods Canyon Lake BA	0915	Adult brooding at least one nestling in new snag nest (#10).
Chevelon Canyon Lake BA	0925	Nest #2 not seen. Nests #3, 4 fallen. Two adult bald eagles seen at lake. No new nests.
Bear Canyon Lake nest site	0940	Ospreys incubating in nest #3 and #5. Nests #1, 2, 4 not found.
Knoll Lake nest site	0948	Osprey incubating in nest #5. Nests #1, 2, 4 not found. Ospreys standing in new snag nests #6 and #7.
Blue Ridge Reservoir nest site	1040	Nests #2 not found. Nest #6 fallen. Nest #7 empty, greenery in nest. New snag nest (#8) with greenery.
Tremaine/Soldier Annex/ Long Lakes nest site	1102	Adult incubating in Tremaine nest #2.
Kinnickinick Lake	1110	No nests or eagles.
Ashurst Lake	1120	Adult in nest #1 with at least one nestling, 4-4.5weeks old.
Lower Lake Mary BA	1125	Adult incubating in nest #3.
Upper Lake Mary nest site	1127	Ospreys incubating in nests #1, 2, 3, 7. Osprey standing in nest #9. Nests #4, 6 not found. Nest #8 empty. Did not check nest #10.
Elaine BA	1143	Two nestlings, 9 weeks old. Adult in nest.
Kachina BA	1308	Osprey incubating in nest #1.
Scholtz Lake	1321	New nest (#1) in live pine, empty.
Kaibab Lake nest site	1335	Ospreys incubating in nests #1, 2, 3, and 5. Nests #4 and #7 empty. Osprey pair standing in nest #6.
Dogtown BA	1340	Adult in new nest (#3) in live pine tree, possibly brooding young. Second adult flew to nest.
Sunflower Flat nest site	1346	Osprey incubating in nest #1.
White Horse Lake BA	1350	Adults in nest #7 with two nestlings, 2-2.5 weeks old. Ospreys incubating in nests #1, 5.
JD Dam Lake nest site	1355	Ospreys incubating in nests #1, 3. Nest #2 fallen.
Green River BA	1411	One nestling, 7 weeks old.
Ladders BA	1424	Adult standing in nest #3. Possibly one egg by adult.
May 17, 2017		
Two Bar nest site	0713	All known nests empty. No eagles.
Pinto BA	0730	Two nestlings, 10.5 weeks old.
Cibecue BA	0753	Adult with one nestling, 3.5-4 weeks old.
Lone Pine BA	0804	All known nests empty. No eagles.
Ladders BA	1044	All known nests empty. No eagles.
Green River BA	1101	One nestling, 9 weeks old.
May 19, 2017		
Dogtown BA	0748	Adult with ≥1 nestling, 4 weeks old.
Silver Creek BA	1218	One nestling, 9 weeks old. Adult perched.
Show Low BA	1246	Two nestlings, 7 weeks old. Adult perched above nest.
Lower Lake Mary BA	1416	All known nests empty. No eagles.
June 13, 2017		
Cibecue BA	0657	One nestling, 7.5-8 weeks old.

APPENDIX E: ARMER GULCH BREEDING AREA SUMMARY

Table 14. Observed human activity and bald eagle behavior, Armer Gulch BA, Arizona, 2017.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Driver	20	14	--	--	--	40	12	86	61.4
OHV	8	5	--	--	--	18	4	35	25.0
Motorcycle	3	--	--	--	--	2	1	6	4.3
Helicopter	1	2	--	--	--	1	--	4	2.9
Construction	1	2	--	--	--	1	--	4	2.9
Small Plane	--	--	--	--	--	2	--	2	1.4
Apache Helicopter	--	1	--	--	--	--	--	1	0.7
Military Jet	--	--	--	--	--	--	1	1	0.7
AGFD Biologist	--	--	--	1	--	--	--	1	0.7
Total	33	24	--	1	--	64	18	140	

[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, Armer Gulch BA, Arizona, 2017.						
Sex	Fish		Reptiles		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	1	1-0	--	--	1	1-0
Female	--	--	1	1-0	1	1-0
Unknown	1	1-0	--	1-0	1	1-0
Total	2	2-0	1	1-0	3	3-3

[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, Armer Gulch BA, Arizona, 2017.						
Sex	Fish	Mammals	Reptiles	Unknown	Total	Percent
Male	15	--	--	3	18	36.0
Female	11	1	1	5	18	36.0
Unknown	5	--	--	9	14	28.0
Total	31	1	1	17	50	
Percent	62.0	2.0	2.0	34.0		

Table 17. Observed prey species delivered to the nest, Armer Gulch BA, Arizona 2017.							
Sex	Fish			Mammal	Reptile	Total	Percent
	CP[1]	SU	CS	GS	DR		
Male	6	4	1	--	--	11	55.0
Female	7	--	--	1	1	9	45.0
Total	13	4	1	1	1	20	
Percent	65.0	20.0	5.0	5.0	5.0		

[1] CP=common carp, SU= sucker species, CS=catfish species, GS=ground squirrel species, DR=diamondback rattlesnake.

Table 18. Bald eagle habitat analysis at the Armer Gulch BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
4.3 CW	SD	Middle	No	--	--	CG
4.5a CW	CS	Right	No	--	--	CG
4.5b CW	CM	Right	No	--	--	CG
4.6 CW	CS	Middle	Yes	--	--	CG
5.0 CW	SM	Right	No	--	--	UP
20.0 RL	SM	Left	No	2	RS	MB
20.6 RL	SM	Left	No	3	RS	MB
30.2 RL	SM	Right	No	2	RS	MB
30.3 RL	SM	Right	No	3	RS	MB
30.4 RL	SM	Right	No	3	RS	MB

[1]River or lake kilometer (Hunt et. al. 1992). CW=Cottonwood Wash, RL=Roosevelt Lake.
[2]CS=cottonwood, small/0-10 m, CM=cottonwood, medium/10-20 m, SD=snag, cottonwood, 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]RS=reservoir main body.
[6]CG=cottonwood grove, MB=mesquite bosque, UP=desert upland.

Table 19. Bald eagle habitat use at the Armer Gulch BA, Arizona, 2017.

River km[1]	PH[2,3]	PW	PP	PU	PI	PE	Total	Percent
4.3 CW	--	180	29	--	17	--	226	34.9
4.5 CW	--	52	26	--	--	--	78	12.1
4.6 CW	--	--	--	15	--	--	15	2.3
5.0 CW	--	18	--	--	--	--	18	2.8
20.0 RL	58	--	--	--	--	--	58	9.0
20.6 RL	30	--	--	--	--	6	36	5.6
30.2 RL	57	--	--	--	--	--	57	8.8
30.3 RL	55	--	--	--	--	--	55	8.5
30.4 RL	104	--	--	--	--	--	104	16.1
Total	304	250	55	15	17	6	647	
Percent	47.0	38.6	8.5	2.3	2.6	0.9		

[1]River or lake kilometer (Hunt et al. 1992). CW=Cottonwood Wash, RL=Roosevelt Lake
[2]Observation time (minutes).
[3]PH=perched hunting, PW=perched watching, PP=perched preening, PU=perched, unknown, PI=perched interaction, PE=perched eating.

APPENDIX F: CRESCENT BREEDING AREA SUMMARY

Table 20. Observed human activity and bald eagle behavior, Crescent BA, Arizona, 2017.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Anglers	250	--	--	--	--	--	--	250	59.2
Boater - fishing	38	--	--	--	--	--	--	38	9.0
Picnickers	33	--	--	--	--	--	--	33	7.8
Canoe - kayak	25	--	--	1	--	--	--	26	6.2
Drivers	19	--	--	--	--	--	--	19	4.5
Birders	14	--	--	--	--	--	--	14	3.3
Hikers	9	--	--	1	--	--	--	10	2.4
Photographer	8	--	--	1	--	--	--	9	2.1
Agency Workers	8	--	--	--	--	--	--	8	1.9
Float tubers fishing	4	--	--	--	--	--	--	4	0.9
Campers	3	--	--	--	--	--	--	3	0.7
Motorcycles	3	--	--	--	--	--	--	3	0.7
Bicycle	1	--	--	--	--	--	--	1	0.2
Horseback Riders	1	--	--	--	--	--	--	1	0.2
Rancher	1	--	--	--	--	--	--	1	0.2
Cattle	1	--	--	--	--	--	--	1	0.2
Small Plane	1	--	--	--	--	--	--	1	0.2
Total	419	--	--	3	--	--	--	422	

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

Table 21. Observed forage events and success, Crescent BA, Arizona, 2017.						
Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	6	6-0	--	--	6	6-0
Female	8	8-0	1	1-0	9	9-0
Total	14	14-0	1	1-0	15	15-0

[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, Crescent BA, Arizona, 2017.				
Sex	Fish	Birds	Total	Percent
Male	6	--	6	40.0
Female	8	1	9	60.0
Total	14	1	15	
Percent	93.3	6.7		

Table 23. Observed prey species delivered to the nest, Crescent BA, Arizona 2017.					
Sex	Fish		Birds	Total	Percent
	RT[1]	BT	AC		
Male	6	--	--	6	40.0
Female	6	2	1	9	60.0
Total	12	2	1	15	
Percent	80.0	13.3	6.7		

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

Table 24. Bald eagle habitat analysis at the Crescent BA, Arizona, 2017.					
Perch Location[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
2.0	HS	Partial	6	RS	CF
2.1a	PO	Yes	4	RS	CF
2.1b	PS	Yes	5	RS	CF
2.15	HS	Partial	8	RS	CF
2.2	PO	Yes	8	RS	CF
2.25	HS	No	8	RS	CF
2.3a	PO	Yes	8	RS	CF
2.3b	PO	Yes	7	RS	CF
2.3c	PS	Yes	4	RS	CF
2.4	SC	No	7	RS	CF
2.5	PO	No	6	RS	CF
2.6	PO	Yes	3	RS	CF

[1]Lake kilometer (clockwise from north boat ramp) .
[2]HS=hard snag (only main branches), PO= Pine/Conifer, old growth/20-30+ m, PS= Pine/Conifer, 2nd growth/10-20 m , SC=snag, conifer.
[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]RS=reservoir main body.
[5]CF=coniferous forest.

Table 25. Bald eagle habitat use at the Crescent BA, Arizona, 2017.										
Lake km[1]	PW[2,3]	PR	PK	PP	PH	ET	PI	PV	Total	Percent
2.0	225	--	--	--	--	--	--	--	225	1.4
2.1	913	--	--	--	--	--	3	--	916	5.6
2.15	5,867	468	--	16	--	--	--	--	6,351	39.1
2.2	218	--	--	--	--	--	--	--	218	1.3
2.25	2,212	--	--	10	--	--	--	--	2,222	13.7
2.3	4,663	110	61	--	17	5	--	--	4,856	29.9
2.4	416	--	--	--	--	--	--	2	418	2.6
2.5	846	110	--	--	--	5	--	--	961	5.9
2.6	60	--	--	--	--	--	--	--	60	0.4
Total	15,420	688	61	26	17	10	3	2	16,227	
Percent	95.0	4.2	0.4	0.2	0.1	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, PK=perched with prey, PP=perched preening, PH=perched hunting, ET=eating in tree, PI=perched interaction, PV=perched vocalizing.

APPENDIX G: GOLDFIELD BREEDING AREA SUMMARY

Table 26. Observed human activity and bald eagle behavior, Goldfield BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	498	--	--	6	--	--	--	504	34.4
Horseback Rider	379	4	--	--	--	--	7	390	26.6
Photographer	277	--	--	2	--	--	--	279	19.0
Birder	60	--	--	--	--	--	--	60	4.1
Fisherman	40	--	--	--	--	--	--	40	2.7
Canoe/Kayak	38	--	--	--	--	--	--	38	2.6
Helicopter	18	11	--	--	--	--	8	37	2.5
Mining-Metal Detector	26	--	--	--	--	--	--	26	1.8
Swimmer	24	--	--	--	--	--	--	24	1.6
Sheriff Helicopter	8	3	--	2	--	--	3	16	1.1
Agency worker	14	--	--	--	--	--	--	14	1.0
Apache Helicopter	2	4	1	--	--	--	1	8	0.5
Moto parachute	--	--	4	2	--	--	--	6	0.4
Small Plane	1	2	--	1	--	--	1	5	0.3
Cycler	4	--	--	--	--	--	--	4	0.3
Military helicopter (non-Apache)	2	--	1	--	--	--	1	4	0.3
Nestwatcher	--	--	--	4	--	--	--	4	0.3
Driver	2	--	--	--	--	--	--	2	0.1
Drone	2	--	--	--	--	--	--	2	0.1
Tuber	2	--	--	--	--	--	--	2	0.1
Total	1,397	24	6	17	0	0	21	1,465	

[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, Goldfield BA, Arizona, 2017.

Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	4	3-1	--	--	4	3-1
Female	4	1-3	1	0-1	5	1-4
Total	8	4-4	1	0-1	9	4-5

Table 28. Observed prey types delivered to the nest, Goldfield BA, Arizona, 2017.

Sex	Fish	Mammals	Unknown	Total	Percent
Male	15	4	13	32	59.3
Female	15	--	7	22	40.7
Total	30	4	20	54	
Percent	55.6	7.4	37.0		

Table 29. Bald eagle habitat analysis at the Goldfield BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
9.0	CM	Right	No	5	RU	MB
9.1a	CM / MB	Right	Partial	6	RU	MB
9.1b	WO	Right	Partial	1	RU	MB
9.2a	HS	Right	No	7	RU	MB
9.2b	SO	Right	No	1	RU	SO
9.2c	HS	Right	No	3	RU	MB
9.2d	CS	Right	Partial	1	RU	MB
9.2e	SM	Right	No	3	RU	MB
9.3a	HS	Right	No	5	RU	CW / MB
9.3b	HS	Right	No	5	RU	MB
9.3c	CM	Right	Partial	7	RU	MB
9.3d	SG	Right	No	1	RU	MB
9.3e	SD	Right	No	6	RU	MB
9.3f	SG	Right	No	5	RU	MB
9.4a	WO	Left	No	1	RI	WT
9.4b	CM	Right	No	5	RU	MB
9.4c	SG	Right	No	5	RU	MB
9.4d	SD	Right	No	1	RU	SO
9.5	WO	Right	No	1	RU	WT
9.7a	SO	Center	No	1	RU	SO
9.7b	CM	Right	Partial	5	RU	MB
9.8	HS	Right	No	3	RU	MB
9.9	SG of WO	Right	No	1	PO	WT
10.0	WO	Right	No	1	RU	WT
10.1	CM	Left	No	2	RU	WT
10.2	SG	Left	No	1	PO	MB
10.3	CM	Left	Yes	1	RU	CW / MB
11.3	CL	Right	No	1	RU	CL
11.4a	WO	Left	Partial	1	PO	WT
11.4b	CL	Right	No	1	PO	CL
11.7a	SO	Middle	No	1	RI	GB
11.7b	HS	Right	No	1	RI	WT
13.1	SG	Left	No	2	RU	WT

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood, large/20-30+, CM=cottonwood medium/10-20+m, CS = Cottonwood small/0-10 m, HS=hard snag (main branches only), MB=mesquite bosque, SD=snag, cottonwood, SG=soft snag (dead but branches still intact), SM=snag, mesquite, 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]PO=pool, RI=riffle, RU=run. (Note that these are conditions before river was raised. Once river was raised, most of the RI became RU).
[6]CL=cliff, CW=cottonwood grove, MB=mesquite bosque, SO=shore, WT=willow thicket.

Table 30. Bald eagle habitat use at the Goldfield BA, Arizona, 2017.

River km[1]	PW[2,3]	PP	PH	CL	PD	PX	DW	PV	ES	OT	Total	Percent
9.0	150	--	--	--	--	--	--	2	--	--	152	1.0
9.1	2,739	434	--	441	--	35	--	11	--	4	3,664	24.6
9.2	35	--	--	--	--	--	2	--	--	1	38	0.3
9.3	3,167	1,014	--	248	106	--	--	7	--	13	4,555	30.6
9.4	130	6	84	--	--	2	--	2	--	--	224	1.5
9.5	6	--	6	--	--	--	--	--	--	--	12	0.1
9.7	158	43	--	29	--	--	23	--	15	8	276	1.9
9.8	15	--	--	--	--	--	--	--	--	--	15	0.1
9.9	27	37	126	--	--	--	--	--	--	--	190	1.3
10.0	2,344	212	64	60	36	--	--	--	--	--	2,716	18.2
10.1	1,012	10	404	133	--	--	--	--	--	--	1,559	10.5
10.2	--	--	31	--	--	--	--	--	--	--	31	0.2
11.3	58	1	--	--	--	--	--	--	--	--	59	0.4
11.4	620	9	727	36	--	--	--	--	--	--	1,392	9.3
11.7	8	--	--	--	--	--	--	1	--	--	9	0.1
13.1	--	--	--	--	--	--	--	--	--	2	2	<0.1
Total	10,469	1,766	1,442	947	142	37	25	23	15	28	14,894	
Percent	70.3	11.9	9.7	6.4	1.0	0.2	0.2	0.2	0.1	0.2		

[1]River kilometer (Hunt et. al. 1992). OOV=out of view.
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PH=perched hunting, CL=perched close to mate, PD=perched drying, PX=perched various, DW=drinking water, PV=perched vocalizing, ES=eating on shore, OT=other (includes perched eating, copulating, bathing, perched unknown, perched on ground).

APPENDIX H: LUNA BREEDING AREA SUMMARY

Table 31. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Anglers	615	--	--	--	--	--	--	615	37.8
Drivers	336	--	--	--	1	--	--	337	20.7
Boaters (fishing)	216	--	--	--	--	--	--	216	13.3
Picnickers	112	--	--	--	--	--	--	112	6.9
Birders	83	--	--	--	--	--	--	84	5.2
Hikers	70	--	1	1	--	--	--	71	4.4
Kayaks/ Canoes	55	--	--	--	--	2	--	57	3.5
Float tubers (fishing)	38	--	--	--	--	--	--	38	2.3
Agency Workers	35	--	1	--	1	--	--	35	2.1
Photographers	19	--	--	--	--	--	--	19	1.2
Helicopter	11	--	--	--	--	--	--	11	0.7
Motorcycles	10	--	--	--	--	--	--	10	0.6
OHV	8	--	--	--	--	--	--	8	0.5
Military jet	5	--	--	--	--	--	--	5	0.3
Swimmer	3	--	--	--	--	--	--	3	0.2
Bicycles	2	--	--	--	--	--	--	2	0.1
Standup paddleboard	2	--	--	--	--	--	--	2	0.1
Campers	1	--	--	--	--	--	--	1	<0.1
AGFD biologist	1	--	--	--	--	--	--	1	<0.1
Small plane	1	--	--	--	--	--	--	1	<0.1
Total	1,623	--	2	1	2	2	--	1,630	

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

Table 32. Observed forage events and success, Luna BA, Arizona, 2017.

Sex	Birds		Fish		Mammals		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	22	21-1	15	15-0	--	--	1	1-0	38	37-1
Female	26	24-2	11	11-0	--	--	4	4-0	41	39-2
Tandem	--	--	--	--	1	1-0	--	--	1	1-0
Total	48	45-3	26	26-0	1	1-0	5	5-0	80	77-3

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

Table 33. Observed prey types delivered to the nest, Luna BA, Arizona, 2017.

Sex	Birds	Fish	Mammals	Unknown	Total	Percent
Male	16	14	1	2	33	50.7
Female	20	7	1	4	32	49.3
Total	36	21	2	6	65	
Percent	55.4	32.3	3.1	9.2		

Table 34. Observed prey species delivered to the nest, Luna BA, Arizona 2017.

Sex	Birds		Fish		Mammals	Total	Percent
	AC[1]	CM	RT	CT	JR		
Male	15	1	14	--	1	31	52.5
Female	20	--	6	1	1	28	47.5
Total	35	1	20	1	2	59	
Percent	59.3	1.7	33.9	1.7	3.4		

[1]AC=American coot, CM=common merganser, RT=rainbow trout, CT=cutthroat trout, JR=jackrabbit species.

Table 35. Bald eagle habitat analysis at the Luna BA, Arizona, 2017.

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	Yes	1	RS	--
0.6	SH	R – E	No	2	RC	--
0.9	PO	R – E	Yes	1	RC	--
1.4	PO	R - E	Yes	2	RS	--
1.7	PS	R - E	Yes	2	RC	--
1.8	PS	R - E	Yes	1	RC	--
1.9	PS	R – NE	Yes	1	RC	--
2.1	PO	R – N	No	7	--	CF
2.2	SH	R – N	No	7	--	CF
2.3a	PO	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	1	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
2.9	PS	L - NW	Yes	1	RC	--
3.0	PS	L – NW	Yes	2	--	CF
3.3	ST	L - NW	No	2	--	CF
3.4	PS	L - NW	Yes	4	--	CF
3.5	PO	L – NW	No	1	RC	--
3.8	FP	L -W	No	1	IF	--
5.1a	FP	R – SW	No	1	RC	--
5.1b	PO	R – SW	Yes	8	--	CF
5.2	BO	--	No	1	RS	--

[1]Lake kilometer (counterclockwise from boat ramp).
[2]BO=boulder, 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, IF=inflow to reservoir
[6]CF=coniferous forest.

Table 36. Bald eagle habitat use at the Luna BA, Arizona, 2017.

Lake km[1]	PW[2,3]	PR	PH	PP	PD	CL	ET	PV	PK	Total	Percent
0.1	--	--	2	--	--	--	--	--	--	2	<0.1
0.9	151	--	--	--	--	--	--	--	--	151	0.3
1.4	223	--	--	--	--	--	--	--	--	223	0.4
1.7	75	--	--	--	--	--	--	--	--	75	0.1
1.8	47	--	--	--	--	--	--	--	--	47	0.1
2.1	292	170	--	--	--	--	--	--	--	462	0.9
2.2	1,597	212	--	--	--	--	--	--	--	1,809	3.4
2.3	4,023	638	--	24	--	--	--	--	--	4,685	8.8
2.4	28,027	5,564	13	649	--	2	12	5	--	34,272	64.3
2.5	1,519	--	--	--	--	--	--	--	--	1,519	2.8
2.6	1,879	717	511	14	--	52	6	--	--	3,179	6.0
2.7	20	--	911	--	--	--	--	3	4	938	1.8
2.8	--	51	715	--	32	--	--	--	--	798	1.5
2.9	282	--	881	--	--	--	--	14	--	1,177	2.2
3.0	190	--	54	--	--	--	--	--	--	244	0.5
3.3	8	--	--	13	61	--	--	--	--	82	0.2
3.4	118	--	--	--	14	--	--	--	--	132	0.2
3.5	2,207	1,043	142	--	--	--	12	--	--	3,404	6.4
3.8	--	--	22	--	--	--	--	--	--	22	<0.1
5.1	--	--	67	--	--	--	--	--	--	67	0.1
5.2	--	--	15	--	--	--	--	--	--	15	<0.1
Total	40,658	8,395	3,333	700	107	54	30	22	4	53,303	
Percent	76.3	15.7	6.3	1.3	0.2	0.1	0.1	<0.1	<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, ET=eating in tree, PV=perched vocalizing, PK=perched with prey.

APPENDIX I: PINTO BREEDING AREA SUMMARY

Table 37. Observed human activity and bald eagle behavior, Pinto BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small plane	7	2	--	--	--	--	--	9	50.0
Helicopter	5	2	--	--	--	--	--	7	38.8
Gunfire	--	2	--	--	--	--	--	2	11.1
Total	12	6	--	--	--	--	--	18	

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

Table 38. Observed prey types delivered to the nest, Pinto BA, Arizona, 2017.

Sex	Fish	Unknown	Total	Percent
Male	8	1	9	31.0
Female	3	8	11	37.9
Unknown	3	6	9	31.0
Total	14	15	29	
Percent	48.3	51.7		

Table 39. Bald eagle habitat analysis at the Pinto BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
104.3	SS	Right	No	6	RU	TX
105.2a	SH	Right	No	6	RU	TX
105.2b	CM	Right	No	6	RU	TX
105.3a	SH	Right	No	6	RU	TX
105.3b	SS	Right	No	8	RU	TX
105.3c	CT	Left	No	1	RU	UP
105.4a	SS	Right	No	5	RU	TX
105.4b	SS	Right	No	6	RU	TX
105.4c	SS	Left	No	1	RU	UP
105.5a	SS	Right	No	6	RU	TX
105.5b	SS	Right	No	6	RU	TX
105.6a	CL	Right	Yes	6	RU	TX
105.6b	SH	Right	No	1	RI	TX
105.7	HL	Left	No	2	RU	UP

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff, CM=cottonwood medium (10-20+m), CT=cliff top, SH=hard snag (main branches only), HL=hillside, SS=soft snag.
[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]RI=riffle, RU=run.
[5]UP=desert upland, TX=tamarisk thicket.

Table 40. Bald eagle habitat use at the Pinto BA, Arizona, 2017.								
Perch Location[1]	PW[2,3]	PP	PH	ET	PV	PD	Total	Percent
104.3	20	--	--	--	--	--	20	0.3
105.2	14	--	--	--	--	--	14	0.2
105.3	46	5	73	--	--	--	124	1.6
105.4	230		177	148	--	--	555	7.3
105.5	6,290	493	--	--	23	--	6,806	89.5
105.6	18	--	--	--	--	27	45	0.6
105.7	35	--	--	--	4	--	39	0.5
Total	6,653	498	250	148	27	27	7,603	
Percent	87.5	6.5	0.3	2.0	0.4	0.4		

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

APPENDIX J: PLEASANT BREEDING AREA SUMMARY

Table 41. Observed human activity and bald eagle behavior, Pleasant BA, Arizona, 2017.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small Plane	13	12	1	--	--	1	9	36	29.0%
Angler	8	4	--	--	1	3	--	16	12.9%
Military Jet	--	1	--	--	--	--	11	12	9.7%
Helicopter	7	1	--	--	--	--	3	11	8.9%
Hiker	5	--	--	--	--	1	2	8	6.5%
Helicopter, Sheriff	2	4	--	1	--	--	--	7	5.6%
OHV	6	--	--	--	--	--	1	7	5.6%
Kayak/Canoe	1	--	--	--	--	6	--	7	5.6%
Agency Worker	1	2	--	--	--	2	--	5	4.0%
Fishing by Boat	1	1	--	--	--	2	--	4	3.2%
Horseback Rider	--	--	2	--	--	--	--	3	2.4%
Jet	2	--	--	--	--	--	1	3	2.4%
Boater	--	1	--	--	--	--	1	2	1.6%
Nestwatcher	--	1	--	--	--	--	--	1	0.8%
Drone	--	--	--	--	--	--	1	1	0.8%
Ultralight	1	--	--	--	--	--	--	1	0.8%
Helicopter, Military	--	1	--	--	--	--	--	1	0.8%
Total	47	28	3	1	1	15	29	124	

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

Table 42. Watercraft compliance at the closure boundary, Pleasant BA, Arizona, 2017.					
Date	Boats at Closure	Boats in Closure	Jet Skis at Closure	Jet Skis in Closure	Total
7 Feb	1	--	--	--	1
5 Mar	2	--	--	--	2
8 Mar	2	1	--	--	3
18-19 Mar	6	1	--	--	7
Total	11	2	--	--	13
Percent	84.6	15.4	--	--	

Table 43. Watercraft compliance: weekend vs. weekday, Pleasant BA, Arizona, 2017.						
Date	Boats at Closure	Boats in Closure	Jet Skis at Closure	Jet Skis in Closure	Total	Percent
Weekend	8	1	--	--	9	69.2
Weekday	3	1	--	--	4	30.7
Total	11	2	--	--	13	

Table 44. Observed forage events and success, Pleasant BA, Arizona, 2017.								
Sex	Fish		Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	2	2-0	--	--	5	1-4	7	3-4
Female	1	1-0	--	--	1	1-0	2	2-0
Unknown	1	1-0	1	1-0	--	--	2	2-0
Total	4	4-0	1	1-0	6	2-4	11	7-4

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

Table 45. Observed prey types delivered to the nest, Pleasant BA, Arizona, 2017.				
Sex	Fish	Unknown	Total	Percent
Male	3	5	8	50.0
Female	4	2	6	37.5
Unknown	--	2	2	12.5
Total	7	9	16	
Percent	43.8	56.3		

Table 46. Bald eagle habitat analysis at the Pleasant BA, Arizona, 2017.								
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O (max)[4]	Distance to H_2O (min)[4]	H_2O Type, low[5]	H_2O Type, high[5]	Land Type[6]
75.7	CT	L	No	1	1	RC	RC	UP
78.2a	SP	C	No	1	1*	IF	RC	-
78.2b	CF	R	No	2	2	RC	RC	CL
78.4a	CT	R	No	3	2	IF	RC	CL
78.4b	HS	R	Partial	1	1	RC	RC	MB
78.5	PT	R	No	3	2	IF	RC	CL
78.6a	HS	R	Partial	1	1	IF	RC	MB
78.6b	LG	R	No	1	1	RC	RC	-
78.6c	SO	R	Partial	1	1*	IF	RC	MB
78.7	HS	R	Partial	1	1	IF	RC	MB
78.8a	EL	R	No	2	1	IF	RC	CW
78.8b	EL	R	Yes	1	1	RC	RC	CW
78.8c	HS	R	Partial	1	1	IF	RC	CW
78.8d	LG	R	Partial	1	1*	IF	RC	CW
78.8e	EL	R	Partial	2	1	IF	RC	CW
78.9a	EL	R	Partial	2	1	IF	RC	CW
78.9b	EL	R	Yes	2	1	IF	RC	CW
78.9c	LG	R	No	1	1*	RC	RC	SO
78.9d	EM	L	No	4	3	IF	RC	UP
79.0	CT	R	No	2	1	RC	RC	UP
79.1a	WO	I	No	1	1	IF	RC	WT
79.1b	HS	R	No	1	1	RC	RC	MB
79.2a	CT	R	No	3	2	RB	RC	UP
79.2b	CT	R	Partial	3	3	RB	RB	UP
79.2c	BO	R	No	3	3	RB	RB	UP
79.2d	HS	R	No	1	1	RC	RC	MB
79.5	CT	L	No	2	2	BW	RC	CL
80.0	CF	L	No	3	2	BW	RC	CL
80.1	CT	L	No	1	1	RI	RC	CL

[1]River kilometer (Hunt et. al. 1992).
[2]BO=boulder; CF=cliff ledge; CT=cliff top; EL=eucalyptus large, 10-20 m; EM=eucalyptus medium, 10-20 m; HS=hard snag; LG=log; PT=pinnacle top; SO=shore; SP=stump; WO=willow.
[3]L=river left, R=river right, C=channel (in river or lake), I=island.
[4]1=0-25m (*indicates underwater), 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400. Maximum and minimum distances to water were only recorded after RAs were observed using each perch. Since the lake level rose steadily throughout the observation period, a narrower range of distances to water was recorded for perches discovered later (higher perch number).
[5]BW=backwater, IF=reservoir inflow, RC=reservoir cove, RI=riffle, RB=river bend.
[6]CL=cliffs, CW=cottonwood grove, MB=mesquite bosque, SO=shore, UP=desert upland, WT=willow thicket.

Table 47. Bald eagle habitat use at the Pleasant BA, Arizona, 2017.

River km[1]	PW[2,3]	PP	PE	PU	PH	DW	PV	ES	GN	OT	Total	Percent
75.7	25	--	--	--	--	--	--	--	--	--	25	0.6
78.2	1	10	41	--	--	--	--	--	--	2	54	1.3
78.4	846	53	--	--	9	--	3	--	--	5	916	22.5
78.5	64	--	--	--	--	--	1	--	3	8	76	1.9
78.6	119	23	--	--	16	--	--	15	--	3	176	4.3
78.7	3	--	--	--	--	--	3	--	--	--	6	0.1
78.8	1,129	638	--	--	9	--	9	--	--	--	1,785	43.8
78.9	206	19	--	32	--	25	1	--	2	2	287	7.0
79.0	71	26	--	--	--	--	--	--	3	--	100	2.5
79.1	61	3	--	--	3	--	2	--	--	--	69	1.7
79.2	210	5	--	--	--	--	--	--	--	--	215	5.3
79.5	212	--	--	--	--	--	--	--	--	--	212	5.2
79.6	--	--	--	--	--	--	--	--	3	--	3	0.1
80.0	106	38	--	--	--	--	--	--	--	--	144	3.5
80.1	--	--	--	7	--	--	--	--	--	--	7	0.2
Total	3,053	815	41	39	37	25	19	15	11	20	4,075	
Percent	74.9	20.0	1.0	1.0	0.9	0.6	0.5	0.4	0.3	0.5		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PE=perched eating, PU=perched, unknown, PH=perched hunting, DW=drinking water, PV=perched vocalizing, ES=eating on shore, GN=gathering nest material, OT=other (includes perched interaction, perched drying, standing in water, perched close to mate).

APPENDIX K: RODEO BREEDING AREA SUMMARY

Table 48. Observed human activity and bald eagle behavior, Rodeo BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter	19	1	--	2	--	22	--	44	24.4
Apache Helicopter	18	5	--	--	--	19	--	42	23.3
Small Plane	17	2	--	--	--	14	1	34	18.9
Rancher	7	2	--	--	--	5	--	14	7.8
Driver/Vehicle	4	--	--	1	--	9	--	14	7.8
Military Helicopter	7	2	--	--	--	4	--	13	7.2
Shooter	3	1	--	--	--	2	--	6	3.3
Sheriff Helicopter	2	--	--	--	--	3	--	5	2.8
Ultralight Flyer	3	--	--	--	--	--	--	3	1.7
Nestwatcher	--	--	1	1	--	--	--	2	1.1
Woodcutter	1	1	--	--	--	--	--	2	1.1
Power company	1	--	--	--	--	--	--	1	0.6
Total	82	14	1	4	--	78	1	180	

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

Table 49. Observed prey types delivered to the nest, Rodeo BA, Arizona, 2017.

Sex	Fish	Birds	Unknown	Total	Percent
Male	2	1	1	4	26.7
Female	2	1	8	11	73.3
Total	4	2	9	15	
Percent	26.7	13.3	60.0		

Table 50. Bald eagle habitat analysis at the Rodeo BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
2.5a	CT	Left	No	7	RU	CL
2.5b	HS	Left	No	4	RU	MB
2.6	WO	Left	No	1	RI	WT
3.1	SG	Right	No	1	RU	CW
3.7a	SG	Left	No	8	RU	MB
3.7b	CM	Left	No	8	RU	MB
3.7c	SG	Left	No	8	RU	MB
3.8	CL	Right	Yes	2	RI	MB
3.9	CL	Left	No	6	RI	CW
4.0a	HS	Left	No	6	RU	CW
4.0b	CL	Left	No	6	RI	CW
4.0c	CL	Left	Yes	7	RU	CW
4.0d	WO	Right	Yes	2	RU	CW
4.0e	HS	Left	No	7	RU	CW
4.0f	WO	Right	No	1	RI	WT
4.0g	CL	Left	No	1	RI	CW
4.1	CM	Left	Partial	7	RU	CW
4.2	SG	Left	No	8	RU	CW
5.4	CL	Island	No	1	RI	CW
6.4	BE	Left	No	1	PN	MN

[1]River kilometer (Hunt and others 1992).
[2]BE=earthen berm, CL=cottonwood, large/20-30+ m, CM=cottonwood, medium/10-20+ m, CT=cliff top, HS=hard snag, 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=>400.
[5]PN=pond, RI=riffle, RU=run.
[6]CL=cliffs, CW=cottonwood grove, MN=mining operation (Fort McDowell Yavapai Materials), MB=mesquite bosque, WT=willow thicket.

Table 51. Bald eagle habitat use at the Rodeo BA, Arizona, 2017.

River km[1]	PW[2,3]	PP	CL	PH	PD	PK	PV	GN	DW	OT	Total	Percent
2.5	42	--	--	--	--	--	--	--	--	2	44	0.5
2.6	3	--	--	--	--	--	--	--	--	--	3	<0.1
3.1	23	--	--	--	--	--	--	1	--	--	24	0.2
3.7	109	--	--	--	--	--	1	4	--	--	114	1.2
3.8	--	--	--	16	--	--	--	--	--	1	17	0.2
3.9	13	--	--	--	--	--	--	--	--	--	13	0.1
4.0	8,430	397	226	151	102	35	6	1	5	1	9,354	96.4
4.1	--	7	--	--	--	--	--	--	--	--	7	0.1
4.2	101	12	--	--	--	--	--	1	--	--	114	1.2
5.4	--	--	2	--	--	--	1	--	--	--	3	<0.1
6.4	10	--	--	--	--	--	--	--	--	--	10	0.1
Total	8,731	416	228	167	102	35	8	7	5	4	9,703	
Percent	90.0	4.3	2.3	1.7	1.1	0.4	0.1	0.1	0.1	<0.1		

[1]River kilometer (Hunt and others 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, CL=perched close to mate, PH=perched hunting, PD=perched drying, PK=perched with prey, PV=perched vocalizing, GN=gathering nest material, DW=drinking water, OT=other (includes perched interaction, perched unknown)

APPENDIX L: SYCAMORE BREEDING AREA SUMMARY

Table 52. Observed human activity and bald eagle behavior, Sycamore BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter	18	1	1	--	1	3	4	28	23.5
Apache helicopter	15	--	1	--	--	2	--	18	15.1
Small plane	13	2	--	--	--	--	1	16	13.5
Military helicopter	11	1	--	--	--	2	--	14	11.8
Horseback riders	10	1	--	1	--	--	--	12	10.1
MCSO helicopter	5	1	--	--	--	2	--	8	6.7
Driver	4	--	--	2	--	--	--	6	5.1
Swimmer	4	--	--	--	--	1	--	5	4.2
OHV	4	--	--	--	--	--	--	4	3.4
Kayak	3	--	---	--	--	1	--	4	3.4
Farmer	--	--	--	1	--	--	--	1	0.8
Bicyclist	--	--	--	1	--	--	--	1	0.8
AGFD worker	--	--	1	--	--	--	--	1	0.8
SRP tree trimming	--	--	--	1	--	--	--	1	0.8
Total	87	6	3	6	1	11	5	119	

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

Table 53. Observed prey types delivered to the nest, Sycamore BA, Arizona, 2017.

Sex	Fish	Unknown	Total	Percent
Male	7	7	14	38.9
Female	6	16	22	61.1
Total	13	23	36	
Percent	36.1	63.9		

Table 54. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
7.9	CL	Left	Yes	1	RI	SO
9.2	YL	Right	No	7	RU	MB
9.3	SM	Right	No	8	--	MB
9.5	GR	Right	No	8	--	FL
9.6a	CM	Left	Partial	1	RI	TX
9.6b	WO	Right	Partial	1	RI	WT
9.7	MS	Left	No	5	RU	MB
10.0	WO	Right	No	1	RI	MB
10.1a	CL	Left	Yes	6	RI	CW
10.1b	SM	Left	No	2	RI	SO
10.1c	CM	Left	No	6	RI	CW
10.2	SM	Right	No	1	RI	MB
10.3a	HS	Left	No	6	RU	MB
10.3b	MS	Right	No	1	RU	MB
10.3c	CS	Left	Partial	2	RU	TX
10.4	CM	Left	Partial	6	RU	CW
10.8	ST	Left	No	5	RU	MB
10.9	CM	Left	Partial	6	RU	MB
11.4	MS	Left	No	6	RU	MB

[1]River kilometer (Hunt and others 1992).
[2]CL=cottonwood, large/20-30+ m, CM=cottonwood, medium/10-20+ m, CS=cottonwood, small/0-10m, GR=ground, HS=hard snag, MS=mesquite, SM=snag, mesquite, ST=snag top, WO=willow, YL=sycamore, large/10-20m+.
[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]RI=riffle, RU=run.
[6]CW=cottonwood grove, FL=farmland, MB=mesquite bosque, SO=shore, TX=tamarisk thicket, WT=willow thicket.

Table 55. Bald eagle habitat use at the Sycamore BA, Arizona, 2017.

River km[1]	PW[2,3]	PH	PP	PG	PD	CL	ET	SH	PK	OT	Total	Percent
7.9	202	258	--	--	--	--	--	--	--	--	460	2.9
9.2	149	--	--	--	--	--	--	--	--	--	149	0.9
9.3	320	--	18	--	--	--	--	--	--	--	338	2.1
9.5	--	--	--	490	--	13	--	--	--	6	509	3.2
9.6	4	142	--	--	--	--	--	--	--	--	146	0.9
9.7	47	--	2	--	--	--	--	--	--	--	49	0.3
10.0	289	928	51	--	--	--	--	--	5	--	1,273	8.0
10.1	2,913	18	27	--	--	15	--	--	3	5	2,981	18.8
10.2	190	242	148	--	45	--	--	19	--	--	644	4.1
10.3	7,936	54	890	--	286	40	41	--	--	--	9,247	58.2
10.4	2	--	30	--	--	--	--	--	--	--	32	0.2
10.8	24	--	--	--	--	--	--	--	--	--	24	0.2
10.9	3	--	--	--	--	--	--	--	--	--	3	0.0
11.4	40	--	--	--	--	--	--	--	--	--	40	0.3
Total	12,119	1,642	1,166	490	331	68	41	19	8	11	15,895	
Percent	76.2	10.3	7.3	3.1	2.1	0.4	0.3	0.1	0.1	0.1		

[1]River kilometer (Hunt and others 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, PG=perched on ground, PD=perched drying, CL=perched close to mate, ET=eating in tree, SH=standing in water, PK=perched with prey, OT=other (includes perched eating, bathing).

APPENDIX M: TONTO BREEDING AREA SUMMARY

Table 56. Observed human activity and bald eagle behavior, Tonto BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small plane	4	2	--	--	--	--	7	13	40.6
Helicopter	1	2	--	--	--	--	3	6	18.8
Hiker	--	--	--	--	--	--	4	4	12.5
Motorized Parachute	2	--	--	--	--	--	1	3	9.4
Dogs	--	2	--	--	--	--	--	2	6.3
OHV	--	--	--	--	--	--	1	1	3.1
Flyer (ultralight)	--	--	1	--	--	--	--	1	3.1
Military Helicopter	1	--	--	--	--	--	--	1	3.1
Cattle	--	--	--	--	--	--	1	1	3.1
Total	8	6	1	--	--	--	17	32	

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

Table 57. Observed forage events and success, Tonto BA, Arizona, 2017.

Sex	Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	--	--	--	--	--	--
Female	1	1-0	--	--	1	1-0
Unknown	1	1-0	4	1-3	5	2-3
Total	2	2-0	4	1-3	6	3-3

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

Table 58. Observed prey types delivered to the nest, Tonto BA, Arizona, 2017.

Sex	Fish	Total	Percent
Male	--	--	--
Female	--	--	--
Unknown	4	4	100
Total	4	4	
Percent	100		

Table 59. Bald eagle habitat analysis at the Tonto BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
16.2a	SD	Left	No	1	UN	TX
16.2b	MS	Left	No	1	UN	TX
17.0	TX	Left	No	--	UN	CW
17.0	MS	Left	No	1	UN	MB
17.3	HS	Right	No	1	UN	MB
17.4	CM	Left	Partial	1	UN	CW
17.5	NE	Left	Partial	1	RU	CW
17.9	UP	Left	No	1	RU	CW

[1]River kilometer (Hunt et. al. 1992).
[2]CM=medium cottonwood/10-20m, HS=hard snag, MS=mesquite, NE=nest, SD=snag, cottonwood, TX=tamarisk, UP=utility pole.
[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, UN=unknown.
[6]CW=cottonwood grove, MB=mesquite bosque, TX=tamarisk thicket.

Table 60. Bald eagle habitat use at the Tonto BA, Arizona, 2017.

River km[1]	NX[2,3]	PW	CL	PP	NH	PH	PD	Total	Percent
16.2	--	--	--	--	--	25	--	25	0.2
17.0	--	--	--	--	--	74	--	74	0.5
17.3	--	1,102	636	189	--	--	43	1,970	13.5
17.5	7,378	4,301	164	223	301	--	--	12,367	85.0
17.9	--	121	--	--	--	--	--	121	0.8
Total	7,378	5,524	800	412	301	99	43	14,557	
Percent	50.7	37.9	5.5	2.8	2.1	0.7	0.3		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]NX=nesting activity, PW=perched watching, CL=perched close to mate, PP=perched preening, NH=nest, shading, PH=perched hunting, PD=perched drying.

APPENDIX N: WHISKEY SPRING BREEDING AREA SUMMARY

Table 61. Observed human activity and bald eagle behavior, Whiskey Spring BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	Total	Percent
Boater	211	38	--	1	--	--	250	42.4
Nestwatcher	166	39	--	--	--	--	205	34.8
Jet ski	13	5	--	--	--	--	18	3.1
Fisher	13	4	--	--	--	--	17	2.9
Exiting Boat	14	3	--	--	--	--	17	2.9
Plane	4	10	--	--	--	--	14	2.4
Helicopter	9	4	1	--	--	--	14	2.4
Sheriff	12	1	--	--	--	--	13	2.2
Maricopa Parks	11	2	--	--	--	--	13	2.2
Jet	5	5	--	--	--	--	10	1.7
AZGFD	6	1	--	--	--	--	7	1.2
OHV	4	--	--	--	--	--	4	0.7
Peoria Fire DPT	2	1	--	--	--	--	3	0.5
Horseback Rider	--	1	--	--	--	--	1	0.2
Gunshot	--	--	--	1	--	--	1	0.2
AZGFD Biologist	--	--	--	1	--	--	1	0.2
Tuber/Rafter	1	--	--	--	--	--	1	0.2
Total	471	114	1	3	--	--	589	

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

Table 62. Watercraft compliance at the southern closure boundary, Whiskey Spring BA, Arizona, 2017.

Date	Watercraft *in* closure[1]	Watercraft *at* closure	Total
2/3-2/12	23	172	195
2/17-2/26	5	70	75
3/1-3/12	45	180	225
3/17-3/27	90	463	553
3/31-4/9	61	403	464
4/14-4/23	58	557	615
4/28-4/29	2	5	7
Total	284 (13.3%)	1,850 (86.7%)	2,134

[1]Includes boaters, anglers, and jet skis that were in the closure, runners, and self-turning boats.

Table 63. Observed forage events and success, Whiskey Spring BA, Arizona, 2017.

Sex	Fish		Reptile		Mammal		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	15	13-2	--	--	--	--	15	13-2
Female	3	2-1	1	1-0	1	1-0	5	4-1
Total	18	15-3	1	1-0	1	1-0	20	17-3

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

Table 64. Observed prey types delivered to the nest, Whiskey Spring BA, Arizona, 2017.							
Sex	Fish	Mammal	Bird	Reptile	Unknown	Total	Percent
Male	35	--	--	--	10	45	70.3
Female	13	3	1	1	1	19	29.7
Total	48	3	1	1	11	64	
Percent	75.0	4.7	1.6	1.6	17.2		

Table 65. Observed prey species delivered to the nest, Whiskey Spring BA, 2017.								
Sex	Fish					Birds	Total	Percent
	LB[1]	BC	SU	CP	BG	AC		
Male	6	2	1	--	--	--	9	60.0
Female	2	--	1	1	1	1	6	40.0
Total	8	2	2	1	1	1	15	
Percent	53.3	13.3	13.3	6.7	6.7	6.7		

[1]LB=largemouth bass, BC=black crappie, SU=sucker species, CP=carp, BG=bluegill, AC=American coot.

Table 66. Bald eagle habitat analysis at the Whiskey Spring BA, Arizona, 2017.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
67.8	CF	Left	No	2	RS	CL
68.7a	CT	Left	No	1	IF	CL
68.7b	DW	Left	Yes	1	IF	SO
68.7c	CF	Left	Yes	1	IF	CL
68.7d	BO	Right	No	1	PO	CL
68.8a	HS	Left	No	1	IF	CL
68.8b	CF	Left	No	1	IF	CL
68.8c	SO	Right	No	1	IF	SO
68.8d	CL	Right	No	1	BW	CL
68.8e	CT	Left	No	1	IF	CL
68.8f	BO	Left	Yes	1	IF	CL
68.9a	CT	Left	Partial	1	IF	CL
68.9b	CF	Left	Yes	1	IF	CL
68.9c	CF	Left	Yes	1	IF	CL
68.9d	CF	Left	Yes	1	IF	CL
68.9e	CF	Left	Partial	1	IF	CL
68.9f	SO	Left	Partial	1	IF	SO
68.9g	BO	Left	Partial	1	IF	CL
69.0a	CT	Left	No	1	IF	CL
69.0b	CF	Left	Partial	1	IF	CL
69.0c	CF	Left	Yes	1	IF	CL
69.0d	SO	Left	Partial	1	IF	SO
69.0e	CF	Left	Partial	1	IF	CL
69.1a	BO	Left	Partial	1	IF	CL
69.1b	DW	Left	Partial	1	IF	SO
69.1c	CL	Left	No	1	IF	CL
69.1d	CF	Left	Partial	2	IF	CL
69.2a	CF	Left	Partial	1	IF	CL
69.2b	SM	Left	Partial	1	BW	SO
69.3	SO	Left	Partial	1	PO	SO
69.4	RW	Left	Partial	1	PO	SO
69.9a	CF	Left	Partial	3	PO	--
69.9b	CF	Left	Partial	2	PO	CL
72.0	CF	Right	Yes	1	RB	CL
72.1	CF	Right	No	1	RB	CL

[1]River kilometer (Hunt et. al. 1992).
[2]BO=boulder, CF=cliff ledge, CL=cottonwood large/20-30+ m , CT=cliff top, DW= driftwood, HS=hard snag, RW=rock in water, SM=snag, mesquite, SO=shore.
[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]BW=backwater, IF=inflow, PO=pool, RB=river bend, RS=reservoir main body.
[6]CL=cliff, SO=shore.

Table 67. Bald eagle habitat use at the Whiskey Spring BA, Arizona, 2017.

Perch Location[1]	PW[2,3]	PP	PD	DW	PV	CL	SS	GN	BA	PE	OT	Total	Percent
67.8	6	--	--	--	--	--	--	--	--	--	--	6	0.1
68.7	1,400	29	37	256	104	50	56	--	--	29	5	1966	17.1
68.8	4,077	558	219	--	169	98	--	--	11	--	11	5143	44.8
68.9	195	--	15	3	4	17	1	13	--	--	--	248	2.2
69.0	2,587	72	254	--	11	39	2	3	--	--	--	2968	25.9
69.1	741	62	86	9	--	2	9	26	9	--	--	944	8.2
69.2	19	15	--	--	--	--	--	--	--	--	--	34	0.3
69.3	29	--	--	10	--	1	16	--	--	--	--	56	0.5
69.4	11	--	7	40	6	--	19	--	17	--	--	100	0.9
69.9	10	--	--	--	--	--	--	--	--	--	--	10	0.1
72.0	3	--	--	--	--	--	--	--	--	--	--	3	<010
Total	9,078	736	618	318	294	207	103	42	37	29	16	11,478	
Percent	79.1	6.4	5.4	2.8	2.6	1.8	0.9	0.4	0.3	0.3	0.1		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PD=perched drying, DW=drinking water, PV=perched vocalizing, CL=perched close to mate, SS=standing on shore, GN=gathering nest material, BA=bathing, PE=perched eating, OT=other (includes perched hunting, eating on cliff, and perched with prey).

APPENDIX O: WHITE HORSE BREEDING AREA SUMMARY

Table 68. Observed human activity and bald eagle behavior, White Horse BA, Arizona, 2017.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Kayak/Canoe	14	42	--	6	--	9	10	81	46.8
Hiker	3	15	--	2	--	3	2	25	14.5
Fishing Boat	--	15	--	3	--	2	3	23	13.3
Angler (from shore)	5	4	1	1	--	2	2	15	8.7
Helicopter	--	6	--	2	--	1	5	14	8.1
Picnic	--	2	--	--	--	--	3	5	2.9
Small Plane	--	1	--	--	--	1	3	5	2.9
Boater	1	1	--	--	--	1	--	3	1.7
Paddleboard	--	1	--	--	--	--	--	1	0.6
Camping	--	--	--	--	--	--	1	1	0.6
Total	23	87	1	14	--	19	29	173	

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

Table 69. Observed forage events and success, White Horse BA, Arizona, 2017.

Sex	Fish		Mammal		Amphibian		Bird		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U	E	S-U
Male	3	1-2	--	--	1	1-0	--	--	3	0-3	7	2-5
Female	--	--	1	1-0	--	--	1	1-0	2	1-1	4	3-1
Total	3	1-2	1	1-0	1	1-0	1	1-0	5	1-4	11	5-6

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

Table 70. Observed prey types delivered to the nest, White Horse BA, Arizona, 2017.

Sex	Fish	Mammal	Bird	Amphibian	Unknown	Total	Percent
Male	11	1	1	1	8	22	44.0
Female	22	2	--	--	4	28	56.0
Total	33	3	1	1	12	50	
Percent	66.0	6.0	2.0	2.0	24.0		

Table 71. Observed prey species delivered to the nest, White Horse BA, 2017.

Sex	Fish		Mammal		Amphibian	Total	Percent
	YB[1]	CS	GO	GS	BF		
Male	--	2	--	1	1	4	50.0
Female	1	1	1	1	--	4	50.0
Total	1	3	1	2	1	8	

[1]YB=yellow bullhead, CS=catfish species, GO=gopher species, GS=ground squirrel species, BF=bullfrog.

Table 72. Bald eagle habitat analysis at the White Horse BA, Arizona, 2017.					
Lake km[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.24	PS	No	1	RS	CF
0.49	SC	No	1	RS	CF
0.50	PO	No	1	RS	CF
0.54	SC	No	2	RS	CF
0.55	PO	No	1	RS	CF
0.56	PO	Yes	1	RS	CF
0.58a	SC	No	1	RS	CF
0.58b	PS	No	2	RS	CF
0.65	SC	No	3	RS	CF
0.68	PO	Yes	4	RS	CF
0.70a	SC	No	4	RS	CF
0.70b	SC	No	4	RS	CF
0.72	SC	No	1	RS	CF
0.73	PO	Yes	1	RS	CF
0.75	PO	Yes	4	RS	CF
0.77	PS	No	1	RS	CF
0.79	PO	Yes	3	RS	CF
0.80	SC	Yes	3	RS	CF
0.84	PS	No	1	RS	CF
0.87	PO	Yes	1	RS	CF
1.25	PO	Yes	2	RS	CF
1.30a	SC	No	2	RS	CF
1.30b	PO	Yes	2	RS	CF
2.65	PO	Yes	1	RS	CF

[1]Lake kilometer (clockwise from boat ramp on north shore).
[2]PO=pine/conifer, old growth/20-30+ m., PS=pine/conifer, 2nd growth/10-20+ m, SC=conifer snag.
[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]RS=reservoir main body.
[5]CF=conifer forest

Table 73. Bald eagle habitat use at the White Horse BA, Arizona, 2017.				
Lake km[1]	PW[2,3]	PH	Total	Percent
0.24	8	--	8	0.1
0.49	14	--	14	0.2
0.5	5	--	5	0.1
0.54	15	--	15	0.2
0.55	258	--	258	3.0
0.56	2,117	--	2,117	24.6
0.58	418	3	421	4.9
0.65	313	--	313	3.6
0.68	372	--	372	4.3
0.70	343	--	343	4.0
0.72	621	--	621	7.2
0.73	20	--	20	0.2
0.75	99	--	99	1.1
0.77	1,505	--	1,505	17.5
0.79	185	--	185	2.1
0.8	113	--	113	1.3
0.84	472	--	472	5.5
0.87	2	--	2	0.0
1.25	145	--	145	1.7
1.30	1,575	--	1,575	18.3
2.65	8	--	8	0.1
Total	8,608	3	8,611	
Percent	99.9	0.1		

[1]Lake kilometer (clockwise from boat ramp on north shore).
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting.

APPENDIX P: WOODS CANYON BREEDING AREA SUMMARY

Table 74. Observed human activity and bald eagle behavior, Woods Canyon BA, Arizona, 2017.

Human Activity[1]	N[2]	W	R	F	L	B	U	Total	Percent
Hiker	918	73	--	--	--	--	--	991	90.6
Swimmer	6	26	--	--	--	--	--	32	2.9
Canoe/Kayak	8	18	--	1	--	--	--	27	2.5
Cycler	7	--	--	--	--	--	--	7	0.6
Drone	--	1	--	5	--	--	--	6	0.5
Horseback Rider	1	4	--	--	--	--	--	5	0.5
Fisherman	5	--	--	--	--	--	--	5	0.5
Helicopter	--	2	--	2	--	--	--	4	0.4
Birder	3	--	--	--	--	--	--	3	0.3
Boat	3	--	--	--	--	--	--	3	0.3
Military helicopter (non-Apache)	--	2	--	1	--	--	--	3	0.3
Stand Up Paddler	--	2	--	--	--	--	--	2	0.2
Nestwatcher	1	--	--	1	--	--	--	2	0.2
Runner	1	--	--	--	--	--	--	1	0.1
OHV	--	1	--	--	--	--	--	1	0.1
Gunshot	--	--	--	1	--	--	--	1	0.1
Dog	--	1	--	--	--	--	--	1	0.1
Total	953	130	--	11	--	--	--	1,094	

[1]Due to constant human activity, the table includes only the number of people at the OP, the number of hikers on the trail directly in front of the nest (up to approximately 200 m), plus activities that yielded a negative response from the eagles.
[2]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, B=birds not in area, U=unknown.

Table 75. Observed forage events and success, Woods Canyon BA, Arizona, 2017.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	9	5-4	9	5-4
Female	5	3-2	5	3-2
Total	14	8-6	14	8-6

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

Table 76. Observed prey types delivered to the nest, Woods Canyon BA, Arizona, 2017.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	56	2	1	6	65	53.3
Female	49	--	1	2	52	42.6
Unknown	5	--	--	--	5	4.1
Total	110	2	2	8	122	
Percent	90.2	1.6	1.6	6.6		

Table 77. Bald eagle habitat analysis at the Woods Canyon BA, Arizona, 2017.					
Lake km[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.3	PO	Partial	1	RS	CF
0.9a	SC	No	1	RS	CF
0.9b	SO	No	1	RS	CF
0.9c	PO	No	1	RS	CF
1.7	PO	Yes	2	RS	CF
2.0a	PO	Yes	3	RS	CF
2.0b	SC	No	5	RS	CF
2.1a	SC	No	5	RS	CF
2.1b	PO	Partial	1	RS	CF
2.1c	SC	Partial	1	RS	CF
2.1d	PO	No	5	RS	CF
2.1e	SC	No	5	RS	CF
2.4	SC	No	4	RS	CF
3.7	SC	No	1	RS	CF
3.8a	PO	Yes	2	RS	CF
3.8b	PO	Partial	1	RS	CF
3.9a	PO	Partial	2	RS	CF
3.9b	PO	Yes	2	RS	CF
4.1	PS	Yes	1	RS	CF
4.5a	PO	Yes	1	RS	CF
4.5b	PO	Partial	1	RS	CF
4.6	PO	Yes	2	RS	CF
4.8	ST	Yes	1	RS	CF
5.0	SC	No	2	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]PO=pine/conifer, old growth/20-30+ m., PS=pine/conifer, 2nd growth/10-20+ m, SC=conifer 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]RS=reservoir main body.
[5]CF=conifer forest.

Table 78. Bald eagle habitat use at the Woods Canyon BA, Arizona, 2017.								
Lake km[1]	PW[2,3]	PP	PH	PV	CL	SS	Total	Percent
0.3	521	78	--	--	--	--	599	10.4
0.9	368	49	--	--	--	3	420	7.3
1.7	12	--	--	--	--	--	12	0.2
2.0	147	13	--	--	--	--	160	2.8
2.1	202	--	--	5	--	--	207	3.6
2.2	354	--	--	--	--	--	354	6.1
3.7	302	17	66	--	10	--	395	6.9
3.8	782	34	--	1	--	--	817	14.2
3.9	284	--	16	--	--	--	300	5.2
4.1	46	--	--	--	--	--	46	0.8
4.5	649	99	--	5	--	--	753	13.1
4.6	491	91	102	--	--	--	684	11.9
4.8	637	155	114	2	6	--	914	15.9
5.0	96	--	--	--	--	--	96	1.7
Total	4,891	536	298	13	16	3	5,757	
Percent	85.0	9.3	5.2	0.2	0.3	0.1		

[1]Lake kilometer (counterclockwise from middle of dam).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PH=perched hunting, PV=perched vocalizing, CL=perched close to mate, SS=standing on shore.