

ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2021 SUMMARY REPORT

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This report, in part, summarizes the results of monitoring by the Arizona Bald Eagle Nestwatch Program using the breeding area reports submitted in 2021. Those include: Leticia Cruz-Paredes and Eduardo Martinez-Leyva, Box Bar and Scholz Lake Breeding Areas (BAs); David Drever and Russell Seeley, Concho and Fool Hollow BAs; Elan Carnahan and Rita Collins, Bachelor Cove BA; Joe and Marta Peddie, Luna BA; Kristina McOmer and Cody Allen, Goldfield BA; Alexia Klopach and Angelica Varela, Orme BA; Jen Ottinger and Lindsay Wilson, Fort McDowell and Sycamore BAs; Ryan Potter and Bryan Carlin, Cole's, Ladders, Pleasant, and Whiskey Spring BAs.

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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 included 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, 2014, and 2020 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 29 members, with the Arizona Game and Fish Department (Department) as the lead implementation agency for bald eagle management projects. This report covers the 2021 results

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

STUDY AREA

Nest monitoring and surveys were conducted statewide, and Arizona bald eagle breeding areas (BAs) were located within eight biotic communities (Brown 1994, The Nature Conservancy 2004): Sonoran Desertscrub (n=54 BAs) [includes Arizona Upland Subdivision (n=46) and Lower Colorado River Valley Subdivision (n=8)], Rocky Mountain (Petran) Montane Conifer Forest (n=16), Plains and Great Basin Grasslands (n=8), Semidesert Grassland (n=7), Interior Chaparral (n=3), 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.

A majority of the 93 bald eagle BAs in 2021 occurred at elevations at or below 3,000 ft (914 m) (58.1%, n=54), 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). Fewer BAs were at elevations between 3,001 and 6,000 ft (915 to 1,829 m) (17.2%, n=16) or above 6,000 ft (>1,829 m) (24.7%, n=23). Representative riparian vegetation at lower elevations included Fremont cottonwood (*Populus fremonti*), Goodding willow (*Salix gooddingii*), Arizona sycamore (*Platanus wrightii*), and nonnative salt cedar (*Tamarix* spp.), with surrounding uplands of the Sonoran Desertscrub-Arizona Upland subdivision, Interior Chaparral, Semidesert Grassland and Great Basin Conifer Woodland. These upland 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*).

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*).

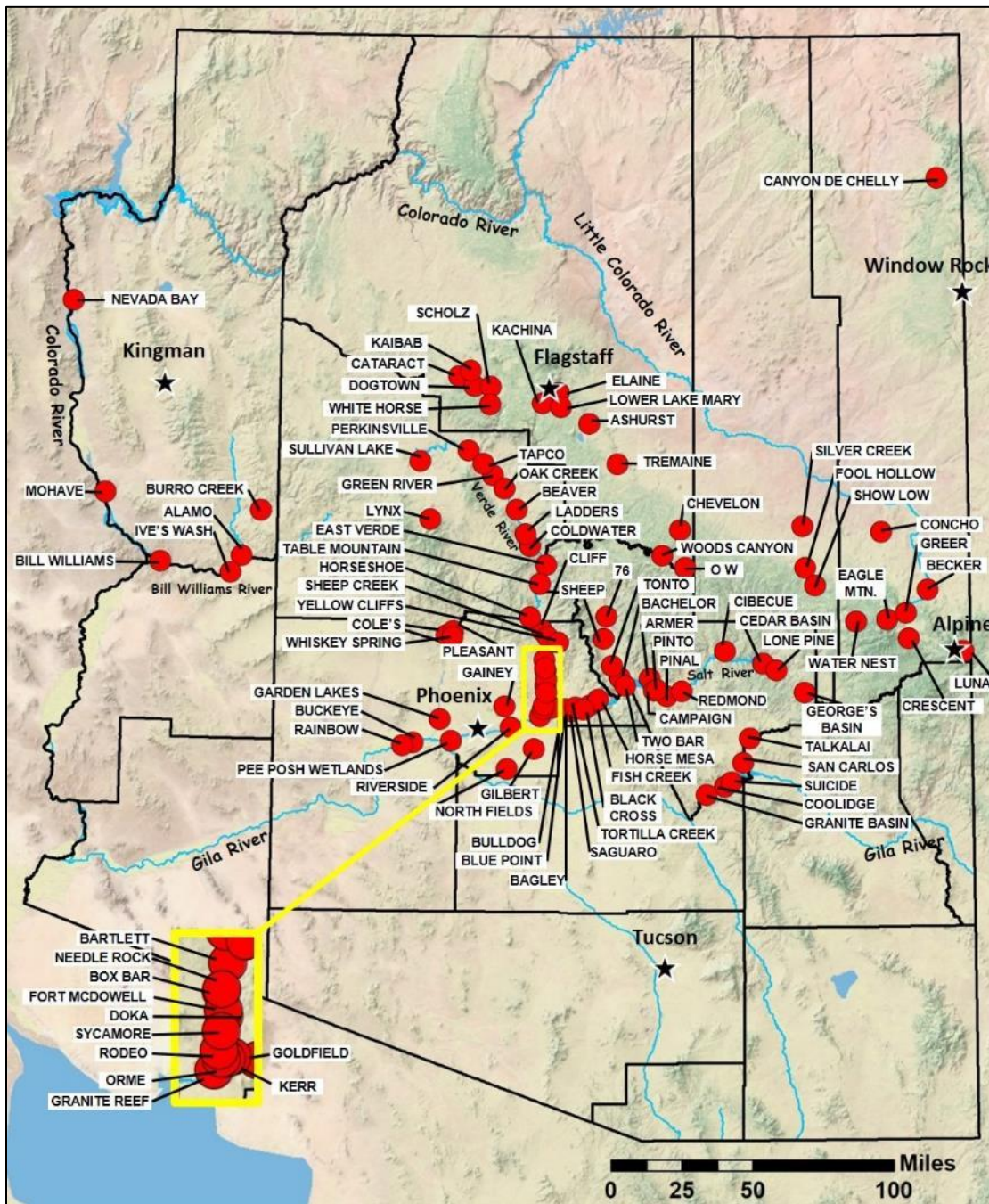


Figure 1. Location of known bald eagle breeding areas in Arizona, 2021.

With some 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 or lake levels (e.g., Alamo Lake and Roosevelt Lake) and the distance of alternate nests. Terrestrial prey comprises an important dietary proportion at some BAs, most notably Gunnison’s prairie dogs (*Cynomys gunnisoni*) at Canyon de Chelly, Concho, and Silver Creek, and may also influence

habitat selection. Several BAs are located in the Phoenix metropolitan area and include disturbed or highly modified riparian communities, primarily consisting of artificial water formations such as recharge basins, urban ponds and lakes, and canals.

In 2021, BAs were located along: Burro, Canyon, Cibecue, Oak, Pinal, Silver, Tonto, and Walnut creeks; Alamo, Apache, Ashurst, Bartlett, Canyon, Cataract, Chevelon Canyon, Crescent, Dogtown, Fool Hollow, Greer, Horseshoe, Kaibab, Lower Lake Mary, Luna, Lynx, Pleasant, Roosevelt, Saguaro, San Carlos, Scholz, Show Low, Talkalai, Tremaine, White Horse, and Woods Canyon lakes or reservoirs; and the Agua Fria, Bill Williams, Black, 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 or ponderosa pine trees. However, they have also occurred in sycamore, juniper, pinyon pine, willow, eucalyptus (*Eucalyptus sp.*), mesquite, and snags, as well as artificial structures and saguaro cactus (Grubb 1980, Hunt et al. 1992, McCarty and Jacobson 2012, McCarty et al. 2018, McCarty et al. 2020).

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).

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. Finally, starting in 2020 we added two new winter count sites (Buckhead Mesa Landfill and Point of Pines aerial) that have been surveyed for the past four years and that had at least three bald eagles seen during one or more surveys, bringing the total number of standardized routes back up to 104 (Figure 2).

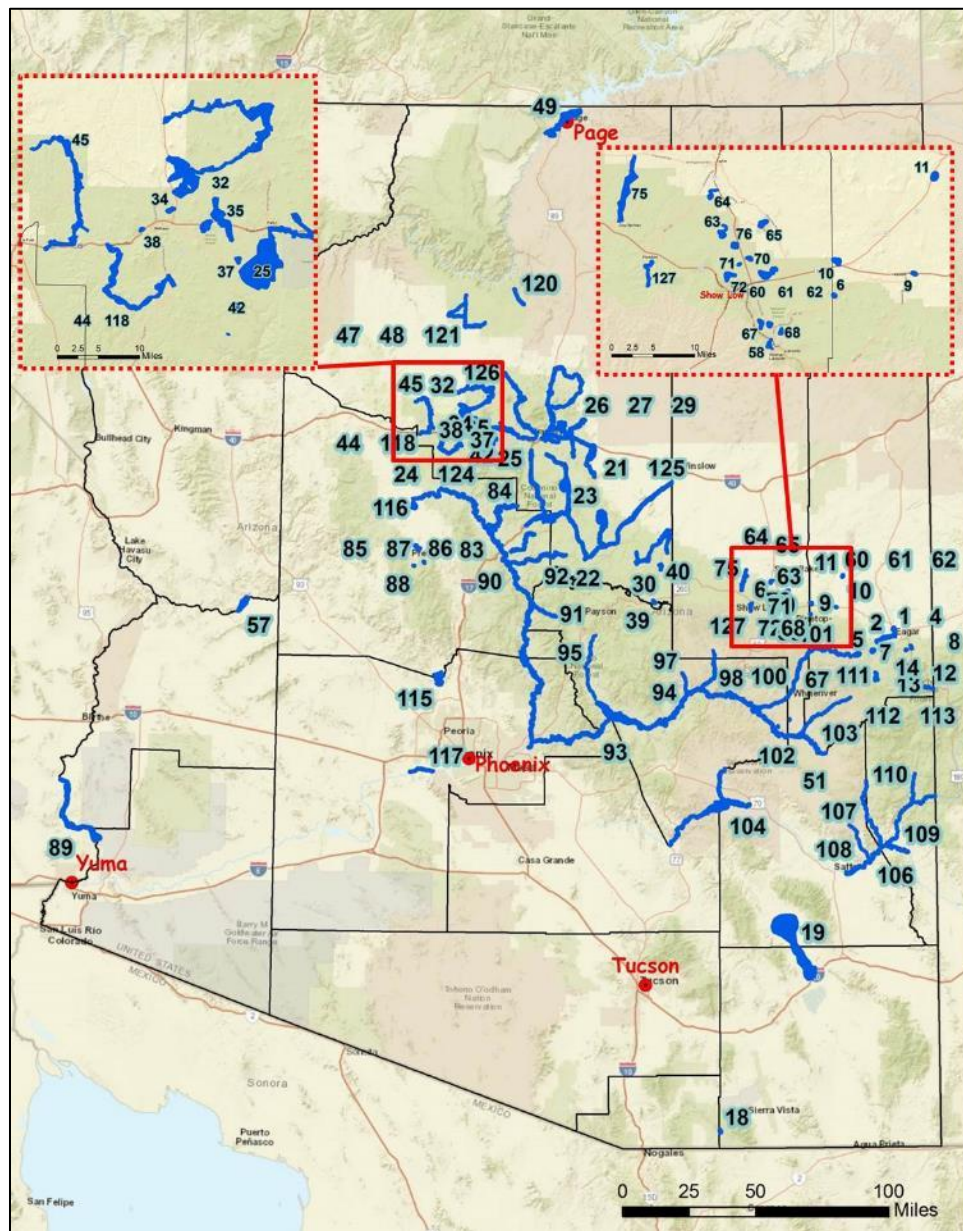


Figure 2. Map of the Arizona Bald Eagle Winter Count survey routes (blue outlines). County lines in black. See Appendix A for the associated route names.

METHODS

We continued to use, and strived to complete, the established standardized survey routes for the 2021 Arizona bald eagle winter count. Additionally, five 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, 2021, 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, the one route representing Graham County was not surveyed in multiple years. This route is now being covered by air to ensure completion.

RESULTS AND DISCUSSION

The 2021 Arizona bald eagle winter count tallied 177 bald eagles, including 130 adults (73.4%), 45 subadults (25.4%), and 2 unknown eagles (1.1%). Participants covered 71 of 104 standardized routes (68%) with a total survey effort of 8,474 minutes (141.2 hours) (Tables 1 and 2). An additional six non-standard routes were surveyed for a total of six bald eagles (Appendix A). The highest total number of bald eagles observed during ground surveys occurred in Coconino

County (n=19 routes, 42 eagles) (Table 1), and the largest concentration on a single ground survey occurred near Flagstaff (11 eagles) (Appendix A). A large number of bald eagles (n=38) was also observed by helicopter along the lower Salt River.

Notably fewer routes were surveyed this year due to weather and scheduling issues. As a result, the total of 177 bald eagles in 2021 was lower than the average of 242 birds observed annually during standardized counts (Table 2). The age composition of this year’s count (73% adult, 25% subadult) was above the average ratio of adults to subadults in Arizona’s winter counts since 2005. While the difference in the number of routes surveyed makes it difficult to draw relevant comparisons to previous counts, by supplementing the 2021 count with averaged data from 2011-2020 for the 32 routes that were not surveyed this year produced an estimated 254 total bald eagles (178 adults, 73 subadults, 6 unknown). This estimate suggests that the 2021 count would have been average or slightly above average if the usual number of routes had been completed.

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=59), most responded that this year’s weather was either mild (46%) or normal (41%), followed by very mild (10%) and harsh (3%). There were no responses for very harsh weather. Similarly, of those that rated ice cover (n=64), most responded that it was normal (52%), followed by less than normal (22%), much less than normal (20%), and more than normal (6%). There were no responses for much more than normal ice cover.

Survey areas	Routes	Minutes (Hours)	Adults	Subadults	Unknown ¹	Total	Total/ Hr.
Apache County	15	1,301 (21.7)	8	1	0	9	0.4
Cochise County	2	285 (4.8)	1	0	0	1	0.2
Coconino County	19	3,486 (58.1)	23	17	2	42	0.7
Gila County	1	40 (0.7)	8	2	0	10	14.3
Graham County	Not surveyed by ground.						
Mohave County	1	115 (1.9)	2	0	0	2	1.1
Navajo County	15	734 (12.2)	16	2	0	18	1.5
Santa Cruz County	1	60 (1.0)	0	0	0	0	0
Yavapai County	6	1,710 (28.5)	8	5	0	13	0.5
Yuma & La Paz County	1	330 (5.5)	2	1	0	3	0.5
Verde River drainage	3	199 (3.3)	19	3	0	21	6.4
Salt River drainage	4	162 (2.7)	32	12	0	44	16.3
Gila River drainage	Not surveyed.						
Various helicopter	3	52 (0.9)	11	2	0	13	14.4
Totals	71	8,474 (141.2)	130	45	2	177	1.3

¹ Unknown age bald eagles and unidentified eagles.

Year	Survey time (min)	Surveys completed	Adults	Subadults	Unknown ¹	Total eagles	Eagles/hour
2005	8,910	97 (84%)	153 (68%)	56 (25%)	15 (7%)	224	1.5
2006 ²	10,074	104 (100%)	239 (74%)	77 (24%)	7 (2%)	323	1.9
2007	11,632*	100 (96%)	192 (68%)	81 (29%)	8 (3%)	281	1.4
2008 ³	9,362	96 (94%)	152 (82%)	29 (16%)	4 (2%)	185	1.2
2009	9,357	94 (92%)	139 (68%)	62 (30%)	3 (2%)	204	1.3
2010	9,138*	96 (94%)	159 (63%)	81 (32%)	12 (5%)	252	1.7
2011	8,713*	93 (91%)	157 (71%)	57 (26%)	8 (4%)	222	1.5
2012	10,320	100 (98%)	189 (63%)	94 (32%)	15 (5%)	298	1.7
2013	9,902*	98 (96%)	169 (66%)	76 (30%)	10 (4%)	255	1.5
2014	9,325	98 (96%)	188 (71%)	77 (29%)	1 (0.4%)	266	1.7
2015	8,989	93 (91%)	141 (69%)	53 (26%)	10 (5%)	204	1.4
2016	8,814	98 (96%)	161 (65%)	71 (29%)	17 (7%)	249	1.7
2017	9,522	101 (99%)	169 (65%)	84 (32%)	8 (3%)	261	1.6
2018	9,045	101 (99%)	172 (70%)	63 (26%)	9 (4%)	244	1.6
2019 ⁴	6,645	79 (77%)	137 (65%)	74 (35%)	1 (0.5%)	212	1.9
2020 ⁵	9,104*	95 (91%)	174 (66%)	78 (30%)	12 (5%)	264	1.7
2021	8,654	71 (68%)	130 (73%)	45 (25%)	2 (1%)	177	1.2
Average	9,265	95 (92%)	166 (69%)	68 (28%)	8 (4%)	242	1.6

¹Unknown age bald eagles and unidentified eagles.

²Beginning of 104 standardized routes derived from the analysis of 1995-2005 surveys.

³Beginning of 102 standardized routes with Lake Meade and Lake Mohave routes dropped.

⁴Federal government shutdown affected survey effort and number of eagles.

⁵Beginning of 104 standardized routes after addition of two new routes.

*Some survey times not recorded. Times averaged from reported times of previous counts.

MANAGEMENT RECOMMENDATIONS

1. Maintain the current 104 standardized routes.
2. Continue to assess non-standardized routes and add new routes for areas with consistent sightings of more than four bald eagles. Previously, the national coordinators required at least four years of data before a route was included in trend analyses, although highly productive routes are added to the Department's database.
3. Compile spatial data from winter count survey maps to document the location and abundance of wintering bald eagles, identify important habitat use areas, and develop statewide maps for distribution to cooperating agencies.
4. Continue to collect data on other wintering raptors along survey routes in addition to eagles, and investigate the potential to standardize methods for wintering raptor data collection with other states and organizations.
5. Work with partners and volunteers to improve route coverage, especially in underrepresented areas of the state.
6. 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. 2018). The Department administered and performed the 2021 surveys in cooperation with the SWBEMC.

METHODS

We monitored breeding activity at current and historic BAs, nest sites discovered between 1992 and 2020, and also investigated reports of bald eagles and nests by other agencies, biologists, and the public. Outside of known BAs, the presence of large nests, habitat quality, previous sightings of bald eagles, and spacing between BAs prioritized survey effort. A two to three-person team conducted surveys between January and June 2021. Winter count flights (January), and ORA flights (February and March), 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).

Helicopters, provided or funded 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 and off-road vehicles were also used to access survey areas. We used Questar[®] spotting scopes (40-160x), binoculars (10x), handheld GPS units, and nest map atlases from Hunt et al. (1992) and SRP (2020), to survey and 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. 2020).

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=93) were examined at least once for breeding activity. Although 77 BAs were occupied, one active BA (Canyon de Chelly) was excluded from productivity calculations since the final outcome was unknown. Of the remaining 76 occupied BAs, 65 were active and 44 pairs successfully produced 69 fledglings (Table 3; Appendix C) for productivity of 0.91 statewide. For 52 BAs where nestlings were aged by feather development, the average egg laying date was estimated as January 26 (ranging from December 14 to March 16), and average hatch date was estimated as March 2 (ranging from January 18 to April 20). Laying and hatch dates were earlier at lower elevations, averaging January 8 and February 12 respectively at BAs below 3,000 ft (914 m) (n=24), January 22 and February 26 at BAs from 3,000 to 6,000 ft (914 to 1,829 m) (n=12), and February 25 and April 1 at BAs above 6,000 ft (n=16).

Noteworthy findings of the 2021 nest survey included three new bald eagle BAs (Eagle Mountain, Kaibab, and Water Nest), 20 new alternate nests within BAs (Alamo #9, Bachelor Cove #3, Bill Williams #4, Bulldog #4, Cataract #4, Canyon de Chelly #3, Fool Hollow #4, Fort McDowell #21, Gainey #3, Goldfield #5, Greer Lakes #10-11, Oak Creek #5, OW #3, Pee Posh Wetlands #9, Seventy-six #7, Sheep #8, Sullivan Lake #3, Talkalai #10, and Woods Canyon #14), 9 fallen nests within BAs (Buckeye #2, Canyon de Chelly #2, Gainey #3, Goldfield #4, Rainbow #1, Sheep #7, Tapco #3, Tonto #7, and Woods Canyon #7), and six new potential nests at five sites (Bear Canyon Lake #7, Blue Ridge #10, Horseshoe Cienega Lake #7, Mogollon #1, and North Fork #1 and #2).

Number of BAs	93	Number of Active BAs	66
Number of Occupied BAs	77	Number of Failed Breeding Attempts	21
Number of Eggs (minimum)	104	Number of Successful Breeding Attempts	44
Nest Success ¹ = 44/76	0.58	Number of Young Hatched	87
Mean Brood Size ¹ = 69/44	1.57	Number of Young Fledged ¹	69
		Productivity ¹ = 69/76	0.91

¹One active site was not included where success or failure was not confirmed (Canyon de Chelly).

DISCUSSION

Statewide productivity at Arizona bald eagle BAs in 2021 was 0.91 young fledged per occupied BA, with some differences in elevations and river systems. Most of this year’s 76 occupied BAs

(those with known final status) were at low elevations (at or below 3,000 ft.) compared to middle (3,001-6,000 ft.) and high elevations (>6,000 ft.). Productivity was below the statewide average at the low elevation sites (0.74, n=42; fledged 31) and above average at the middle (1.1, n=13; fledged 14) and high elevations (1.1, n=21; fledged 24). There were also differences in productivity at BAs along two of the state’s central rivers. Productivity was below the statewide average on the Verde River (0.59, n=17; fledged 10), which contained mostly lower elevation sites. Further, productivity was low at BAs both on the regulated (0.56, n=9; fledged 5) and unregulated (0.63, n=8; fledged 5) portions of the Verde River. Overall productivity on the Salt River was also relatively low (0.78, n=18; fledged 14), where BAs on the regulated and unregulated Salt River (downstream vs. upstream of the Highway 288 bridge) had below-average (0.71, n=14; fledged 10) and above-average production respectively (1.0, n=4; fledged 4). While statewide productivity varies from year to year (Figure 3), it has been relatively high since 2004 and averaged 0.95 over the last ten years (Table 4). This year’s productivity (0.91) was not based on a complete census as the Canyon de Chelly BA was not fully monitored.

The number of known bald eagle breeding areas in Arizona continues to grow. This increase has been consistent since the 1990s, but has been especially apparent in the last two decades, with an average of three new BAs identified each year from 2006 to 2021. During that timeframe many of the new BAs (38%) were found at elevations above 6,000 ft, including the three confirmed this year (Eagle Mountain, Kaibab, and Water Nest). The continued creation of new breeding areas, discovery of new nests, and changes in occupancy demonstrates 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 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.

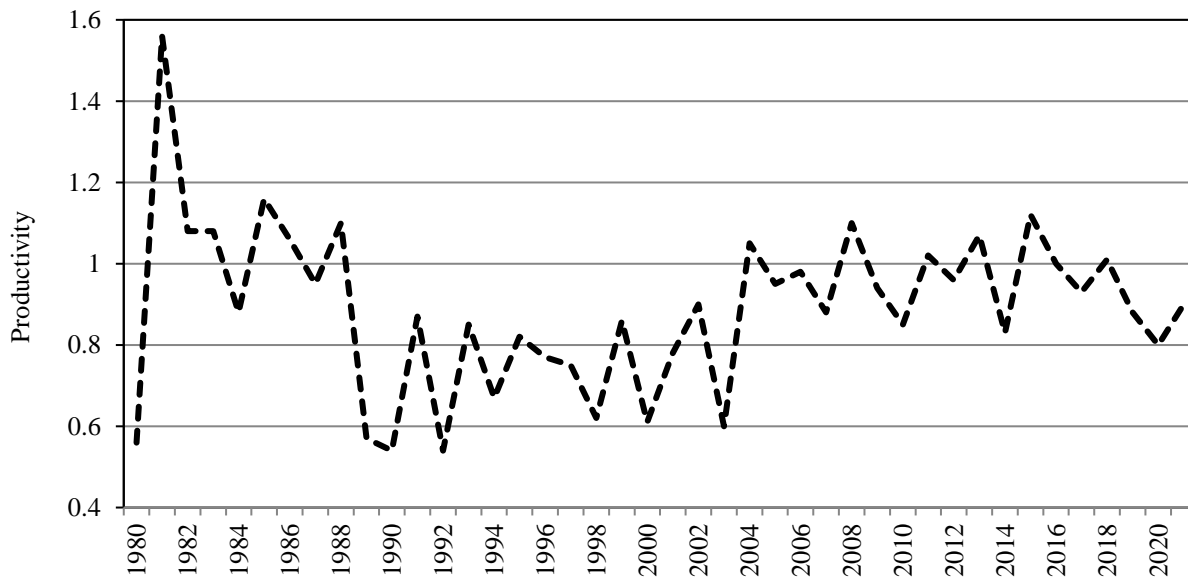


Figure 3. Productivity at bald eagle breeding areas in Arizona, 1980-2021.

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Number of BAs	93	92	89	87	85	81	76	68	68	66
Number of occupied BAs	77	73	74	69	68	65	59	52	54	54
Occupancy rate (%)	83	79	83	79	80	80	78	77	79	82
Number of eggs (minimum)	104	92	97	102	97	97	90	73	79	80
Number of active BAs	66	66	67	63	60	60	56	47	49	50
Failed breeding attempts	21	27	26	19	25	19	17	17	14	19
Successful breeding attempts	44	36	41	44	35	41	39	30	35	31
Young hatched	87	71	72	87	82	79	75	58	71	66
Young fledged	69 ^a	56 ^a	65	70	63	65	66	43	57	52
Nest success	0.58 ^a	0.51 ^a	0.55	0.64	0.51	0.63	0.66	0.58	0.65	0.57
Mean brood size	1.6 ^a	1.6 ^a	1.6	1.6	1.8	1.6	1.7	1.4	1.6	1.7
Productivity	0.91 ^a	0.80 ^a	0.88	1.01	0.93	1.0	1.12	0.83	1.06	0.96

^aSome active sites were not included where success or failure was not determined.

Results of the individual survey 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 below. 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 5)

Included below are descriptions of new large nests found in suitable habitat (new nest sites), new breeding areas discovered, and results of surveys (including bald eagle sightings) outside of known breeding areas.

Big Sandy River. – On February 1, we surveyed cottonwood trees along the Big Sandy River for 1.5 miles upstream of its confluence with the Santa Maria River. No new nests or eagles were found.

Cherry Creek. – On March 16, we surveyed trees along Cherry Creek for one mile upstream of its confluence with the Salt River. No new nests or eagles were found.

Cooley Lake. – On March 16, two adult bald eagles were seen at the lake. No nests or breeding activity was observed and no eagles were seen during another survey on May 7.

Eagle Mountain (new BA). – On May 7, an adult bald eagle and a pair of four-week old nestlings were found in a new large nest in a conifer tree, potentially a fir tree (Figure 4). Occasional eagle sightings have been documented in this area which has been monitored in previous years, however no breeding behavior was ever observed. Due to the sensitivity of the nest location, the specific area is not named in this report.



Figure 4. Eagle Mountain (left) and Water Nest (right) breeding areas.

Burro Creek. – On March 17, we surveyed a strand of cottonwood trees along Burro Creek 5-6 miles upstream of the Burro Creek BA. No new nests or eagles were found.

Goldwater Lake. – On February 1, one subadult bald eagle was seen near the lake. No nests were found.

Mogollon (new potential nest site). – On May 7, a large nest (#1) was found in a live pine tree, and one adult bald eagle was seen flying nearby. Although no breeding activity was confirmed, eagles have been occasionally observed at the site in previous years and there is high potential for a pair to initiate nesting behavior in the future. Due to the potential sensitivity of the nest location, the specific area is not named in this report.

Nelson Reservoir. – Early in spring, a Department wildlife manager reported a pair of bald eagles at Nelson Reservoir. During an aerial survey on May 7, we observed a pair of adults soaring over the lake and also examined a large nest (#1) that had been found several years ago near the lake, but that nest was in poor condition and no others were found. During a ground survey on May 19, an adult was seen perched and flying at the lake for several hours and also vocalizing at an immature bald eagle that flew over. On May 20, an adult was again observed perching and flying around the lake for almost two hours, presumably the same eagle as the day before. A second adult flew over the lake briefly and elicited a vocalization from the first adult. An immature bald eagle also visited the lake with no noticeable response from any other eagles.

North Fork White River (new potential nest site). – On May 7, we surveyed approximately five miles of the river and found two new nests in snags (North Fork 1 nest #1, and North Fork 2 nest #1), both with incubating ospreys. No eagles were seen.

Santa Maria River. – On February 1, we surveyed cottonwood trees along the Santa Maria River for one mile upstream of its confluence with the Big Sandy River. No new nests or eagles were found.

Water Nest (new BA). – On May 7, an adult bald eagle and a single 2.5-week old nestling were found in a new large nest in a ponderosa pine tree (Figure 4), the first time that breeding activity has been documented in this area. Due to the sensitivity of the nest location, the specific area is not named in this report.

Location	Date(s)	Survey Method	Results
Big Sandy River	2/1	Helicopter	No nests or eagles.
Boot Lake	3/16, 5/7	Helicopter	No nests or eagles.
Burro Creek	3/17	Helicopter	No nests or eagles.
Cherry Creek	3/16	Helicopter	No nests or eagles.
Cooley Lake	3/16, 5/7	Helicopter	3/16: Pair of adult bald eagles flying. No nests.
Eagle Mountain	5/7	Helicopter	5/7: Adult in new nest #1 with two nestlings, 4 weeks old.
East Verde River	1/6	Helicopter	No nests or eagles.
Fossil Creek	2/1	Helicopter	No nests or eagles.
Goldwater Lake	2/1	Helicopter	One subadult bald eagle. No nests.
Hell Canyon	3/17	Helicopter	No nests or eagles.
Horsethief Basin	5/10	Helicopter	No nests or eagles.
Lee Valley Reservoir	5/7	Helicopter	No nests or eagles.
Mogollon	5/7	Helicopter	New large nest #1 found. One adult flying.
Nelson Reservoir	5/7, 5/19-5/20	Helicopter, Ground	5/7: Two adults flying. 5/19: One adult and one immature seen. 5/20: Two adults and one immature seen.
North Fork White River	5/7	Helicopter	Ospreys incubating in two new large nests (#1-2).
Reservation Lake	5/7	Helicopter	No nests or eagles.
Salome Creek	1/7	Helicopter	No nests or eagles.
Santa Maria River	2/1	Helicopter	No nests or eagles.
Sycamore Creek	1/6	Helicopter	No nests or eagles.
Water Nest	5/7	Helicopter	5/7: Adult in new nest #1 with one nestling, 2.5 weeks old.
West Clear Creek	1/6	Helicopter	No nests or eagles.
Woolsey Lake	5/7	Helicopter	No nests or eagles.

Potential Nest Sites (Table 6)

Below are findings at previously documented potential nest sites, including observations of bald eagles, new nests, fallen nests, and nesting activity of other raptor species.

Bear Canyon Lake. – On May 6, ospreys were active in nest #5, 6, and a new nest #7 in a snag. Nest #3 was not found, considered as fallen, and no eagles were seen.

Blue Ridge Reservoir. – On May 6, an osprey was incubating in nest #8, and another osprey was perched by a new large nest (#10) in a snag. Nest #9 was not found. On August 20-22, Department personnel incidentally observed an immature (2-3 years old) and two adult bald eagles at the lake.

Horseshoe Cienega. – On May 7, ospreys were incubating in nest #1, 5, and 6. One other nest (either #2 or #3) was empty. A new nest (#7) was found in the top of a snag.

Knoll Lake. – On May 7, an osprey was incubating in nest #6, and one adult bald eagle was seen flying.

Mormon Pocket (golden eagle BA). On February 1, two adult bald eagles were perched downstream. On March 17, two golden eagles were perched at a new large nest (#3) on a cliff. All other known nests were empty.

Willow Springs Lake. – On May 6, ospreys were active in nests #4-6, and 9-12. No eagles were seen.

Woods Canyon. – On May 6, ospreys were active in nest #6 and new nests #15 and #16. A third new large nest (#17) was also found in a snag. No eagles were seen.

Location*	Date(s)	Survey Method	Results
Bear Canyon Lake	5/6	Helicopter	Ospreys incubating in nests #5-6. Nest #3 not found. New large nest #7 found in snag.
Black Canyon Lake	5/6	Helicopter	No nests or eagles.
Blue Ridge Reservoir	5/6	Helicopter	Osprey incubating in nest #8. Nest #9 not found. Nest #7 empty. Osprey perched by new large nest #10.
Granite (2GE049)	1/6, 2/1, 3/17, 4/21	Helicopter	All known nests empty. No eagles.
Hell Point (3GE017)	1/6, 2/1, 3/17	Helicopter	All known nests empty. No eagles.
Hidden Valley	2/1, 3/17	Helicopter	All known nests empty. No eagles.
Horseshoe Cienega	5/7	Helicopter	Ospreys incubating in nests #1, 5-6. New large nests #7 and #8 found. One adult bald eagle flying.
Knoll Lake	5/6	Helicopter	Osprey incubating in nest #6. Nests #5,7 not found. One adult bald eagle flying.
Mormon Pocket (2GE031)	1/6, 2/1, 3/17, 4/21	Helicopter	2/1: Two adult bald eagles. 3/17: Pair of golden eagles at new nest #3.
Muldoon	1/6, 2/1, 3/17	Helicopter	All known nests empty. No eagles.
Pineasco Creek	2/2, 4/16	Helicopter	All known nests empty. No eagles.
Sunflower Flat	5/6	Helicopter	Nest #1 not found. No eagles.
Watson Lake (3GE010)	3/17	Helicopter	All known nests empty. No eagles.
Willow Springs Lake	5/6	Helicopter	Ospreys incubating in nest #4-6, 9-12. Nests #2, 7-8 not found.
Woods Canyon	5/6	Helicopter	Ospreys incubating in nests #6 and new nests #15-16. New large nest #17 also found. Nest #7 not seen. No eagles.

*Parentheses indicates corresponding site identification number in the Department’s golden eagle database.

Historic Breeding Areas (Table 7)

Below are findings at historic breeding areas including observations of bald eagles, new nests, fallen nests, and nesting activity of other species.

Devil's Post. – A portion of this area was examined during golden eagle surveys. A new, active golden eagle nest (#11) was found downstream of the historic area and fledged one young in June. No bald eagles were seen.

Dupont. – On March 2, a golden eagle was incubating in nest #5. The nest was empty and considered failed on May 27. No bald eagles were seen.

Location	Date(s)	Survey Method	Results
Bagley Canyon	1/7, 3/16, 4/16	Helicopter	All known nests empty. No eagles.
	1/7	Helicopter	No new nests or eagles.
Devil's Post (3GE011)	2/24, 5/28, 6/9	Helicopter, Fixed-wing	2/24: Golden eagle incubating in new large nest #11. Nests #6, 9 poor. #7 fair.
Dupont (6NE052)	3/2, 5/27	Helicopter	3/2: Golden eagle incubating in nest #5.
Rock Creek	3/1	Helicopter	No nests or eagles.
Tower	1/6, 2/1, 3/17	Helicopter	All known nests empty. No eagles.
Mule Hoof	2/2, 4/16	Helicopter	All known nests empty. No eagles.

Breeding Areas (Table 8)

Below are findings at known breeding areas, limited to observations of new nests, fallen nests, bald eagles without active nests, and breeding activity of other species.

Alamo. – On February 1, an adult was incubating in a new nest (#9) in a live willow tree.

Bachelor Cove. – On January 7, an adult was incubating in a new nest (#3) in the same tree as the previous nest that fell in 2020.

Bartlett. – A pair of adult bald eagles was seen on three visits from January to March, and a single eagle was observed February 10, but no breeding activity was detected.

Bill Williams. – During a ground visit on March 10, an adult bald eagle was seen for a short time flying up and down the river apparently hunting before going down out of view. On May 10, a new large nest was found in a tree by the river and no eagles were observed.

Bulldog. – On January 7, a new nest (#4) was found on a cliff. On February 2, a pair of adults flew to nest #3 but no eggs were seen. On March 16, a near-adult and a subadult were soaring over the nest area.

Canyon de Chelly. – In April, the Navajo Nation Department of Fish and Wildlife reported bald eagles were active in a new nest but were unable to confirm the presence of nestlings. Two

juvenile bald eagles were seen nearby in late August, potentially having fledged from the new nest.

Cataract and Kaibab Lake. – The Cataract BA was first identified in 2018 with a successful nesting attempt at nest #1. Another nest (#2) was found that year in a snag. In 2019, nests #1 and #2 were empty and a search of the area yielded discovery of nest #3 between Cataract and Kaibab Lake. On June 22, 2021, a wildlife manager for the Department notified us of a juvenile bald eagle, approximately 10 weeks old, on the ground at a new nest location near Cataract Lake and a second juvenile still in the nest. The new nest was clearly associated with the area identified as the Cataract BA, however bald eagles were also active in nest #3, meaning there are two BAs. We are adding Kaibab Lake as the “new” BA and changing the name of Cataract nest #3 to Kaibab Lake #8 (nests #1-7 are all osprey nests that were found at Kaibab Lake prior to 2019). Consequently, productivity data in 2019-2020 has been transferred from Cataract to Kaibab Lake and any mention of Cataract nest #3 in previous management reports should be interpreted as referring to Kaibab Lake nest #8. In order to help reduce confusion with past reporting, the new nest at Cataract will be identified as nest #4.

Cliff. – On February 10, a near-adult and an adult bald eagle (both unbanded) were observed interacting briefly on the west side of the Verde River, south of KA Ranch. The birds tangled or presented talons and vocalized before separating, with the near-adult flying upstream and the adult downstream. An unbanded near-adult, presumably the same bird, was later seen perched at the Deadman Creek inflow at Horseshoe Lake with an unbanded adult (female and male respectively based on their size difference). No new nests were found during ground or aerial surveys.

Cole's Bay. – On a March 17 aerial survey an adult bald eagle was seen flying from nest #1, although no eggs or young were present. Nestwatchers observed an adult pair and several other bald eagles during part-time observations from February to mid-March.

Coolidge. – San Carlos Apache Tribe (SCAT) biologists reported a single adult bald eagle in the area of nest #5 on March 12, but there was no breeding activity. On April 16, an adult bald eagle was seen perched in the area and the nest was empty.

Crescent. – On February 2, a pair of adults was perched near nest #1. Nestwatchers saw the pair in the BA occasionally during monitoring in late April to early May.

Fort McDowell. – On January 6, an adult bald eagle was incubating in a new nest (#21) in a medium size cottonwood tree.

Goldfield. – On January 7, nest #4 was fallen and an adult bald eagle was incubating in a new nest (#5) in a live cottonwood tree.

Greer Lakes. – On May 7, an adult bald eagle was seen flying over the Little Colorado River, and during a ground survey on May 20 two adults were observed perching and flying at the

lakes. All known eagle nests were empty. Ospreys were active in nests #8-9 and two new nests (#10-11) in snags.

Kaibab Lake. – See *Cataract and Kaibab Lake* above.

Kerr BA. – In 2020, a pair of adult bald eagles was seen perching at and defending Orme nest #11 during the breeding season. At the same time, both the Orme and Granite Reef BAs (upstream and downstream respectively) were occupied. The pair at nest #11 was therefore suspected of being the Kerr eagles since their previous nest (#2) had fallen prior to January 2020 and no other nests were found. In 2021, a pair of adults laid eggs in the existing nest, and since the Orme and Granite Reef pairs were active in different locations we again assumed the pair nesting between them belonged to the Kerr BA and assigned the nest as Kerr #3 (same nest as Orme #11). The adult male at Orme was identified this year as the same individual breeding since 2015, however the identity of the Kerr and Granite Reef eagles was unknown.

Needle Rock. – Since 2012, one pair of bald eagles has nested in the area that previously supported two pairs, with occupancy only by the Box Bar pair. During three aerial surveys (January 6, February 1, and March 17) no other adult eagles were seen and no new nests were found, making 2021 the tenth consecutive year that the Needle Rock BA has been unoccupied. Nestwatchers at the Box Bar BA did observe other subadults during February and March, but only as floaters attempting to fill a vacancy in the Box Bar BA. Needle Rock will now be designated a historic BA.

Oak Creek. – On January 6, a new large nest (#5) was found in a live cottonwood tree, and an adult bald eagle was incubating in the nest on February 1.

OW. – On March 3, an adult bald eagle was seen flying. On March 31, an adult was standing in nest #2 but no eggs or young were present (Figure 5). On May 6, a single adult was perched in the area and an active osprey nest (#3) was found nearby.



Figure 5. OW (left) and Seventy-six (right) breeding areas. Gila County, Arizona.

Pee Posh Wetlands. – On January 6, an adult bald eagle was found incubating in a new large nest (#9) in a snag.

Redmond. – On February 2, a pair of adult bald eagles was standing in nest #5.

Seventy-six. – On January 7, a new large nest (#7) was found in a live cottonwood tree and two adult bald eagles were in the area. On February 2, an adult was incubating in the new nest (Figure 5).

Sheep. – On January 7, nest #7 was fallen and a new large nest (#8) was found in the same tree with an adult bald eagle perched nearby. On February 2, an adult was incubating in the new nest.

Sheep Creek. – On January 6, an adult bald eagle was perched in the area. Although no breeding activity was detected this season, on March 24 we received a photo from the public of a pair of adults perched together downstream of the nest area. One of these adults was blue banded on its left leg (13/X) and was identified as the resident adult male in 2019-2020. The second adult in the photo appeared to be a female whose left leg was not banded, indicating this bird has replaced the previous resident female that was banded on both legs.

Sullivan Lake. – On January 6, an adult bald eagle was incubating in a new nest (#3) in a snag.

Table Mountain. – On February 1 and March 17, two adult bald eagles were perched in the area. All known nests were empty and no new nests were found.

Talkalai. – On April 16, a new large nest (#10) was observed. Although no bald eagles were seen that day, SCAT biologists reported seeing a pair of adults in the area in February and March.

White Horse. – On May 6, one adult bald eagle was perched at the lake. No new nests were found. An osprey was incubating or brooding in nest #8.

Table 8. Arizona bald eagle nest survey summary, 2021 breeding areas.			
Location	Date(s)	Method	Results
Alamo	2/1, 3/17, 4/14	Helicopter, Ground	2/1: Adult incubating in new nest #9.
Bachelor Cove	1/7, 2/2, 3/16, 4/16	Helicopter	1/7: Adult incubating in new nest #3.
Bartlett	1/6, 2/1, 2/10, 3/17, 4/21	Helicopter, Ground	All known nests empty. 1/6: Pair of adults perched at lake. 2/1: Pair of adults perched. 2/10: One adult in area. 3/17: Two adults and two immatures.
Bill Williams	3/10, 5/10	Helicopter, Ground	3/10: One adult flying. 5/10: New large nest #4.
Bulldog	1/7, 2/2, 3/16, 4/16	Helicopter	1/7: New nest #4 found. 2/2: Pair of adults in nest area. 3/16: One adult and one near-adult flying.
Canyon de Chelly	--	--	4/27: Adult reported incubating or brooding in new nest #3. 8/24: Two juveniles reported.
Cliff	1/6, 2/1, 2/10, 3/17	Helicopter, Ground	2/10: Adult and near-adult interacting. No new nests.
Cole's Bay	1/6, 2/1, 3/17, 4/21	Helicopter	3/17: Adult at nest. No eggs or young.
Coolidge	4/16	Helicopter	4/16: One adult in area.
Crescent	2/2, 4/16, 5/7	Helicopter	2/2: Pair of adults perched.
Fort McDowell	1/6, 2/1, 2/12, 3/17	Helicopter, Ground	1/6: Adult incubating in new nest #21.
Goldfield	1/7, 2/2, 3/16, 3/19, 4/16, 5/7	Helicopter	1/7: Adult incubating in new nest #5. Nest #4 fallen.
Greer Lakes	2/2, 4/16, 5/7, 5/20	Helicopter, Ground	4/16: Ospreys incubating in nests #8-9. 5/7: Osprey active in new large nest #10. 5/20: Osprey active in new large nest #11.
Kaibab Lake	2/23, 3/22, 5/6, 6/11	Helicopter, Ground	2/23: Adult incubating in nest #8.
Kerr	1/7, 2/2, 3/16, 4/16, 4/21, 5/7	Helicopter	2/2: One adult perched. 3/16: Adult incubating in nest #3.
Oak Creek	1/6, 2/1, 3/17, 4/21, 5/6	Helicopter	1/6: New large nest #5 found. 2/1: Adult incubating in nest #5.
OW	3/3, 3/31, 5/6	Helicopter	3/3: One adult flying. 3/31: Adult standing in nest #2. 5/6: One adult perched. Osprey active in new nest #3.
Pee Posh Wetlands	1/6, 2/1, 3/17, 4/21	Helicopter	1/6: Adult incubating in new nest #9.
Redmond	1/7, 2/2, 3/16, 3/29, 4/16	Helicopter	2/2: Pair of adults standing in nest #5.
Seventy-six	1/7, 2/2, 3/16, 4/16, 5/6	Helicopter	1/7: New large nest #7 found.
Sheep	1/7, 2/2, 3/16, 3/31, 4/16, 5/6, 6/2, 6/4	Helicopter, Ground	1/7: Nest #7 fallen. New large nest #8 found. One adult perched. 2/2: Adult incubating in nest #8.
Sheep Creek	1/6, 2/1, 3/17, 4/21	Helicopter	1/6: One adult perched. 4/21: One immature downstream.
Sullivan Lake	1/6, 2/1, 3/17, 4/21, 5/6	Helicopter	1/6: Adult incubating in new nest #3.
Table Mountain	1/6, 2/1, 3/17	Helicopter	2/1 & 3/17: Pair of adults perched.
Talkalai	4/16	Helicopter	New large nest #10. No eagles.
White Horse	5/6	Helicopter	Ospreys active in nest #8. One adult bald eagle.

Breeding Areas in Surrounding States (Table 9)

Black Canyon BA (Nevada). – On May 10, nest #1 was empty and no eagles were seen. Although no breeding activity was observed, the timing of the survey was late and it is unknown if eagles occupied the BA earlier in the season.

Copper Basin BA (California). – Personnel from the Metropolitan Water District of Southern California reported observations of a bald eagle sitting in a nest on a cliff in February, however it was not clear if this was a known nest or a new one. No eagles were seen three weeks after the first visit and no activity was observed during several visits throughout March.

Whipple Mountains BA (California). – On May 10, a pair of adult bald eagles flew off the cliff within the area of nest #1, which was empty. Two other large nests (#2-3) were found on cliffs nearby. Although no breeding activity was observed, the timing of the survey was late in the season. It is unknown if the eagles were active earlier in the season and had already either failed or fledged young.

Location	Date(s)	Survey Method	Results
Black Canyon, NV	5/10	Helicopter	All known nests empty. No eagles.
Copper Basin, CA	--	--	Pair reported at a cliff nest potentially incubating. No eagles seen during subsequent visits.
Whipple Mountains, CA	5/10	Helicopter	Pair of adults flying. All known nests empty. Two new large nests (#2-3) found.

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 new and recently discovered breeding areas including Black Cross, Cataract (2021), Eagle Mountain, Green River, Kachina, Kaibab Lake, OW, Nevada Bay, Rainbow, Two Bar, Water Nest.
4. Identify banded adults at sites where one or both of the pair has long tenure within the breeding area in order to detect when replacement of these important birds has occurred.
5. Examine the following areas for breeding bald eagles and/or nests:
 - Anderson Mesa and area lakes –Kinnikinick Lake.
 - Big Sandy River drainage – upper Trout Creek.
 - Black River drainage – Known osprey nesting areas on the East and West Fork and main stem of the Black River; Tanks Canyon.

- Central and Eastern Mountain Lakes – Bear Canyon, Black Canyon, Blue Ridge, Dry, Knoll, Lyman, Nash Creek, Point of Pines, Rogers, Willow Springs.
- Colorado River drainage – Gene Wash Reservoir (CA), Cibola Havasu National Wildlife Refuge, Havasu National Wildlife Refuge, Imperial National Wildlife Refuge, Black Canyon (Lake Mohave to Lake Mead), Lake Mead (Grand Wash), Nankoweap Creek.
- North Fork of White River – Known osprey nesting locations.
- Prescott area – Watson, Willow, and Goldwater lakes.
- Gila River drainage – Lower Blue River, San Francisco River, Gila Box, Gila River bottom through Phoenix metro area.
- Salt River Drainage – Search at least two miles upstream on major washes and creeks around Roosevelt Lake (e.g., Greenback Creek, Pinto Creek); Tonto Creek north of Tonto BA; Redmond BA to Lone Pine BA; major 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 – Big Lake, Carnero, Christmas Tree, Nutrioso, Pacheta.
- White River – Whiteriver to confluence with Black and Salt Rivers.
- Williams area lakes – JD Dam and Santa Fe Reservoir.
- Urban and rural areas – Payson, Stanfield.

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 2021. 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 BAs to be monitored by weighing the level of recreation activity and management needs. Included are those with seasonal closures (Bachelor Cove, Box Bar, Cole's, Concho, Crescent, Fool Hollow, Goldfield, Ladders, Luna, Pleasant, and Whiskey Spring), those without closures (Fort McDowell, Granite Reef, Orme, Rodeo, Scholz Lake, and Sycamore), and those monitored opportunistically for information (Doka, Tonto, and Woods Canyon). In the fall of 2020, 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 applicants.

We held two orientation meetings, and three question and answer sessions for the selected ABENWP contractors (nestwatchers). The two orientation 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. Additional communication was achieved via phone and email.

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 to 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.

At the Bachelor Cove, Box Bar, and Concho BAs, nestwatchers recorded human activity differently than described above. At the Bachelor Cove BA, nestwatchers had a limited view of the area with observations primarily restricted to the nest canyon and immediate area. Traffic along Highway 188 was not recorded due to its regular presence and no reaction from the resident eagles. At the Box Bar BA, nestwatchers had a limited view of the area to the north, east, and south of the nest tree and no view to the west, and therefore were only able to observe human activity occurring within about 250 m of the nest tree. At Concho, because Highway 61, residences, and other permanent structures occur within 1 km of the nest tree, nestwatchers limited their recording of human activity to the lake area east of the highway.

In addition to recording human activity and associated eagle responses, nestwatchers documented 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.

In 2021, due to the continuation of the COVID-19 pandemic, Nestwatchers were instructed to maintain physical distance and to not interact with people if they did not feel comfortable doing so. Therefore, close interactions with the public and other education opportunities may have been more limited again this season.

RESULTS AND DISCUSSION

The ABENWP monitored 20 breeding areas (either full or part-time) in 2021 including Bachelor Cove, Box Bar, Cole’s Bay, Concho, Crescent, Doka, Fool Hollow, Fort McDowell, Goldfield, Granite Reef, Kerr, Ladders, Luna, Orme, Pinto, Pleasant, Rodeo, Scholz Lake, Sycamore, Tonto, Whiskey Spring, and Woods Canyon (Appendix C). The Cole’s Bay, Crescent, Doka, Granite Reef, Kerr, Pinto, Rodeo, Tonto, and Woods Canyon BAs were monitored part-time or opportunistically by nestwatchers at nearby BAs. Therefore, data for some of these sites are not included in the following section of this report.

Bachelor Cove Breeding Area (Appendix E, Figure 6)

Observation Period. – February 5 to May 9. Total monitoring 489.5 hours over 68 days.

Bald Eagle Identification. – Both eagles were in adult plumage. Nestwatchers reported that the female was not banded (unknown origin), and the male had a blue VID band “21/W” on the left leg and silver band on the right leg (2008 nestling from the Pleasant BA).

Management Activities. – 1) The USFS maintained “No Entry” signs around the nest area.

Human Activity. – Nestwatchers recorded 531 human activities. Terrestrial activity of fifteen types represented 88.1% of activities, watercraft (boat, canoe, standup paddleboard) 7.7%, and aircraft activity (small plane, jet, helicopter, seaplane) 4.1%. Two types of activity elicited five significant responses from the breeding pair. The bald eagles were restless in response to four military jets and one vehicle.

Food Habits. – The nestwatchers observed 14 forage events, with fish accounting for 35.7%, birds and mammals 7.1% each, and unknown prey types 50.0%. The male was successful in 55.6% (n=9), the female in 0% (n=1), and an unknown adult in 25.0% (n=4) of forage events. The breeding pair was observed delivering 122 prey items to the nest, of which the male delivered 74.5%, the female 18.9%, and an unknown adult 6.6%. Fish comprised 73.0%, mammals 3.3%, birds 2.5%, and unknown prey 21.3% of the deliveries. Of the 34 prey items further identified, 52.9% were channel catfish (*Ictalurus punctatus*), 20.6% were sunfish species, 14.7% were bass species, 5.9% were American coots (*Fulica americana*), and 2.9% each were black crappie (*Pomoxis nigromaculatus*) and unidentified rabbit species.

Habitat Use. – The Bachelor Cove nestwatchers identified 44 separate perch locations. The bald eagle pair spent 44.3% of the observed time at lake km (lk) 82.3, 20.6% at lk 82.5, 15.0% at lk 82.4, 9.2% at lk 83.5, 6.8% at lk 82.6, and 4.1% at the remaining locations.



Figure 6. Bachelor Cove (left) and Box Bar (right) breeding areas. Gila and Maricopa Counties, Arizona.

Box Bar Breeding Area (Appendix F, Figure 6)

Observation Period. – February 3 to March 14. Total monitoring 277 hours over 32 days.

Bald Eagle Identification. –The male was in adult plumage and not banded (unknown origin), and the female had a blue VID band “24/S” on the left leg and silver band on the right leg (2010 nestling from the Sheep BA). On January 20, the female was found dead by electrocution under a power line.

Management Activities. – 1) The USFS placed or maintained “No Entry” signs around the nest area.

Human Activity. – Nestwatchers recorded 440 human activities. Terrestrial activity of 11 types represented 89.5%, water pursuits (canoe/kayak) 10.0%, and aircraft activity (drones) 0.5%. One type of activity elicited two significant responses from the breeding pair. The bald eagles were restless in response to two gunshots.

Food Habits. – The nestwatchers were unable to observe any forage events. Due to the early failure of the nesting attempt, there were no prey deliveries to nestlings.

Habitat Use. – The Box Bar nestwatchers identified four separate perch locations spanning 0.4 km of the Verde River ranging from river kilometer (rk) 25.4 to 25.8. The bald eagles spent 68.6% of the observed time at rk 25.5, 30.7% at rk 25.8, and 0.7% at rk 25.4.

Concho Breeding Area (Appendix G, Figure 7)

Observation Period. – February 3 to March 21. Total monitoring 296 hours over 33 days.

Bald Eagle Identification. – Nestwatchers reported that both eagles were in adult plumage and unbanded (unknown origin).

Management Activities. – 1) “No Entry” signs were placed around the perimeter of the nest area.

Human Activity. – Nestwatchers recorded 40 human activities. Terrestrial activity of three types represented 92.5%, water pursuits (kayak) 5.0%, and aircraft activity (military plane) 2.5%. One type of activity elicited two significant responses from the breeding pair. The bald eagles flushed in response to two hikers.

Food Habits. – The nestwatchers observed 7 forage events, with fish accounting for 42.9%, mammals 28.6%, and birds 14.3%. The male was successful in 0% (n=6) and the female in 0% (n=1) of forage events. The breeding pair was observed delivering four prey items to the nest, of which the male delivered 100%. Mammals comprised 75.0% and unknown prey 25.0% of the deliveries. Of the three prey items further identified, 100% were mountain cottontail (*Sylvilagus nuttallii*).

Habitat Use. – The Concho nestwatchers identified 23 separate perch locations at the lake. The bald eagle pair spent 46.7% of the observed time at lk 1.3, 33.6% at lk 1.4, 6.6% at lk 1.1, 5.1% at lk 1.2, and 8.0% at the remaining locations.



Figure 7. Concho (left) and Fool Hollow (right) breeding areas. Apache County and Navajo County, Arizona.

Fool Hollow Breeding Area (Appendix H, Figure 7)

Observation Period. – March 22 to June 14. Total monitoring 530 hours over 59 days.

Bald Eagle Identification. – The male and female were in adult plumage and unbanded.

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. 2) On April 13, one nestling was blue VID banded “52/B” at 6 weeks old.

Human Activity. – Nestwatchers recorded 29 human activities within the closure during the monitoring period. Terrestrial activity of five different types represented 93.1% and aircraft (helicopters) 6.9%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – No forage events were observed. The breeding pair was observed delivering 34 prey items to the nest, of which the male delivered 41.2% and the female 58.8%. Fish comprised 70.6%, mammals 23.5%, and unknown prey 5.9% of the deliveries. Of the six prey items further identified, 66.7% were mountain cottontail and 33.3% were rainbow trout (*Oncorhynchus mykiss*).

Habitat Use. – Nestwatchers identified 11 perch locations around Fool Hollow Lake. The bald eagles spent 88.9% of the observed time at lk 0.0, 5.9% at lk 8.7, 3.6% at lk 8.9, and 1.7% at the remaining locations.

Fort McDowell Breeding Area (Appendix I, Figure 8)

Observation Period. – Full-time observations March 19 to April 17. Total monitoring 184 hours over 36 days.

Bald Eagle Identification. – The male and female were unbanded and in adult plumage.

Management Activities. – 1) FMYN placed “No Entry” signs to prevent off-road vehicle access to the nest area.

Human Activity. – Nestwatchers recorded 16 human activities during the monitoring period. Aircraft activity of two different types (small planes and helicopters) represented 62.5% and terrestrial activity of five types 37.5%. None of the activities elicited a significant response from the eagles.

Food Habits. – No forage events were observed. The breeding pair was observed delivering 18 prey items to the nest, of which the male delivered 33.3% and the female 66.7%. Fish comprised 27.8%, birds 5.6%, and unknown prey 66.7% of the deliveries. None of the prey items were further identified.

Habitat Use. – Nestwatchers identified ten perch locations along the Verde River. The bald eagles spent 63.6% of the observed time at rk 19.9, 26.3% at rk 19.5, 4.3% at rk 19.3, 3.8% at rk 20.1, and 2.0% at the remaining locations.



Figure 8. Fort McDowell (left) and Goldfield (right) breeding areas. Maricopa County, Arizona.

Goldfield Breeding Area (Appendix J, Figure 8)

Observation Period. – February 3 to April 28. Total monitoring 461 hours over 65 days.

Bald Eagle Identification. – The Nestwatchers reported the male had a blue VID band “30/K” on his left leg, USFWS band on the right leg, and was in adult plumage (2015 nestling from the Box Bar BA), and the female was unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The USFS enacted the seasonal BA closure and maintained wildlife breeding area signs along the river prohibiting entry. 2) The USFS closed off vehicle access to the nest area.

Human Activity. – Nestwatchers recorded 2,572 human activities during the observation period. Water activities of five types (canoe/kayak, stand-up paddleboard, tuber, airboat, swimmer) represented 52.8%, terrestrial activities of 11 types 41.4%, and aircraft (helicopters, small planes, drones, motorized parachutes, jets) 5.8%. One type of activity elicited one significant response from the breeding pair. The bald eagles were restless in response to one dog.

Food Habits. – The nestwatchers observed one forage event, with the male successful in foraging a mammal. The breeding pair was observed delivering 49 prey items to the nest, of which the male delivered 28.6%, the female 61.2%, and an unidentified adult 10.2%. Fish comprised 40.8% of these deliveries, mammals 8.2%, birds 4.1%, and unknown prey types 46.9%. Of the seven prey items further identified, 85.7% were rainbow trout and 14.3% were Sonora sucker (*Catostomus insignis*).

Habitat Use. – The Goldfield nestwatchers identified 23 perch locations, spanning a 2.0 km stretch of the Salt River ranging from rk 8.6 to 10.6. The bald eagle pair spent 51.2% of the observed time at rk 9.8, 27.0% at rk 10.1, 7.9% at rk 10.5, 6.7% at rk 9.7, and 7.2% at the remaining locations.

Ladders Breeding Area (Appendix K, Figure 9)

Observation Period. – March 11 to April 8. Total monitoring 159 hours over 21 days.

Bald Eagle Identification. – Both eagles were in adult plumage. The male was not banded (unknown origin), and the female had a blue VID band “25/K” on the left leg and silver band on the right leg (2010 nestling from the Needle Rock BA).

Management Activities. – 1) The USFS enacted the seasonal BA closure and maintained wildlife breeding area signs along the river prohibiting entry. 2) The USFS closed off vehicle access to the nest area.

Human Activity. – Nestwatchers recorded 26 human activities during the observation period. Water activities of one type (kayaks) represented 46.2%, aircraft (helicopters, small planes) 42.3%, and terrestrial activities (nestwatcher, hiker) 11.5%. Two types of activity elicited two significant responses from the breeding pair. The eagles were restless in response to one helicopter and one nestwatcher.

Food Habits. – No forage events were observed. The breeding pair was observed delivering 22 prey items to the nest, of which the male delivered 45.5% and the female 54.6%. Fish and birds each comprised 31.8% of these deliveries, mammals 22.7%, and unknown prey types 13.6%. Of the nine prey items further identified, 33.3% were unidentified waterfowl species, 22.2% were American coots, and 11.1% each were wood duck (*Aix sponsa*), pied-billed grebe (*Podilymbus podiceps*), common carp (*Cyprinus carpio*), and Sonora sucker.

Habitat Use. – The Goldfield nestwatchers identified 33 perch locations, spanning a 1.7 km stretch of the Salt River ranging from rk 161.5 to 163.2. The bald eagle pair spent 33.5% of the

observed time at rk 162.9, 31.7% at rk 163.0, 12.2% at rk 162.8, 7.1% at rk 163.1, 6.7% at rk 162.0, 3.1% at rk 162.5, and 5.7% at the remaining locations.



Figure 9. Ladders (left) and Luna (right) breeding areas. Yavapai and Apache Counties, Arizona.

Luna Breeding Area (Appendix L, Figure 9)

Observation Period. – February 4 to April 18. Total monitoring 494 hours over 53 days.

Bald Eagle Identification. – The male and female were in adult plumage. The band status of the resident adult eagles at Luna Lake was not determined.

Management Activities. – 1) Nestwatchers were stationed at the boat ramp to talk to visitors. 2) USFS evaluated closure options around nest #2.

Human Activity. – The nestwatchers recorded 624 human activities. Terrestrial activity of sixteen different types accounted for 90.9%, water pursuits (fishing boats, float tubers, kayaks/canoes) for 7.4%, and aircraft (helicopters, jets) 1.9%. Five types of activity elicited six significant responses from the breeding pair. The bald eagles flushed in response to two jets, one angler, one birder, one biologist, and one nestwatcher.

Food Habits. – The nestwatchers observed 51 forage events, with birds accounting for 76.4%, carrion 13.7%, fish 3.9%, and unknown prey types for 5.9%. The male was successful in 86.2% (n=29) and the female in 81.8% (n=22) of forage events. The breeding pair was observed delivering 24 prey items to the nest, of which the male delivered 62.5% and the female 37.5%. Birds comprised 62.5% of these deliveries, 16.7% carrion, 8.3% fish, and unknown prey types 12.5%. Of the 17 prey items further identified, 88.2% were American coots and 11.8% were rainbow trout.

Habitat Use. – Nestwatchers identified 18 separate habitat use areas around Luna Lake. The bald eagle pair spent 75.9% of the observed time at lk 4.8, 5.9% at lk 2.6, 4.9% at lk 2.7, 4.9% at lk 5.0, and 8.4% at the remaining locations.

Orme Breeding Area (Appendix M, Figure 10)

Observation Period. – February 4 to April 18. Total monitoring 494 hours over 53 days.

Bald Eagle Identification –The male had a blue VID band “26/B” on the left leg, USFWS band on the right leg, and was in adult plumage (2011 nestling from the Riverside BA). The female was unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The Salt River Pima-Maricopa Indian Community (SRPMIC) continues to restrict non-tribal member use to the area. 2) On April 9, one male nestling was blue VID banded “51/B” at 5.5 weeks old.

Human Activity. –Nestwatchers recorded 648 human activities. Aircraft (helicopter, small plane, jet, motorized parachute, drone) represented 83.6%, terrestrial activities of 14 types 15.9%, and water pursuits (swimmer) 0.5%. Six types of activity elicited nine significant responses from the breeding pair. The bald eagles were restless in response to one angler and flushed in response to three drivers, one hiker, one horseback rider, one angler, one AZGFD biologist, and one hunter.

Food Habits. – The nestwatchers observed nine forage events, with fish accounting for 55.6%, birds 11.1%, mammals 11.1%, and unknown prey types 22.2% The male was successful in 16.7% (n=6) and the female in 33.3% (n=3) of forage events. The breeding pair was observed delivering 58 prey items to the nest, of which the male delivered 60.3%, the female 37.9%, and an unknown adult 1.7%. Fish comprised 32.8%, birds 15.5%, mammals 1.7%, carrion 1.7%, and unknown prey 48.3% of the deliveries. None of the prey items were identified to species.

Habitat Use. – The Orme nestwatchers identified 36 perch locations spanning 1.4 km along the Verde River ranging from rk 0.3 to 1.7, and 2.9 km along the Salt River ranging from rk 3.6 to 6.5. The bald eagle pair spent 47.9% of the observed time at rk 0.6 (Verde River), 24.2% at rk 0.7 (Verde River), 19.6% at rk 0.9 (Verde River), 2.6% at rk 0.8 (Verde River), 1.4% at rk 1.7 (Verde River), and 4.3% at the remaining locations.



Figure 10. Orme (left) and Pleasant (right) breeding areas. Maricopa County, Arizona.

Pleasant Breeding Area (Appendix N, Figure 10)

Observation Period. – February 5 to March 9. Total monitoring 50 hours over 9 days.

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

Management Activities. – 1) MCPRD enacted the seasonal closure around the active nest, and marked closure boundaries with buoys. 2) Nestwatchers were supplied a boat by AGFD and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 17 human activities. Watercraft (boats) represented 58.8%, aircraft (small planes, jets) 35.3%, and terrestrial activity (motorcycle) 5.9%. Two types of activity elicited two significant responses from the breeding pair. The bald eagles were restless in response to a small plane and flushed in response to a boater. Due to the location of the nest this year, the nestwatchers were out of view of the buoy line and were unable to consistently gather data on compliance with the southern end of the closure (see Whiskey Spring summary).

Food Habits. – Nestwatchers observed one forage event, with the female successfully foraging a fish. Due to the early failure of the nesting attempt, there were no prey deliveries to the nest.

Habitat Use. – The Pleasant nestwatchers identified 16 separate perch locations along the Agua Fria River arm of Lake Pleasant. Perches spanned a total of 2.0 km ranging from rk 72.0 to 74.0. The breeding pair spent 85.1% of the observed time at rk 73.5, 10.5% at rk 73.3, 2.4% at rk 74.0, and 2.1% at the remaining locations.

Scholz Lake Breeding Area (Appendix O), Figure 11)

Observation Period. – May 1 to July 18. Total monitoring 356 hours over 48 days.

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

Management Activities. – 1) The USFS closed public access to the lake from June 22 to July 9 due to wildfire activity in the area. 2) On July 6, the Department fostered a juvenile bald eagle at the lake which had been rescued from the Silver Creek area.

Human Activity. – Nestwatchers recorded 436 human activities. Terrestrial activities of seven types accounted for 70.2% and water pursuits (swimmer, canoe/kayak, stand up paddler, tuber) for 29.8%. One activity elicited three significant responses from the breeding pair. The eagles flushed in response to three hikers.

Food Habits. – Nestwatchers observed 32 forage events, with fish accounting for 90.6%, birds 3.1%, and unknown prey types 6.3%. The male was successful in 54.5% (n=11) and the female in 90.5% (n=21) of forage events. The breeding pair was observed delivering 49 prey items to the nest, of which the male delivered 40.8% and the female 59.2%. Fish comprised 57.1%, birds

16.3%, mammals 2.0%, and unknown prey 4.1% of the deliveries. Of the 28 prey items further identified, all were catfish species.

Habitat Use. – Nestwatchers identified 20 separate perch locations around the lake. The bald eagle pair spent 21.5% of the observed time at lk 1.1, 18.2% at lk 0.2, 16.6% at lk 1.3, 14.7% at lk 1.7, 12.0% at lk 0.7, 8.9% at lk 2.2, 3.4% at lk 1.5, and 4.6% at the remaining locations.



Figure 11. Scholz Lake (left) and Sycamore (right) breeding areas. Coconino County and Maricopa County, Arizona.

Sycamore Breeding Area (Appendix P, Figure 11)

Observation Period. – Full-time observations from February 4 to March 14. Total monitoring 220.5 hours over 34 days.

Bald Eagle Identification. – The male and female were unbanded (unknown origin).

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

Human Activity. – Nestwatchers recorded 81 human activities. Terrestrial activities of seven types accounted for 75.3%, aircraft (helicopter, small plane) for 22.2%, and water pursuits (swimmer, canoe/kayak) for 2.5%. Three types of activity elicited six significant responses from the breeding pair. The eagles were restless in response to one horseback riding group, and flushed in response to three horseback riding groups, one driver, and one rancher.

Food Habits. – Nestwatchers observed two forage events, with the male successful in one of two forages of fish. Due to the early failure of the nesting attempt, there were no prey deliveries to the nest.

Habitat Use. – The Sycamore nestwatchers identified 18 separate perch locations, spanning 3.1 km along the Verde River and ranging from rk 7.8 to 10.9, and 0.1 km along Sycamore Creek.

The bald eagle pair spent 30.5% of the observed time at rk 10.1, 26.6% at rk 7.8, 20.1% at rk 10.7, 7.2% at rk 10.0, 4.3% at rk 9.7, 4.1% at rk 10.9, and 7.2% at the remaining locations.

Whiskey Spring Breeding Area (Appendix Q, Figure 12)

Observation Period. – February 5 to March 9. Total monitoring 76 hours over 12 days.

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

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

Human Activity. – Nestwatchers recorded 52 human activities within the closure boundary. Water pursuits (boats, jet skis) accounted for 84.6% and aircraft (small planes, helicopters) for 15.4%. None of the activities elicited a significant response from the breeding pair. During February 20-27, nestwatchers recorded 239 watercraft that approached the southern buoy line before turning back.

Food Habits. – The nestwatchers observed eight forage events, with fish accounting for 100%. The male was successful in 50.0% (n=4), the female in 100% (n=1), and an unknown adult in 66.7% (n=3) of forage events. Due to the early failure of the nesting attempt, there were no prey deliveries to the nest.

Habitat Use. – The Whiskey Spring nestwatchers identified 26 perch locations at the lake and along the Agua Fria River, spanning a total of 2.4 km and ranging from rk 68.1 to 70.5. The bald eagle pair spent 40.1% of the observed time at rk 68.8, 31.4% at rk 69.0, 13.3% at rk 68.9, 4.3% at rk 68.2, and 11.0% at the remaining locations.



Figure 12. Whiskey Spring breeding area. Maricopa County, Arizona.

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.

Bachelor Cove and Tonto

- 1) The USFS should continue to install “No Parking” and “No Stopping” markers or posts at the pullout on FR647 (across from the cove entrance), and also continue to line the edge of the road with cobbles in order to prevent parking at this location. This practice was effective in 2021 at preventing closure violations.
- 2) To reduce potential disturbance to the Bachelor Cove pair, post a large and visible sign when the cove gate is closed. A large proportion of traffic entered FR647, passed the nest tree, turned into the cove, saw the closed gate, backed up towards the nest tree, and then exited FR647; the majority of these vehicles were watched by adults attending the nest. These instances could be completely avoided or greatly reduced if visitors were informed of the closure just prior to entering FR647. (Apparently, the signage on SR188 stating “Bachelor Cove: Closed” was not clear enough; this may be due to the associated directional arrow that points towards Roosevelt Lake instead of the cove gate).

Box Bar

- 1) Many visitors to Box Bar Recreation Area were unaware that a wildlife closure was in effect. Placing large, visible educational signs about closures and maps showing where closures areas are located would help limit the number of people trespassing. Nestwatchers suggest posting this information at the main Box Bar Recreation Area parking lot and the parking area off Needle Rock Road.
- 2) Although steps may have already been taken to prevent another accident like the one that caused the death of the resident adult female eagle, we would like to still stress the importance of implementing measures to discourage other eagles to use these electric posts as perches when searching for nest material inside the Rio Verde Ranch. Maybe also suggesting the local landscaping company to cover their brush piles or locate them where they are not surrounded by electric lines could prevent further accidents.

Concho

- 1) Consideration should be given to the installation of a gate across the access road to the AZGFD property on the southeast shore of the lake. The ability to lock out vehicular access to this area during the Bald eagle breeding season should be of substantial benefit to the resident eagles. The roads accessed from this gate allow individuals to drive to within approximately 50 meters of the nest. People approaching in this manner are not visible to Nestwatchers, as visibility is blocked by the band of cottonwoods. This situation prevents Nestwatchers from being able to intervene before human activity can disturb the resident adults. It should be noted that Nestwatcher conversations with several locals indicates that AZGFD property is used for small game and waterfowl hunting

access in the fall and the winter, so it is recommended that this gate only be locked as necessary during the bald eagle breeding season.

- 2) Foot access to the nest area by people crossing the lake inlet area at the south end of the lake is also a concern. Conversations with people who had seen the signs advising against entering the area indicate that there is a misunderstanding of the signs' meaning. Part of this confusion could stem from the wording of the signs, particularly the phrase: "Entering may violate Federal, State, or Tribal laws." The use of the word "may" indicates to the reader that entering the area might or might not be legal. Some individuals reasoned that simply walking through an area would not significantly disturb any wildlife. As rewording and production of new signs would be a significant undertaking, Nestwatchers should consider posting one individual in the parking lot/boat-ramp area on high use days to explain the signs and educate the public about the importance of staying away from the nest area during the breeding season.

Fort McDowell

- 1) Consider cutting some branches away from the Sycamore breeding area nest tree before the breeding season. Currently, Nestwatchers are unable to view the nest once leaf-out occurs which prevents accurate data collection and their ability to confirm nest status. Alternatively, a camera setup in the nest tree would be beneficial to observed the activity at the nest once leaf out has occurred.
- 2) While a couple of FMYN police dispatchers were very helpful and receptive to Nestwatcher calls, several other dispatchers were not. Additionally, at times, they did not seem to know basic landmarks or directions when Nestwatchers would call to relay concerns. Perhaps incorporating a ride-along with officers into new dispatcher training would be helpful in familiarizing them with key landmarks. We often felt a disconnect in our communication with dispatch. FMYN officers were extremely helpful without exception, encouraging us to report trespassers on the Nation. However, when we would do so, some dispatchers conveyed a tone of annoyance with our calls. Consistent messaging in this arena would be very helpful in the future.
- 3) Strongly encourage woodcutters with permits in the vicinity of FMYN breeding areas to cut wood elsewhere from December through June if the nearby nest is active. This truly is vital to the success of future nesting attempts. Also ask FMYN Environmental staff to check for new roads that woodcutters may have made during the fall. If new roads are found prior to the breeding season then signs can be put up to keep vehicles from entering too close to a nest tree once nesting season has begun.
- 4) Coordinate interdisciplinary meetings and on-going communication between Nestwatchers, tribal entities such as the Environmental Department, law enforcement, FMD Adventures to share information and advice.
- 5) Due to the high volume of horseback riding tours through the Sycamore BA, outreach targeted to the wranglers/tour guides would be beneficial to provide accurate information to the public. A few times through the season, wranglers gave visitors incorrect bald eagle information or approached a resident bald eagle too closely. Outreach through the horseback tours office might support stewardship in the BA when Nestwatchers are not actively observing or during off-days.

- 6) Continue closure of any horse trail proximate to the Sycamore nest from December-June if the nest is active. Advise Fort McDowell Adventures Stables of this and notify them of any changes.
- 7) Consider providing Nestwatchers with laminated FMYN parking passes to place in their windshields when parked on the Nation. This would save law enforcement the time it takes them to stop and check our vehicles when we are out doing habitat surveys or observing from various OPs.

Goldfield

- 1) Continue posting and maintaining signage around the closure area throughout the breeding season, to aid the enforcement of the closure and to continue to educate the public.
- 2) Continue the education of local pilots, law enforcement, and military agencies about flight ceiling advisories in the vicinity of the breeding area.
- 3) We recommend future education of horse-riding groups about the closure and the need to respect the eagles' need for space, as our conversations with several of the tour operators led us to believe that they ignored the closure while leading horse-riding groups through the breeding area, and chose a course of action based on their own interpretation of eagle behavior.

Ladders

- 1) Consider placing a "No stopping" sign on the peninsula below the nest/OP where Chasm Creek connects to the Verde River. This was a common stopping/gathering point for kayak groups as they seemed to sometimes be unsure the actual boundary was further down at the Sycamore Canyon connection.

Luna

- 1) Establish closure boundaries for the south side breeding area, getting signs in place before the breeding season.
- 2) Repair the downed fence on the south side waterfowl closure at the water's edge.
- 3) All USFS projects impacting the Luna Lake Breeding Area should be discussed in advance with AZGFD Bald Eagle management team and Nest Watchers prior to implementation.
- 4) Luna Lake is a unique breeding area and the presence of Nest Watchers is of great benefit to the success of the resident breeding pair. Since recreational demands are constantly increasing, it is extremely important to remain proactive in establishing and implementing a well thought out management plan.

Orme and Granite Reef

- 1) Nestwatchers recommend that the barricades in place along the dirt road at the Orme nest be reinforced with sandbags and caution tape. This would ensure that they are not blown over by wind gusts, as well as deter people from moving the barricades to pass into the closure. It would also be helpful to have a sign saying that the area is closed to foot and vehicle traffic to prevent people from parking outside the barricades and walking into the closure, which was a common occurrence during the season. During the 2020 breeding

season, signs were placed on every barricade stating the purpose of the closure as well as giving alternative routes to get to the river. This deterred many members from moving the barricades in the first place and helped curb the amount of disturbances that occurred around the nest. Nestwatchers believe that due to the connection tribal members have with bald eagles, notifying them of the breeding area would be respected.

- 2) Restrictions in place during the Covid-19 pandemic prevented community outreach events designed to educate community members about bald eagles. In light of these safety protocols, it is recommended that educational materials that were once provided at in-person gatherings be made available online for community members to access. In addition, informational flyers can be made available at the entrance to the preserve for people to grab upon entering.
- 3) On several occasions throughout the breeding season, horseback riders from Phon D. Sutton caused significant disturbance to the Orme eagles by riding into the closure area. To combat this, we recommend communicating with local horseback riding tour leaders in order to inform them of the closure and safe ways to observe and photograph the eagles. Having signs installed behind the nest on the left side of the Verde river to inform hikers, fisherman, and horseback riders of the breeding area may also help in deterring disturbances.
- 4) Nestwatchers suggest that future biologists working in the Red Mountain Preserve are educated regarding the use of the non-emergency dispatch number for human disturbances around the nest. This will help mitigate issues of cultural sensitivity that arise between nestwatchers and community members, as well as increase the probability of contacting those causing the disturbance. During orientation and the first meeting at the field site, the differences between public interactions on tribal land as opposed to Forest Service land should be explored and reiterated. We also strongly recommend informing nestwatchers of potential hazards at the campsite, where non-emergency dispatch was called several times throughout the season. Nestwatchers believe that night patrol on weekend nights would help to control large parties that occur in the area. On several occasions during the 2021 season, nestwatchers experienced loud and unsettling partying, including the discharge of firearms, in the area immediately surrounding the nestwatchers designated campsite. This will ensure the safety of future nestwatchers as they camp during the months of the project.

Scholz Lake

- 1) Observations during the 2021 breeding season indicate that human activity may have more impact on the eagle's breeding effort than previously thought. Consider assigning nestwatchers to monitor the area in upcoming seasons to obtain enough comparative data on this impact.
- 2) Although we don't consider that a closure around the nest tree is necessary, given its distance to the lake, we believe some signage should be placed on both west and north shores stressing the importance of avoiding the northwest corner of the lake during the breeding season. Such signage must be officially supported with AZGFD and/or USFS logos and any relevant legislation, as the signs that currently exist are handmade, plain and do not seem to impose any attention from passersby.

- 3) Place fishing line and tackle disposal tubes. We collected a significant amount of both, especially around the south corner of the lake and parking lot.

Whiskey Spring (all BAs at Lake Pleasant)

- 1) The possible addition of a land-based sign at the southern side of the Whiskey Spring closure boundary indicating the area is closed from December to June for sensitive wildlife breeding habitat.
- 2) Increasing the size of the AZGFD logo on the side panel of the nestwatcher boat could help more readily identify the vessel as agency personnel when entering/exiting the closure or while approaching for closure violations.

Woods Canyon

- 1) Results from this season, and observations from the previous one, strongly indicate that it is necessary to establish a closure around the nest tree and adjacent area before Woods Canyon Lake and its recreational areas are open to the public for the season. During the 2020 breeding season, the lack of a closure around the nest area and the constant increase of human activity in the lake may have led the resident male (very likely a newcomer) to abandon the BA before the chick had fledged. During the 2021 season, nestwatchers arrived to Woods Canyon Lake right after it opened to the public and were able to observe the reactions of the resident adults to the sudden increase of human activity. The resident male, for sure a newcomer due to his apparent age, seemed to be the more affected by human presence too close to him or the nest, being easily flushed at the sight of approaching people and even abandoning the area at all if too pressed. The resident female, although much more tolerant, seemed affected when people walked too close to the nest and abandoned it when the activity lasted more than a few moments. The fact that the nest was located no more than 20 yards from one of the main trails that surrounds the lake, and that it may be reutilized during the next breeding season, adds up to the urgency of setting up a closure and/or close the section of the trail that runs just north of the nest area.
- 2) Drone activity at the lake and elsewhere was relatively frequent and is likely to keep increasing over the years. It will be helpful to post signage at the boat dock and campgrounds warning recreationists about flying drones near the eagle's nest (with updated nest and OP locations) and provide nestwatchers with current information about laws permitting (or not) flying drones inside the different recreational areas.
- 3) Add more or bigger fishing line and tackle disposal tubes. The ones already installed get filled quickly and are usually overflowing with that and other trash. One at the Spillway parking lot is especially needed.

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APPENDIX A: 2021 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 10. 2021 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	40	2	0	0	0
2	Little Colorado River	30	0	0	0	0
3	S. Fork LCR – Campground	79	0	0	0	0
4	Casa Malpais – LCR	240	0	0	0	0
5	Greer Lakes	90	1	1	0	0
6	Sponseller Lake	30	0	0	0	0
7	Mexican Hay Lake	90	0	0	0	0
8	White Mountain Hereford Ranch	90	0	0	0	0
9	The Ranch Lake	30	2	0	0	0
10	Ortega Lake	20	0	0	0	0
11	Concho Lake	40	1	0	0	0
12	Luna Lake	180	2	0	0	0
13	Nelson Reservoir	75	0	0	0	0
14	Nutrioso Reservoir	87	0	0	0	0
16	San Francisco River	180	0	0	0	0
Total		1,301	8	1	0	0
Cochise County						
18	Parker Canyon Lake	45	0	0	0	0
19	Willcox Playa	240	1	0	0	0
Total		285	1	0	0	0
Coconino County						
21	Long Lake Complex	178	4	1	0	0
22	Stoneman Lake	Not surveyed.				
23	FH-3	47	1	1	0	0
24	I-17, Section to Flagstaff	150	1	1	0	1
25	Bellemont	350	3	0	0	0
26	Townsend/Winona A/B	604	0	0	0	1
27	HWY 89 North /Sunset Crater – Wupatki	380	5	3	0	0
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	419	3	8	0	0
29	Continental Country Club Lakes	325	2	0	0	0
30	Chevelon Canyon Lake	166	0	1	0	0
32	Spring Valley Wash	Not surveyed.				
33	Red Lake Valley	Not surveyed.				
34	Kaibab Lake	Not surveyed.				
35	Pittman Valley	Not surveyed.				
36	Davenport Lake	Not surveyed.				
37	Scholz Lake	Not surveyed.				
38	Cataract Lake	Not surveyed.				
39	Willow Springs Lake	133	2	1	0	0
40	West Chevelon Canyon	135	0	0	0	0
41	Willow Creek	85	0	0	0	0
42	White Horse Lake – Pomeroy Tanks	Not surveyed.				

Table 10 continued.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
43	JD Dam Lake	Not surveyed.				
45	Steel/Stone Road	Not surveyed.				
48	Blue Stem Wash-Babbit property	66	0	0	0	0
49	Glen Canyon Nat'l Rec. Area (Lake Powell to Lee's Ferry)	Not surveyed.				
118	Bill Williams Loop Road	Not surveyed.				
119	Johnson Canyon	Not surveyed.				
120	Highway 64 east	8	0	0	0	0
121	Highway 64	14	0	0	0	0
122	Camp Navajo	215	0	0	0	0
123	Partridge Creek	Not surveyed.				
124	Odell Lake	50	1	1	0	0
125	Highway 87 north	21	1	0	0	0
126	Highway 180	140	0	0	0	0
Total		3,486	23	17	0	2
Gila County						
129	Buckhead Mesa landfill	40	8	2	0	0
Total		40	8	2	0	0
Graham County						
51	Point of Pines Lake area (ground)	Not surveyed.				
Mohave County						
57	Alamo Lake	115	2	0	0	0
Total		115	2	0	0	0
Navajo County						
58	Lake of the Woods	30	0	0	0	0
59	Rainbow Lake	40	10	0	0	0
61	Whipple Lake	25	0	0	0	0
62	Long Lake	80	0	0	0	0
63	Lone Pine Dam	Not surveyed.				
64	Schoens Reservoir	25	0	0	0	0
65	White Mountain Lake	75	1	1	0	0
67	Jacques Marsh	65	1	0	0	0
68	Scott's Reservoir	45	1	0	0	0
69	Show Low Lake	90	1	0	0	0
70	Pintail Lake	34	0	0	0	0
71	Telephone Lake	20	2	1	0	0
72	Fool Hollow Lake	105	0	0	0	0
75	Cottonwood Wash/ Clay Springs	35	0	0	0	0
76	White Lake	5	0	0	0	0
127	Mortenson Wash	60	0	0	0	0
Total		734	16	2	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	360	0	0	0	0
84	Oak Creek	500	2	0	0	0
85	Willow Lake	120	1	0	0	0

Table 10 continued.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
86	Lynx Lake	240	1	0	0	0
87	Watson Lake	250	2	2	0	0
88	Goldwater Lake	240	2	3	0	0
Total		1,710	8	5	0	0
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	330	2	1	0	0
Total		330	2	1	0	0

Table 11. 2021 Arizona bald eagle winter count helicopter survey results.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
90	Verde River	181	19	3	0	0
91	Lower East Verde River	8	0	0	0	0
92	Lower West Clear Creek	10	0	0	0	0
93	Lower Salt River	114	26	12	0	0
94	Upper Salt River	24	2	0	0	0
95	Lower Tonto Creek	18	4	0	0	0
97	Lower Canyon Creek	6	0	0	0	0
98	Lower Cibecue Creek	Not surveyed.				
100	White River	Not surveyed.				
101	North Fork White River	Not surveyed.				
102	Lower Black River	Not surveyed.				
103	Big and Little Bonito Creeks	Not surveyed.				
104	San Carlos River–Talkalai Lake	Not surveyed.				
105	San Carlos Reservoir	Not surveyed.				
106	Upper and Lower Gila River	Not surveyed.				
107	Eagle Creek	Not surveyed.				
108	Bonita Creek	Not surveyed.				
109	Lower San Francisco River	Not surveyed.				
110	Blue River	Not surveyed.				
111	Sunrise Lake	Not surveyed.				
112	Big Lake	Not surveyed.				
114	Crescent Lake	Not surveyed.				
115	Lake Pleasant	28	4	2	0	0
116	Del Rio Ponds	2	2	0	0	0
117	Tres Rios	22	5	0	0	0
128	Point of Pines aerial	Not surveyed.				
Total		413	62	17	0	0

Table 12. 2021 Arizona bald eagle winter count non-standardized survey route results.							
Route Number	Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
130	Cibola NWR	La Paz, Yuma	180	0	0	0	0
974	Glendale Recharge Ponds	Maricopa	195	0	0	0	0
976	West Clear Creek	Yavapai	180	1	0	0	2
977	Blue Ridge Reservoir	Coconino	55	0	0	0	0
986	Kachina Wetlands	Coconino	60	2	1	0	0
991	Clint's Well to Camp Verde	Coconino, Yavapai	66	0	0	0	0
Total			681	3	1	0	2

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: 2021 ARIZONA BALD EAGLE PRODUCTIVITY

Breeding Area	Status ¹	Nest ²	Incubation Date	Eggs ³	Hatch Date	Young	Fledge Date	Fledged
Alamo	S	9	<2/1	2	2/1-3/17	2	>4/14	1
Armer Gulch	U	All known nests empty. No eagles.						
Ashurst	S	3	<4/9	1	<4/9	1	>6/11	1
Bachelor Cove*	S	3	<1/7	2	1/7-3/16	2	4/30-5/5	2
Bartlett	O	All known nests empty. Pair of adults in area.						
Beaver	F	1	1/6-2/1	2	2/1-4/8	2	Failed 5/6-5/24	
Becker	S	2	<2/2	2	2/2-3/25	2	>5/7	2
Bill Williams	U	All known nests empty. One adult in area.						
Black Cross	O	All known nests empty. Pair of adults in area.						
Blue Point	F	10	<1/7	3	1/7-2/2	3	Failed 3/16-4/16.	
Box Bar*	F	5	<1/6	1			Failed by 3/15.	
Buckeye	F	3	1/6-1/18	1			Failed 2/1-2/16	
Bulldog	O	All known nests empty. Pair of adults in area.						
Burro Creek	U	All known nests empty. No eagles.						
Campaign Bay	U	No nests or eagles.						
Canyon De Chelly	A	3	<4/27	1	Active nest observed. Final status not confirmed.			
Cataract Lake	S	3	<6/9	2	<6/9	2	6/22, >6/23	2
Cedar Basin	S	9	<2/2	2	2/2-4/16	2	>5/7	2
Chevelon	S	5	<5/6	1	<5/6	1	>6/24	1
Cibecue	S	9	2/2-4/16	2	<4/16	2	>5/27	2
Cliff	U	No new nests. At least one adult in area.						
Coldwater	U	All known nests empty. No eagles.						
Cole's Bay*	O	All known nests empty. Pair of adults in area.						
Concho*	F	2	<2/2	1	Failed by 3/21.			
Coolidge	U	All known nests empty. One adult in area.						
Crescent*	O	All known nests empty. Pair of adults in area.						
Dogtown	S	3	<4/15	2	4/15-5/6	2	6/20-7/9	2
Doka	F	8	1/6-2/1	1	Failed 3/9-3/25.			
Eagle Mountain	S	1	<5/7	2	<5/7	2	6/18-6/25	1
East Verde	S	8	<1/6	1	2/1-3/17	1	4/21-5/6	1
Elaine	S	1	<2/11	2	2/11-4/1	2	>5/17	2
Fish Creek	S	1	<1/7	1	2/2-3/1	1	4/16-5/7	1
Fool Hollow*	S	4	1/15-1/22	1	1/22-3/5	1	5/23-5/28	1
Fort McDowell*	S	21	<1/6	2	1/6-2/8	2	4/7, 4/13	2
Gainey Ranch	S	3	1/4-1/8	1	1/8-2/10	1	5/8	1

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

²Nest 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. 2013-2020.

³Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 13 continued.								
Breeding Area	Status ¹	Nest ²	Incubation Date	Eggs ³	Hatch Date	Young	Fledge Date	Fledged
Garden Lakes	S	2	12/13-12/15	2	1/4-1/21	2	4/11-4/14	2
George's Basin	U	All known nests empty. No eagles.						
Gilbert	U	No nests or eagles reported.						
Goldfield*	S	5	<1/7	2	1/7-2/4	2	4/25-5/7	2
Granite Basin	U	All known nests empty. No eagles.						
Granite Reef*	F	7	<1/7	1	Failed 1/7-2/2.			
Green River	S	1	<1/6	2	2/1-3/17	2	>4/21	2
Greer Lakes	O	All known nests empty. Pair of adults in area.						
Horse Mesa	F	4	<1/7	2	Failed 3/1-3/16.			
Horseshoe	S	13	<2/1	2	2/1-3/17	2	>5/6	1
Ive's Wash	S	4	1/11-2/1	2	2/1-3/17	2	4/29-5/10, >5/10	2
Kachina Village	S	1	2/17-3/1	1	3/1-4/6	1	7/1	1
Kaibab Lake	S	8	<2/23	3	3/22-4/15	3	5/28-6/11, >6/11	3
Kerr*	F	3	3/10	1	Failed 4/21-4/29.			
Ladders*	F	3	1/6-2/1	2	2/1-3/8	2	Failed 4/4-4/8.	
Lone Pine	U	All known nests empty. No eagles.						
Lower Mary	S	5	2/17-3/3	2	3/3-4/9	2	>6/11	2
Luna*	F	2	2/11-3/13	1	4/5	1	4/11-4/16.	
Lynx	S	7	1/6-2/1	2	2/1-3/17	2	5/14-5/23, >5/23	2
Mohave	U	All known nests empty. No eagles.						
Needle Rock	U	No nests or eagles.						
Nevada Bay	S	1	<5/10	1	<5/10	1	>5/10	1
North Fields	S	1	<12/18	2	12/18- 1/28	2	4/18	2
Oak Creek	S	5	1/6-2/1	1	2/1-3/17	1	>5/18	1
Orme*	S	7	1/6-2/1	1	2/26-2/28	1	5/15-5/16	1
OW	O	All known nests empty. One adult in area.						
Pee Posh Wetlands	S	9	10/30-1/6	1	1/6-3/17	1	4/30	1
Perkinsville	U	All known nests empty. No eagles.						
Pinal	F	9	2/2-3/2	1	3/16-3/29	1	Failed 3/29-4/16.	
Pinto*	F	10	2/2-3/2	1			Failed by 4/16.	
Pleasant*	F	5	<1/6	1	Failed 1/6-2/1.			
			2/5-2/7	1	Failed 3/7.			
Rainbow	S	2	12/21-1/6	2	2/1-2/16	2	>4/21	2
Redmond	O	All known nests empty. Pair of adults in area.						

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

²Nest 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. 2013-2020.

³Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 13 continued.								
Breeding Area	Status ¹	Nest ²	Incubation Date	Eggs ³	Hatch Date	Young	Fledge Date	Fledged
Riverside Ruin	S	2	<1/4	2	1/4-2/11	2	4/21-4/28, 4/26	2
Rodeo*	S	6	<1/6	2	2/1-2/9	2	4/30-5/3	2
Saguaro	S	1	<1/7	1	2/2-3/16	1	>5/7	1
San Carlos	U	No nests or eagles.						
Scholz Lake*	S	1	<4/15	2	<4/15	2	6/20-7/11	1 + 1F ^Δ
		ΔFoster-fledged one young from Silver Creek BA.						
Seventy-six	S	7	1/7-2/2	1	2/2-3/16	1	>5/6	1
Sheep	S	8	1/7-2/2	1	2/2-3/16	1	2-Jun	1
Sheep Creek	O	All known nests empty. Pair of adults in area.						
Show Low Lake	S	1	2/8-2/25	2	3/1-4/2	2	6/25-6/26, 6/29	2
Silver Creek	S	3	<3/16	2	3/16-3/21	2 ^Δ	>6/10	1
		ΔOne young pre-fledged, was rescued and fostered to the Scholz BA.						
Suicide	S	1	<3/12	2	<3/12	2	>4/16	2
Sullivan Lake	S	3	<1/6	2	2/1-3/17	2	>4/21	1
Sycamore*	F	7	1/6-2/1	1	Failed by 3/25.			
Table Mountain	O	All known nests empty. Pair of adults in area.						
Talkalai	O	All known nests empty. Pair of adults in area.						
Tapco	F	6	1/6-2/1	2	Failed by 3/17.			
Tonto*	F	9	<1/7	2	2/2-3/16	2	Failed 3/19-3/21.	
Tortilla Creek	S	1	2/2-3/16	1	3/16-4/16	1	>5/27	1
Tremaine	S	2	<4/7	2	<4/7	2	>6/7	2
Two Bar	S	1	<1/7	2	1/7-3/1	2	>4/21	2
Water Nest	F	1	<5/7	1	<5/7	1	Failed 5/7-6/18.	
Whiskey Spring*	F	2	2/19	1	Failed 2/23.			
White Horse	U	All known nests empty. One adult in area.						
Woods Canyon*	F	14	<4/1	1	Failed 4/23.			
Yellow Cliffs	F	1	1/6-2/1	1	2/1-3/17	1	Failed 3/17-4/21.	

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

²Nest 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. 2013-2020.

³Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

APPENDIX D: NEST SURVEY RESULTS

Table 14. Results of the 2021 bald eagle winter count, ORA, and nest survey flights (continued next page).		
Location	Time	Comments
January 6, 2021		
Orme BA	0837	All known nests empty. Pair of adults by river.
Rodeo BA	0840	Adult incubating in nest #6.
Sycamore BA	0845	All known nests empty. No eagles.
Doka BA	0851	All known nests empty. One adult perched.
Fort McDowell BA	0859	Adult incubating in new nest #21.
Box Bar BA	0903	Pair of adults in nest #5, one appeared to be incubating.
Needle Rock BA	0904	No new nests or eagles.
Bartlett BA	0908	All known nests empty. Pair of adults perched at lake.
Yellow Cliffs BA	0921	All known nests empty. No eagles.
Sheep Creek BA	0934	All known nests empty. One adult perched.
Cliff BA	0938	No new nests. No eagles.
Horseshoe BA	0950	Nests #17 empty, #18 not seen. No eagles.
Table Mountain BA	1004	All known nests empty. No eagles.
East Verde BA	1014	Adult incubating in nest #8.
East Verde River	1020	No new nests. No eagles.
Coldwater BA	1031	All known nests empty. No eagles.
Ladders BA	1044	All known nests empty. No eagles.
West Clear Creek	1049	No new nests or eagles.
Beaver BA	1229	All known nests empty. No eagles.
Oak Creek BA	1238	New large nest #5 in tree. No eagles.
Green River BA	1244	One adult in nest #1 standing with at least one egg.
Tapco BA	1252	All known nests empty. No eagles.
Tower historic BA	1258	All known nests empty. No eagles.
Sycamore Canyon	1300	No new nests. No eagles.
Mormon Pocket golden eagle BA	1307	All known nests empty. No eagles.
Perkinsville BA	1308	All known nests empty. No eagles.
Hell Point golden eagle BA	1319	All known nests empty. No eagles.
Muldoon nest site	1324	All known nests empty. No eagles.
Granite golden eagle BA	1325	All known nests empty. No eagles.
Sullivan Lake BA	1332	Adult incubating in new nest #3. Second adult perched.
Lynx BA	1421	All known nests empty. No eagles.
Pleasant BA	1443	Adult incubating in nest #5.
Whiskey Spring BA	1445	Pair of adults standing in nest #2. No eggs.
Cole's Bay BA	1454	All known nests empty. No eagles.
Rainbow BA	1532	Adult incubating in nest #2.
Buckeye BA	1534	Pair of adults perched in nest #3 tree.
Pee Posh Wetlands BA	1549	Adult incubating in new nest #9.
January 7, 2021		
Granite Reef BA	0807	Adult incubating in nest #7.
Kerr BA	0811	No new nests. Pair of adults perched at Coon Bluff.
Goldfield BA	0814	Adult incubating in new nest #5. Nest #4 fallen.
Bulldog BA	0823	All known nests empty. No eagles. New nest #4 found, empty.
Blue Point BA	0831	Adult incubating in nest #10.
Bagley historic BA	0836	All known nests empty. No eagles.

Table 14 continued.		
Location	Time	Comments
Saguaro BA	0839	Adult incubating in nest #1.
Tortilla Creek BA	0847	One adult standing in nest #1. No eggs. Second adult perched.
Black Cross BA	0851	One adult standing in nest #1. No eggs.
Fish Creek BA	0856	Adult incubating in nest #1. Second adult perched.
Horse Mesa BA	0859	Adult standing in nest #4 with two eggs.
Two Bar BA	0909	Adult incubating in nest #1.
Pinto BA	0922	All known nests empty. One adult perched in nest #10 tree.
Pinal BA	0924	Two adults at nest #9. No eggs.
Redmond BA	0930	All known nests empty. No eagles.
Canyon historic BA	0950	No new nests or eagles.
76 BA	1051	All known nests empty. New nest #7 found, empty. One adult perched. Second adult flying.
Sheep BA	1102	Nest #7 fallen. New nest #8 found, empty. One adult perched.
Tonto BA	1107	Adult incubating in nest #9. Nest #7 fallen.
Bachelor Cove BA	1113	Adult incubating in new nest #3. Second adult flying.
Armer Gulch BA	1126	No new nest or eagles.
Salome Creek	1132	No new nest or eagles.
February 1, 2021		
Riverside BA	0754	Adult incubating in nest #2.
Orme BA	0803	Adult incubating in nest #7.
Rodeo BA	0805	Adult incubating.
Sycamore BA	0808	Adult incubating in nest #7.
Doka BA	0813	Adult incubating in nest #8.
Fort McDowell BA	0816	Adult incubating or brooding.
Box Bar BA	0819	Adult incubating in nest #5.
Bartlett BA	0822	All known nests empty. Pair of adults perched.
Yellow Cliffs BA	0829	Adult incubating in nest #1.
Sheep Creek BA	0831	All known nests empty. No eagles.
Cliff BA	0847	No new nests or eagles.
Horseshoe BA	0850	Adult incubating in nest #13.
Table Mountain BA	0904	All known nests empty. Pair of adults perched.
East Verde BA	0908	Adult incubating.
Fossil Creek	0910	No new nests or eagles.
Coldwater BA	0921	All known nests empty. No eagles.
Ladders BA	0927	Adult incubating in nest #3.
Beaver BA	0938	Adult incubating in nest #1.
Oak Creek BA	0945	Adult incubating in nest #5.
Hidden Valley nest site	0945	All known nests empty. No eagles.
Green River BA	1046	Adult incubating. Second adult upstream.
Tapco BA	1050	Adult incubating in nest #6.
Tower historic BA	1056	All known nests empty. No eagles.
Mormon Pocket golden eagle BA	1103	All known nests empty. Two adult bald eagles perched downstream.
Perkinsville BA	1105	All known nests empty. No eagles.
Hell Point golden eagle BA	1117	All known nests empty. No eagles.
Muldoon nest site	1125	All known nests empty. No eagles.
Granite golden eagle BA	1128	All known nests empty. No eagles.
Sullivan Lake BA	1131	Adult incubating.
Goldwater Lake	1145	One immature bald eagle. No nests.

Table 14 continued.		
Location	Time	Comments
Lynx BA	1151	Adult incubating in nest #7.
Santa Maria River	1305	No nests or eagles.
Big Sandy River	1310	No nests or eagles.
Alamo BA	1318	Adult incubating in new nest #9.
Ive's Wash BA	1321	Adult incubating in nest #4.
Cole's Bay BA	1357	All known nests empty. No eagles.
Whiskey Spring BA	1401	All known nests empty. No eagles.
Pleasant BA	1405	One adult standing in nest #5. No eggs or young.
Rainbow BA	1423	Adult incubating. Second adult perched.
Buckeye BA	1425	Adult incubating.
Pee Posh Wetlands BA	1434	Adult incubating or brooding.
Garden Lakes BA	1440	Adult standing in nest #2 with at least one nestling, 10 days old.
February 2, 2021		
Granite Reef BA	0826	Nest empty, failed.
Kerr BA	0828	All known nests empty. One adult perched.
Goldfield BA	0833	Adult incubating or brooding.
Bulldog BA	0840	All known nests empty. Two adults in area.
Blue Point BA	0848	Adult with at least one small nestling, 1-2 weeks old. Second adult flew to nest.
Saguaro BA	0851	Adult incubating.
Tortilla Creek BA	0857	Adult standing in nest #1. No eggs or young.
Black Cross BA	0902	Two adults standing at nest #1. No eggs or young.
Fish Creek BA	0906	Adult incubating or brooding.
Horse Mesa BA	0915	Adult incubating or brooding.
Two Bar BA	0923	Adult in nest #1 possibly brooding young.
Bachelor Cove BA	0927	Adult incubating or brooding.
Tonto BA	0932	Adult incubating.
Sheep BA	0939	Adult incubating in nest #8.
76 BA	0947	Adult incubating in nest #7.
Cibecue Crossing nest site	1146	All known nests empty. No eagles.
Cibecue BA	1150	All known nests empty. One adult perched.
Mule Hoof historic BA	1157	All known nests empty. No eagles.
Cedar Basin BA	1215	Adult incubating in nest #9.
Lone Pine BA	1219	All known nests empty. No eagles.
Pineasco Creek nest site	1232	All known nests empty. No eagles.
George's Basin BA	1236	All known nests empty. No eagles.
Crescent BA	1300	All known nests empty. Two adults perched.
Greer Lakes BA	1308	All known nests empty. No eagles.
Becker BA	1316	Adult incubating in nest #2.
Concho BA	1331	Adult incubating in nest #2.
Silver Creek BA	1440	All known nests empty. Pair of adults perched.
Fool Hollow BA	1453	Adult incubating in new nest #4.
Show Low BA	1458	All known nests empty. No eagles.
Redmond BA	1533	Pair of adults standing in nest #5.
Pinal BA	1538	All known nests empty. Two adults perched.
Pinto BA	1544	All known nests empty. No eagles.
February 23, 2021		
Kaibab Lake BA	1245	Adult incubating in nest #8.

Table 14 continued.		
Location	Time	Comments
March 1, 2021		
Two Bar BA	1010	Adult with at least one nestling, 3.5-4 weeks old.
Rock Creek historic BA	1017	No new nests or eagles.
Horse Mesa BA	1047	Adult incubating or brooding.
Fish Creek BA	1057	Adult with at least one nestling, 1-2 weeks old.
March 2, 2021		
Pinal BA	1130	Adult incubating in nest #9.
Pinto BA	1133	Adult incubating in nest #10.
March 3, 2021		
OW BA	1000	All known nests empty. One adult flying.
Yellow Cliffs BA	1255	Adult brooding at least one small nestling. Second adult flying.
March 16, 2021		
Granite Reef BA	1020	All known nests empty. No eagles.
Kerr BA	1023	Adult incubating in nest #3.
Goldfield BA	1026	Two nestlings, 4.5-5 weeks old.
Bulldog BA	1030	All known nests empty. One near-adult and one subadult flying.
Blue Point BA	1037	One adult with three nestlings, 7-8 weeks old.
Bagley historic BA	1040	All known nests empty. No eagles.
Saguaro BA	1041	Adult with one nestling, 5.5 weeks old.
Tortilla Creek BA	1044	Adult incubating in nest #1.
Black Cross BA	1047	All known nests empty. No eagles.
Fish Creek BA	1053	Adult with at least one nestling, 3 weeks old.
Horse Mesa BA	1057	Nest empty, failed.
Two Bar BA	1100	Adult with two nestlings, 6-6.5 weeks old.
Bachelor Cove BA	1104	Two nestlings, 5-5.5 weeks old. One adult perched.
Pinto BA	1113	Adult incubating in nest #10.
Pinal BA	1115	Adult incubating in nest #9.
Redmond BA	1119	All known nests empty. No eagles.
Cherry Creek	1120	No nests or eagles.
Silver Creek BA	1327	Adult incubating in nest #3.
Fool Hollow BA	1340	Adult brooding at least one nestling.
Show Low BA	1346	Adult incubating in nest #1.
Cooley Lake	1350	Pair of adults flying. No nests.
Boot Lake	1352	No nests or eagles.
76 BA	1522	Adult with one nestling, 1-2 weeks old.
Sheep BA	1530	Adult with one hatchling, 1 week old.
Tonto BA	1534	Adult with two nestlings, 4-4.5 weeks old.
March 17, 2021		
Riverside BA	0754	Two nestlings, 7 weeks old.
Orme BA	0803	Adult brooding young.
Rodeo BA	0808	Two nestlings, 5-6 weeks old. One adult perched.
Sycamore BA	0817	Adult incubating.
Doka BA	0825	Adult incubating.
Fort McDowell BA	0827	Two nestlings, 7 weeks old.
Box Bar BA	0831	One egg in nest, unattended. One near-adult flew to nest tree.
Bartlett BA	0837	All known nests empty. Two adults and two immatures flying.
Yellow Cliffs BA	0845	Adult with one nestling, 1-2 weeks old. Second adult perched.
Sheep Creek BA	0849	All known nests empty. No eagles.
Cliff BA	0857	No nests or eagles.

Table 14 continued.		
Location	Time	Comments
Horseshoe BA	0906	Adult with two nestlings, 3 weeks old.
Table Mountain BA	0915	All known nests empty. Pair of adults perched downstream.
East Verde BA	0920	One nestling, 4.5 weeks old.
Coldwater BA	0927	All known nests empty. No eagles.
Ladders BA	0935	Adult with at least one nestling, 1-2 weeks old.
Beaver BA	0940	Adult incubating or brooding.
Oak Creek BA	0952	Adult with at least one nestling, 1-2 weeks old.
Hidden Valley nest site	0955	All known nests empty. No eagles.
Green River BA	1106	Adult with two nestlings, 4-4.5 weeks old.
Tapco BA	1111	Adult incubating.
Tower historic BA	1115	All known nests empty. No eagles.
Mormon Pocket golden eagle BA	1122	All known nests empty. Pair of golden eagles perched at a new large nest #3.
Perkinsville BA	1125	All known nests empty. No eagles.
Hell Canyon	1140	No nests or eagles.
Hell Point golden eagle BA	1147	All known nests empty. No eagles.
Muldoon nest site	1152	All known nests empty. No eagles.
Granite golden eagle BA	1157	All known nests empty. No eagles.
Sullivan Lake BA	1202	Two nestlings, 4-4.5 weeks old.
Lynx BA	1215	Adult with at least one nestling, 2 weeks old.
Watson golden eagle BA	1225	All known nests empty. No eagles.
Burro Creek	1356	No nests or eagles.
Burro Creek BA	1400	All known nests empty. No eagles.
Alamo BA	1415	Two nestlings, 7 weeks old. Two adults flying.
Ive's Wash BA	1420	Adult with two nestlings, 4 weeks old. Second adult flew to nest.
Pleasant BA	1455	All known nests empty. One immature flying.
Whiskey Spring BA	1500	Pair of adults perched. No eggs or young.
Cole's Bay BA	1502	One adult flew from nest. No eggs or young.
Rainbow BA	1528	Adult with two nestlings, 4.5 weeks old.
Buckeye BA	1530	All known nests empty. No eagles.
Pee Posh Wetlands BA	1537	Adult with one nestling, 5.5 weeks old.
Garden Lakes BA	1542	Two nestlings, 8+ weeks old.
March 22, 2021		
Kaibab Lake BA	1050	Adult incubating.
March 29, 2021		
Redmond BA	1138	All known nests empty. No eagles.
Pinal BA	1205	Adult brooding at least one small nestling.
Pinto BA	1208	Adult incubating.
March 30, 2021		
Granite Basin BA	0949	All known nests empty. No eagles.
March 31, 2021		
Tonto BA	0840	Nest empty, failed.
Sheep BA	0844	Adult with one nestling, 3 weeks old. Second adult perched.
OW BA	0946	Adult standing in nest #2, no eggs or young.
April 16, 2021		
Kerr BA	0840	Adult incubating.
Goldfield BA	--	Two nestlings, 9.5-10 weeks old.
Bulldog BA	--	All known nests empty. No eagles.

Table 14 continued.		
Location	Time	Comments
Blue Point BA	--	All known nests empty. No eagles.
Bagley historic BA	--	All known nests empty. No eagles.
Saguaro BA	0857	Adult with one nestling, 9.5-10 weeks old. Second adult perched.
Tortilla Creek BA	0902	One nestling, 4 weeks old.
Black Cross BA	0906	All known nests empty. No eagles.
Fish Creek BA	0910	One nestling, 9-9.5 weeks old.
Two Bar BA	0918	Two nestlings, 10+ weeks old.
Bachelor Cove BA	0923	Two nestlings, 9.5 weeks old.
Tonto BA	0924	All known nests empty. No eagles.
Sheep BA	0929	Two adults, nestling not seen.
76 BA	0939	One nestling, 6 weeks old.
Pinto BA	0958	Adult incubating.
Pinal BA	1000	Nest empty, failed.
Redmond BA	--	All known nests empty. No eagles.
Fool Hollow BA	--	One nestling, 6 weeks old.
Cibecue Crossing nest site	--	All known nests empty. No eagles.
Cibecue BA	1148	One nestling, 4 weeks old in nest #9.
Mule Hoof historic BA	--	All known nests empty. No eagles.
Cedar Basin BA	1201	Two nestlings, 7+ weeks old.
Lone Pine BA	--	All known nests empty. No eagles.
Pineasco Creek nest site	--	All known nests empty. No eagles.
George's Basin BA	1219	All known nests empty. No eagles.
Crescent BA	--	All known nests empty. No eagles.
Greer Lakes BA	--	Ospreys incubating in nests #8-9. All other nests empty. No eagles.
Becker BA	1301	Two nestlings,
Silver Creek BA	1330	Two nestlings, 4 weeks old.
Show Low BA	1431	Two nestlings, 2.5-3 weeks old.
Talkalai BA	1517	New nest #10. No eagles.
San Carlos BA	--	No new nests. No eagles.
Suicide BA	1534	Two nestlings, 11 weeks old.
Coolidge BA	1537	All known nests empty. One adult in area.
April 21, 2021		
Riverside BA	0754	Two nestlings, 12 weeks old. One adult perched.
Kerr BA	0801	Adult incubating. Second adult perched.
Orme BA	0802	One nestling, 7+ weeks old.
Rodeo BA	0804	Two nestlings, 10-11 weeks old, branching.
Bartlett BA	0810	All known nests empty. No eagles.
Yellow Cliffs BA	0825	Nest empty, failed.
Sheep Creek BA	0830	All known nests empty. One immature downstream.
Horseshoe BA	0837	One nestling, 8 weeks old.
East Verde BA	0844	One nestling, 9.5 weeks old. One adult perched.
Beaver BA	0854	One nestling, 6 weeks old.
Oak Creek BA	0900	Adult with one nestling, 7 weeks old.
Kachina BA	0912	One nestling, 2-3 weeks old. One adult perched.
Elaine BA	0918	Adult with two nestlings, 5-5.5 weeks old.
Lower Lake Mary BA	0925	Adult brooding at least one nestling, 2 weeks old.
Ashurst BA	0931	Adult incubating or brooding in nest #3.

Table 14 continued.		
Location	Time	Comments
Green River BA	1040	Two nestlings, 9-10 weeks old.
Tapco BA	1044	Two eggs in nest, unattended. Failed.
Mormon Pocket golden eagle BA	1050	All known nests empty. No eagles.
Perkinsville BA	1054	All known nests empty. No eagles.
Granite golden eagle BA	1100	All known nests empty. No eagles.
Sullivan Lake BA	1113	One nestling, 9-10 weeks old.
Lynx BA	1125	Two nestlings, 7-8 weeks old.
Pleasant BA	1145	All known nests empty. One adult perched. One immature flying.
Whiskey Spring BA	1149	All known nests empty. Pair of adults perched near nest #1.
Cole's Bay BA	1151	All known nests empty. No eagles.
Rainbow BA	1112	Two nestlings, 9.5-10 weeks old. Adult perched.
Pee Posh Wetlands BA	1222	One nestling, 10-11 weeks old.
May 6, 2021		
Sheep BA	0802	Adult with one nestling, 7 weeks old.
76 BA	0810	One nestling, 9.5-10 weeks old. One adult perched.
Christopher Creek nest site	0828	Osprey incubating in nest #1.
OW BA	0839	All known nests empty. One adult perched. Active osprey nest found nearby.
Black Canyon Lake	0850	No nests or eagles.
Willow Springs Lake	0901	Ospreys incubating in nest #4-6, 9-12. Nests #2, 7-8 not found.
Woods Canyon nest site	0912	Osprey incubating in nest #6 and new nests #15-16. New large nest #17 also found. Nest #7 not found. No eagles.
Woods Canyon BA	0918	All known nests empty. No eagles.
Chevelon BA	0925	Adult in nest #5 brooding one nestling, 3.5-4 weeks old.
Bear Canyon Lake	0937	Ospreys incubating in nests #5-6. Nest #3 not found. New large nest #7 found in snag.
Knoll Lake	0948	Osprey incubating in nest #6. Nests #5,7 not found. One adult bald eagle flying.
Blue Ridge Reservoir	1052	Osprey incubating in nest #8. Nest #9 not found. Nest #7 empty. Osprey perched by new large nest #10.
Tremaine BA	1111	Two nestlings, 5-6 weeks old, in nest #2. One adult perched.
Ashurst BA	1124	One nestling, 4.5 weeks old. One adult flew to nest tree.
Lower Lake Mary BA	1130	Adult with two nestlings, 4-4.5 weeks old. Second adult flying.
Elaine BA	1136	Two nestlings, 8 weeks old.
Kachina BA	1140	Adult with one nestling, 4+ weeks old.
White Horse Lake BA	1155	Osprey incubating in nest #8. Nest #6 empty. One adult bald eagle perched.
Sunflower Flat nest site	1203	Nest #1 not found.
Dogtown BA	1208	Adult with one nestling, 3 weeks old.
Kaibab Lake BA	1212	One adult with three nestlings, 4-5 weeks old.
Sullivan Lake BA	1241	One nestling, 11-12 weeks old.
Green River BA	1256	One nestling in nest, 11-12 weeks old. One fledgling in nest tree.
Oak Creek BA	1405	Adult with one nestling, 9 weeks old.
Beaver BA	1412	One nestling, 7.5 weeks old.
East Verde BA	1428	Nest empty, presumed fledged.
Horseshoe BA	1440	One nestling, 10 weeks old.
May 7, 2021		
Kerr BA	0743	Nest empty, failed.

Table 14 continued.		
Location	Time	Comments
Goldfield BA	0745	Nest empty, presume fledged. One adult perched upstream.
Blue Point BA	0750	Nest empty. One adult perched at lake.
Saguaro BA	0800	One nestling, 12+ weeks old.
Tortilla Creek BA	0804	Adult with one nestling, 6.5 weeks old.
Fish Creek BA	0808	Nest empty, presume fledged.
Cibecue BA	0954	Adult with one nestling, 7 weeks old.
Cedar Basin BA	1005	Two nestlings, 10+ weeks old.
North Fork White River	1015	Ospreys incubating in two new large nests, #1-2.
Woolsey Lake	1025	No nests or eagles.
Reservation Lake	1040	No nests or eagles.
Crescent Lake BA	1047	All known nests empty. No eagles.
Lee Valley Reservoir	1058	No nests or eagles.
Eagle Mountain BA	1106	Adult in new nest #1 with two nestlings, 4 weeks old.
Horseshoe Cienega	1110	Ospreys incubating in nests #1, 5-6. New large nests #7 and #8 found. One adult bald eagle flying.
Water Nest BA	1130	Adult with one nestling, 2.5 weeks old in new large nest #1. Second adult flying. New large nest #2 found.
Cooley and Boot Lakes	1145	No nests or eagles.
Show Low BA	1150	Adult with two nestlings, 4.5 weeks old.
Silver Creek BA	1253	Two nestlings, 7 weeks old.
Becker BA	1321	Two nestlings, 9.5 weeks old.
Nelson Reservoir	1330	Pair of adults flying. No new nests.
Greer Lakes BA	1348	Ospreys incubating in nests #8-9. All other known nests empty. New large nest #10 found. Adult bald eagle flying.
May 10, 2021		
Horsethief Basin	0850	No nests or eagles.
Black Canyon BA	1127	All known nests empty. No eagles.
Nevada Bay BA	1212	One nestling, 11+ weeks old.
Mohave BA	1303	All known nests empty. No eagles.
Whipple Mountains BA (CA)	1427	Pair of adults flying. All known nests empty. Two new large nests (#2-3) found.
Bill Williams BA	1500	All known nests empty. New large nest #4 found. No eagles.
May 27, 2021		
Tortilla Creek BA	0832	One nestling, 10+ weeks old.
Sheep BA	1306	One nestling, 10 weeks old. Two adults perched.

APPENDIX E: BACHELOR COVE BREEDING AREA SUMMARY

Table 15. Observed human activity and bald eagle behavior, Bachelor Cove BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Vehicle	80	173	1	--	--	36	17	307	57.8
Angler	19	9	--	--	--	8	--	36	6.8
Fishing boat	21	8	--	--	--	3	--	32	6.0
Hiker	4	13	--	--	--	3	2	22	4.1
Dog	6	13	--	--	--	1	--	20	3.8
OHV	5	12	--	--	--	1	--	18	3.4
Bicyclist	6	6	--	--	--	3	2	17	3.2
Picnicker	6	11	--	--	--	--	--	17	3.2
Motorcycle	2	8	--	--	--	3	3	16	3.0
Military jet	--	3	4	--	--	2	4	13	2.4
Canoe/kayak	6	1	--	--	--	--	--	7	1.3
Small plane	3	1	--	--	--	--	--	4	0.8
USFS personnel	1	2	--	--	--	1	--	4	0.8
Camper	3	--	--	--	--	--	--	3	0.6
Helicopter	1	--	--	--	--	1	--	2	0.4
Metal detector	2	--	--	--	--	--	--	2	0.4
Military helicopter	--	2	--	--	--	--	--	2	0.4
Paddleboard	--	--	--	--	--	2	--	2	0.4
Photographer	--	2	--	--	--	--	--	2	0.4
RV	--	--	--	--	--	2	--	2	0.4
Fire seaplane	--	1	--	--	--	--	--	1	0.2
Nestwatcher	--	--	--	--	--	--	1	1	0.2
Runner	--	1	--	--	--	--	--	1	0.2
Total	165	266	5	--	--	66	29	531	

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

Table 16. Observed forage events and success, Bachelor Cove BA, Arizona, 2021.

Sex	Fish		Birds		Mammals		Unknown		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U	E	S-U
Male	4	4-0	1	0-1	--	--	4	1-3	9	5-4
Female	--	--	--	--	1	0-1	--	--	1	0-1
Unknown	1	1-0	--	--	--	--	3	0-3	4	1-3
Total	5	5-0	1	0-1	1	0-1	7	1-6	14	6-8

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 17. Observed prey types delivered to the nest, Bachelor Cove BA, Arizona, 2021.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	66	3	2	20	91	74.5
Female	17	1	--	5	23	18.9
Unknown	6	--	1	1	8	6.6
Total	89	4	3	26	122	
Percent	73.0	3.3	2.5	21.3		

Sex	Fish				Bird	Mammal	Total	Percent
	CC ¹	SF	BA	BC	AC	RA		
Male	13	6	2	1	1	1	24	70.6
Female	4	1	3	--	--	--	8	23.5
Unknown	1	--	--	--	1	--	2	5.9
Total	18	7	5	1	2	1	34	
Percent	52.9	20.6	14.7	2.9	5.9	2.9		

¹CC=channel catfish, SF=sunfish species, BA=bass species, BC=black crappie, AC=American coot, RA=rabbit species.

Lake km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
76.5	HS	Right	No	8	RS	UP
82.0	BA	Right	No	1	RS	UP
82.1	SO	Right	No	0	RS	SO
82.2	SO	Right	No	0	RS	SO
82.3	BO	Right	No	6	RC	UP
82.3	HL	Right	No	5	RC	UP
82.3	HL	Right	No	5	RS	UP
82.3	CT	Right	No	5	RS	UP
82.3	SS	Right	No	6	RS	UP
82.3	HS	Right	No	6	RS	UP
82.3	SS	Right	No	8	RC	UP
82.3	HS	Right	No	0	RS	SO
82.4	HS	Right	No	6	RC	UP
82.4	RI	Right	No	6	RC	UP
82.4	HS	Right	No	8	RC	UP
82.5	CT	Right	Partial	7	RC	UP
82.5	CF	Right	No	8	RC	UP
82.5	CF	Right	Partial	7	RC	UP
82.5	HL	Right	No	8	RC	UP
82.5	HS	Right	Yes	8	RC	UP
82.5	CL	Right	Partial	8	RC	UP
82.5	CS	Right	No	7	RC	UP
82.5	CF	Right	Yes	7	RC	UP
82.5	HS	Right	Yes	7	RC	UP
82.5	CT	Right	No	7	RC	UP
82.5	SO	Right	Partial	0	RC	SO
82.5	BO	Right	Partial	7	RC	UP
82.5	SS	Right	Partial	7	RC	UP
82.5	HL	Right	No	8	RC	UP
82.5	SS	Right	Partial	7	RC	UP
82.5	RI	Right	No	8	RC	UP
82.6	HL	Right	No	7	RC	UP

¹Lake kilometer.

²BA=cut back, BO=boulder, CF=cliff face, CL=cottonwood large (>20m), CS= cottonwood small (<10m), CT=cliff top, HL=hillside, HS=hard snag (dead, main branches only), PT=pinnacle top, RI=ridge, SO=shoreline, SS=soft snag (dead, but branches still intact).

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove, RS=reservoir main body.

⁵SO=shoreline, UP=desert upland.

Table 19 continued.

Lake km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
82.6	HS	Right	No	6	RC	UP
82.6	HS	Right	No	6	RC	UP
82.6	BO	Right	No	6	RC	UP
82.6	SS	Right	No	6	RC	UP
82.6	HL	Right	No	6	RC	UP
82.7	HS	Right	No	5	RC	UP
82.7	RI	Right	No	7	RC	UP
82.7	HL	Right	No	6	RC	UP
82.8	HL	Right	Yes	7	RC	UP
83.5	HS	Right	No	4	RS	UP
83.5	PT	Right	No	3	RS	UP
83.5	PT	Right	No	3	RS	UP

¹Lake kilometer.

²BA=cut back, BO=boulder, CF=cliff face, CL=cottonwood large (>20m), CS= cottonwood small (<10m), CT=cliff top, HL=hillside, HS=hard snag (dead, main branches only), PT=pinnacle top, RI=ridge, SO=shoreline, SS=soft snag (dead, but branches still intact).

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove, RS=reservoir main body.

⁵SO=shoreline, UP=desert upland.

Table 20. Bald eagle habitat use at the Bachelor Cove BA, Arizona, 2021.

Lake km ¹	PW ^{2,3}	PP	PE	PG	PH	CL	PV	GM	PD	PK	OT	Total	Percent
76.5	--	--	--	--	10	--	--	--	--	--	--	10	0.1
82.0	3	--	--	--	--	--	--	--	--	--	--	3	<0.1
82.1	--	--	--	--	--	--	--	--	--	--	3	3	<0.1
82.2	--	--	--	--	2	--	--	--	--	--	--	2	<0.1
82.3	2,813	181	--	6	1	69	22	1	26	10	6	3135	44.3
82.4	923	24	54	7	--	30	21	--	--	--	--	1,059	15.0
82.5	1,036	54	145	133	3	35	18	19	--	16	--	1,459	20.6
82.6	356	73	--	31	--	3	9	5	5	--	--	482	6.8
82.7	171	59	--	--	--	--	24	6	--	--	1	261	3.7
82.8	--	--	--	--	--	--	--	15	--	--	--	15	0.2
83.5	518	3	5	--	122	--	--	--	--	--	--	648	9.2
Total	5,820	394	204	177	138	137	94	46	31	26	10	7,077	
Percent	82.2	5.6	2.9	2.5	1.9	1.9	1.3	0.6	0.4	0.4	0.1		

¹Lake kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening, PE= perched eating, PG=perched on ground, PH=perched hunting, CL=perched close to mate, PV= perched vocalizing, GM=gathering nest material, PD= perched drying, PK=perched with prey, OT=other (perched interaction, drinking water, copulating).

APPENDIX F: BOX BAR BREEDING AREA SUMMARY

Table 21. Observed human activity and bald eagle behavior, Box Bar BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Hiker	282	--	--	--	--	--	--	282	64.1
Canoe/Kayak	44	--	--	--	--	--	--	44	10.0
Photographer	35	--	--	--	--	--	--	35	8.0
Horse Back Rider	25	--	--	--	--	--	--	25	5.7
Birder	17	--	--	--	--	--	--	17	3.9
Fisherman	14	--	--	--	--	--	--	14	3.2
Cyclor	10	1	--	--	--	--	--	11	2.5
Camper	3	--	--	--	--	--	--	3	0.7
Drone	1	1	--	--	--	--	--	2	0.5
Gunshot	--	--	2	--	--	--	--	2	0.5
Hunter	2	--	--	--	--	--	--	2	0.5
Runner	2	--	--	--	--	--	--	2	0.5
USFS staff	1	--	--	--	--	--	--	1	0.2
Total	436	2	2	--	--	--	--	440	

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

Table 22. Bald eagle habitat analysis at the Box Bar BA, Arizona, 2021.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
25.4	CL	Right	No	2	RU	CW
25.5	CL	Right	Partial	2	RU	CW
25.5	CL	Right	No	2	RU	CW
25.8	CL	Right	No	3	RU	CW

¹River kilometer.

²CL=cottonwood large (>20m).

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RU=run.

⁵CW=cottonwood grove.

Table 23. Bald eagle habitat use at the Box Bar BA, Arizona, 2021.

Lake km ¹	PW ^{2,3}	PI	PP	PV	Total	Percent
25.4	8	--	--	--	8	0.7
25.5	478	199	67	54	798	68.6
25.8	247	99	10	1	357	30.7
Total	733	298	77	55	1,163	
Percent	63.0	25.6	6.6	4.7		

¹Lake kilometer.

²Observation time (minutes).

³PW=perched watching, PI=perched interaction, CL=perched close to mate, PP=perched preening, PV= perched vocalizing.

APPENDIX G: CONCHO BREEDING AREA SUMMARY

Table 24. Observed human activity and bald eagle behavior, Concho BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Hikers	16	--	--	2	--	--	--	18	45.0
Dog Walkers	18	--	--	--	--	--	--	18	45.0
Kayakers	2	--	--	--	--	--	--	2	5.0
Fisherman	1	--	--	--	--	--	--	1	2.5
Military Plane	1	--	--	--	--	--	--	1	2.5
Total	38	--	--	2	--	--	--	40	

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

Table 25. Observed forage events and success, Concho BA, Arizona, 2021.

Sex	Fish		Mammals		Birds		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U
Male	3	0-3	2	0-2	1	0-1	6	0-6
Female	--	--	--	--	1	0-1	1	0-1
Total	3	0-3	2	0-2	1	0-1	7	0-7

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 26. Observed prey types delivered to the nest, Concho BA, Arizona, 2021.

Sex	Mammals	Unknown	Total	Percent
Male	3	1	4	100
Female	--	--	--	--
Total	3	1	4	
Percent	75.0	25.0		

Table 27. Observed prey species delivered to the nest, Concho BA, Arizona 2021.

Sex	Mammal	Total	Percent
	Mountain cottontail		
Male	3	3	100
Female	--	--	--
Total	3	3	
Percent	100		

Lake km ¹	Perch Type ²	Shade	Distance to H ₂ O ³	Land Type ⁴
0.3	JN	No	3	CF
0.4	SO	No	1	SO
0.5	SO	No	1	SO
0.7	SO	No	1	SO
0.8	CM	Partial	1	CW
0.9	LG	No	1	SO
1.1	JN	No	5	CF
1.1	SJ	No	5	CF
1.1	SJ	No	5	CF
1.1	SO	No	1	SO
1.2	SO	No	1	SO
1.2	SJ	No	4	CF
1.3	CM	Partial	1	CW
1.3	JN	No	3	CF
1.3	CM	Partial	1	CW
1.3	SO	No	1	SO
1.3	CM	Partial	1	CW
1.4	LG	Partial	1	CW
1.5	CM	Partial	1	CW
1.6	CM	Partial	2	CW
1.7	CM	Partial	2	CW
1.7	CM	Partial	2	CW
2.7	SO	No	1	SO

¹Lake kilometer.

²CM=cottonwood medium (10-20m), JN=live juniper, LG=log, SJ=snag juniper, SO=shore.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴CF=conifer forest, CW=cottonwood grove, SO=shore.

Lake km ¹	PW ^{2,3}	PP	SH	DW	ES	SS	PD	EG	PE	BA	OT	Total	Percent
0.3	10	--	--	--	--	--	--	--	--	--	--	10	0.1
0.4	--	--	11	5	5	--	--	--	--	--	--	21	0.2
0.5	48	7	21	7	--	--	--	--	--	--	--	83	0.9
0.6	--	--	--	--	--	48	--	--	--	--	--	48	0.5
0.7	--	--	178	21	--	--	--	--	--	12	--	211	2.3
0.9	--	--	45	4	--	--	--	--	--	--	--	49	0.5
1.1	443	109	5	60	--	--	--	--	--	--	--	617	6.6
1.2	179	13	76	50	99	26	--	--	--	19	--	472	5.1
1.3	4,065	135	20	30	--	--	59	--	--	--	30	4,339	46.7
1.4	2,493	547	--	3	--	--	10	40	15	--	11	3,119	33.6
1.5	204	5	--	--	--	--	--	--	--	--	1	210	2.3
1.7	69	--	--	--	--	--	--	--	20	--	--	89	1.0
2.7	--	--	--	--	--	18	--	--	--	--	--	18	0.2
Total	7,511	816	356	180	104	92	69	40	35	31	52	9,286	
Percent	80.9	8.8	3.8	1.9	1.1	1.0	0.7	0.4	0.4	0.3	0.6		

¹Lake kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening, SH=standing in water, DW=drinking water, ES=eating on shore, SS=standing on shore, PD=perched drying, EG eating on ground, PE=perched eating, BA=bathing, OT=other (perched hunting, perched on ground, perched with prey, perched various).

APPENDIX H: FOOL HOLLOW BREEDING AREA SUMMARY

Table 30. Observed human activity and bald eagle behavior, Fool Hollow BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Hikers	22	--	--	--	--	--	--	22	75.8
Cyclists	2	--	--	--	--	--	--	2	6.9
Helicopters	2	--	--	--	--	--	--	2	6.9
Birdwatcher	1	--	--	--	--	--	--	1	3.4
Dirt bike	1	--	--	--	--	--	--	1	3.4
Gunshot	1	--	--	--	--	--	--	1	3.4
Total	29	--	--	--	--	--	--	29	

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

Table 31. Observed prey types delivered to the nest, Fool Hollow BA, Arizona, 2021.

Sex	Fish	Mammals	Unknown	Total	Percent
Male	6	8	--	14	41.2
Female	18	--	2	20	58.8
Total	24	8	2	34	
Percent	70.6	23.5	5.9		

Table 32. Observed prey species delivered to the nest, Fool Hollow BA, Arizona 2021.

Sex	Mammal	Fish	Total	Percent
	MC ¹	RT		
Male	4	1	5	83.3
Female	--	1	1	16.7
Total	4	2	6	
Percent	66.7	33.3		

¹ MC=mountain cottontail, RT=rainbow trout.

Table 33. Bald eagle habitat analysis at the Fool Hollow BA, Arizona, 2021.

Lake km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
0.0	PS	--	No	6	TR	CF
0.0	SC	--	No	6	TR	CF
0.0	PS	--	No	8	RS	CF
0.0	PS	--	Partial	6	TR	CF
0.0	SC	--	No	6	TR	CF
0.0	PS	--	Partial	6	TR	CF
0.0	PS	--	Partial	6	TR	CF
0.0	PS	--	Partial	6	TR	CF
0.1	SC	--	No	2	RS	CF
8.7	PS	--	No	2	RS	CF
8.9	PS	--	Partial	2	RS	CF

¹Lake kilometer.

²PS=pine/conifer second growth (10-20m), SC=snag, conifer.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RS=reservoir main body, TR=tailrace of dam.

⁵CF=conifer forest.

Table 34. Bald eagle habitat use at the Fool Hollow BA, Arizona, 2021.				
Lake km ¹	PW ^{2,3}	PP	Total	Percent
0.0	13748	278	14,026	88.9
0.1	242	20	262	1.7
8.7	933	--	933	5.9
8.9	563	--	563	3.6
Total	15,486	298	15,784	
Percent	98.1	1.9		

¹Lake kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening.

APPENDIX I: FORT MCDOWELL BREEDING AREA SUMMARY

Table 35. Observed human activity and bald eagle behavior, Fort McDowell BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Small plane	4	--	--	--	--	3	--	7	43.8
Helicopter	2	--	--	--	--	--	1	3	18.8
Farmer/rancher	2	--	--	--	--	--	--	2	12.5
ATV/OHV	--	--	--	--	--	1	--	1	6.3
Picnicker	1	--	--	--	--	--	--	1	6.3
Gunshot	--	--	--	--	--	1	--	1	6.3
AZGFD biologist	--	--	--	--	--	--	1	1	6.3
Total	9	--	--	--	--	5	2	16	

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

Table 36. Observed prey types delivered to the nest, Fort McDowell BA, Arizona, 2021.

Sex	Fish	Birds	Unknown	Total	Percent
Male	1	--	5	6	33.3
Female	4	1	7	12	66.7
Total	5	1	12	18	
Percent	27.8	5.6	66.7		

Table 37. Bald eagle habitat analysis at the Fort McDowell BA, Arizona, 2021.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
19.3	UP	Right	No	6	RI	MB
19.4	CL	Left	Partial	2	RI	MB
19.5	CL	Left	Yes	1	RU	MB
19.7	CL	Left	Yes	3	RU	GB
19.9	CL	Right	Yes	6	RI	GB
19.9	HS	Right	No	7	RI	MB
19.9	CL	Right	Partial	6	RI	GB
19.9	HS	Right	No	6	RI	GB
20.0	HS	Right	No	7	RU	MB
20.1	CL	Right	Yes	6	RU	GB

¹River kilometer.

²CL=cottonwood large (>20m), HS=hard snag, UP=utility pole.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RI=riffle, RU=run.

⁵GB=gravel bar, MB=mesquite bosque.

Table 38. Bald eagle habitat use at the Fort McDowell BA, Arizona, 2021.					
River km ¹	PW ^{2,3}	PP	PH	Total	Percent
19.3	83	--	75	158	4.3
19.4	--	--	42	42	1.1
19.5	913	60	--	973	26.3
19.7	17	--	--	17	0.5
19.9	2,255	99	--	2,354	63.6
20.0	15	--	--	15	0.4
20.1	140	--	--	140	3.8
Total	3,423	159	117	3,699	
Percent	92.5	4.3	3.2		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening, PH=perched hunting.

APPENDIX J: GOLDFIELD BREEDING AREA SUMMARY

Table 39. Observed human activity and bald eagle behavior, Goldfield BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Canoe/Kayak	395	--	--	--	--	507	1	903	35.1
Hiker	417	--	--	--	--	100	1	518	20.1
SUP	176	--	--	--	--	199	--	375	14.6
Horseback Rider	193	5	--	--	--	50	6	254	9.9
Photographer	123	--	--	--	--	23	--	146	5.7
Helicopter	41	7	--	--	--	19	--	67	2.6
Tuber/Rafter	4	--	--	--	--	46	--	50	1.9
Picnicker	31	5	--	--	--	12	--	48	1.9
Angler	34	--	--	--	--	7	--	41	1.6
Small Plane	30	1	--	--	--	6	1	38	1.5
Airboat	20	--	--	--	--	1	--	21	0.8
Birder	18	--	--	--	--	2	--	20	0.8
Helicopter, Apache	8	1	--	--	--	5	--	14	0.5
Cyclor (bicycle)	11	--	--	--	--	1	--	12	0.5
Dog	7	2	1	--	--	--	--	10	0.4
Drone (rec)	3	3	--	--	--	4	--	10	0.4
Helicopter, Sheriff	3	--	--	--	--	6	1	10	0.4
Driver	5	--	--	--	--	4	--	9	0.3
Swimmer	8	--	--	--	--	--	--	8	0.3
Motorized Parachute	--	--	--	--	--	6	--	6	0.2
Runner	3	--	--	--	--	3	--	6	0.2
Helicopter, Military	--	--	--	--	--	3	--	3	0.1
Military Jet	2	--	--	--	--	--	--	2	0.1
OHV	1	--	--	--	--	--	--	1	<0.1
Total	1,533	24	1	--	--	1,004	10	2,572	

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

Table 40. Observed forage events and success, Goldfield BA, Arizona, 2021.

Sex	Mammals		Total	
	E	S-U	E	S-U
Male	1	1-0	1	1-0
Female	--	--	--	--
Total	1	1-0	1	1-0

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 41. Observed prey types delivered to the nest, Goldfield BA, Arizona, 2021.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	5	2	1	6	14	28.6
Female	13	2	1	14	30	61.2
Unknown	2	--	--	3	5	10.2
Total	20	4	2	23	49	
Percent	40.8	8.2	4.1	46.9		

Sex	Fish		Total	Percent
	RT ¹	SS		
Male	2	--	2	28.6
Female	4	1	5	71.4
Total	6	1	7	
Percent	85.7	14.3		

¹RT=rainbow trout, SS=Sonora sucker.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
8.6	SB	Island	Partial	1	RB	SO
8.7	CL	Right	Partial	5	RI	MB
8.8	HS	Right	No	1	RB	SO
8.8	SO	Right	No	1	RI	SO
8.9	CL	Right	Partial	7	RI	MB
9.0	CL	Right	Partial	7	RI	MB
9.0	SG	Right	No	1	RI	SO
9.1	SG	Right	Partial	1	RU	SO
9.2	CL	Right	Partial	7	RI	MB
9.3	SD	Right	No	1	RI	SO
9.5	SO	Right	No	1	RI	SO
9.7	CL	Right	Partial	7	RI	MB
9.7	HS	Right	No	8	RI	MB
9.7	FP	Right	No	8	RI	UP
9.8	CL	Right	Partial	7	RI	MB
9.8	CM	Right	No	1	RB	SO
9.8	HL	Right	Partial	8	RI	CL
10.1	CL	Left	Partial	1	RB	SO
10.1	CL	Right	Yes	4	RB	MB
10.1	HS	Right	No	3	RI	MB
10.1	CL	Right	Yes	4	RI	MB
10.5	CF	Right	No	1	RU	CL
10.6	MS	Left	Yes	1	RI	SO

¹River kilometer.

²CL=cottonwood large (>20m), CM=cottonwood medium (10-20m), FP=fence post, HL=hillside, HS=hard snag, SB=sand bar, SD=cottonwood snag, SG=soft snag, SO=shore.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RB=river bend, RI=riffle, RU=run.

⁵CL=cliff, MB=mesquite bosque, SO=shore, UP=desert upland.

Table 44. Bald eagle habitat use at the Goldfield BA, Arizona, 2021.											
River km ¹	PW ^{2,3}	PP	PD	PK	PU	DW	SS	PV	GN	Total	Percent
8.6	--	--	--	--	--	7	--	--	--	7	<0.1
8.7	31	--	--	--	--	--	--	--	--	31	0.2
8.8	652	--	78	--	--	--	4	1	--	735	4.7
8.9	18	--	--	--	--	--	--	--	--	18	0.1
9.0	163	--	--	--	--	--	--	--	--	163	1.0
9.1	4	--	--	--	--	--	--	--	--	4	<0.1
9.2	127	--	--	--	--	--	--	--	--	127	0.8
9.3	26	--	--	--	--	--	--	--	--	26	0.2
9.5	--	--	--	--	--	--	--	--	1	1	<0.1
9.7	963	96	--	--	--	--	--	--	--	1,059	6.7
9.8	7,921	101	--	11	10	--	--	--	--	8,043	51.2
10.1	4,243	--	--	--	--	--	--	1	--	4,244	27.0
10.5	1,239	--	--	--	--	--	--	--	--	1,239	7.9
10.6	13	--	--	--	--	--	--	--	--	13	0.1
Total	15,400	197	78	11	10	7	4	2	1	15,710	
Percent	98.0	1.3	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening, PD= perched drying, PK=perched with prey, PU=perched unknown, DW=drinking water, SS=standing on shore, PV= perched vocalizing, GN=gathering nest material.

APPENDIX K: LADDERS BREEDING AREA SUMMARY

Table 45. Observed human activity and bald eagle behavior, Ladders BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Kayak	1	11	--	--	--	--	--	12	46.2
Helicopter	1	4	--	--	--	--	--	5	19.2
Small Plane	3	1	--	--	--	--	1	5	19.2
Nestwatcher	--	1	1	--	--	--	--	2	7.7
Hiker	--	1	--	--	--	--	--	1	3.9
Police Helicopter	--	--	1	--	--	--	--	1	3.9
Total	5	18	2	--	--	--	1	26	

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

Table 46. Observed forage events and success, Ladders BA, Arizona, 2021.

Sex	Fish		Birds		Mammals		Unknown		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U	E	S-U
Male	1	1-0	--	--	--	--	--	--	1	1-0
Female	2	0-2	1	0-1	1	0-1	2	1-1	6	1-5
Total	3	1-2	1	0-1	1	0-1	2	1-1	7	2-5

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 47. Observed prey types delivered to the nest, Ladders BA, Arizona, 2021.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	3	2	4	1	10	45.5
Female	4	5	1	2	12	54.6
Total	7	7	5	3	22	
Percent	31.8	31.8	22.7	13.6		

Table 48. Observed prey species delivered to the nest, Ladders BA, Arizona 2021.

Sex	Birds				Fish		Total	Percent
	WS ¹	AC	WD	PG	CP	SS		
Male	--	2	--	--	--	1	3	
Female	3	--	1	1	1	--	6	
Total	3	2	1	1	1	1	9	
Percent	33.3	22.2	11.1	11.1	11.1	11.1		

¹WS=waterfowl species, AC=American coot, WD=wood duck, PG=pied-billed grebe, CP=common carp, SS=Sonora sucker.

Table 49. Bald eagle habitat analysis at the Ladders BA, Arizona, 2021.						
River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
161.5	CF	Right	No	3	UN	CL
161.9	JN	Left	Yes	8	RI	CL
161.9	CF	Right	No	7	RI	CL
162.0	SJ	Right	Partial	4	RI	JW
162.0	JN	Left	Yes	8	RI	CL
162.1	CT	Right	No	2	RI	CL
162.1	JN	Right	No	1	RI	CL
162.1	JN	Left	Yes	8	RI	CL
162.5	JN	Right	No	3	PO	JW
162.6	ID	Island	No	1	PO	SO
162.7	WO	Left	Partial	1	PO	WT
162.7	CT	Left	No	3	RU	CL
162.8	JN	Left	No	4	RU	CL
162.8	SO	Left	Yes	1	RU	SO
162.8	HL	Right	Yes	1	RU	CL
162.8	RW	Island	No	1	RU	SO
162.8	WO	Left	No	1	RI	WT
162.9	NE	Right	Partial	2	RU	CL
162.9	JN	Left	No	4	RU	CL
162.9	CT	Left	No	3	RU	CL
162.9	CT	Right	No	2	RU	CL
162.9	JN	Right	No	2	RU	CL
162.9	RW	Right	No	1	PO	SO
162.9	SB	Right	No	1	PO	WT
163.0	JN	Left	No	3	RU	CL
163.0	CT	Left	No	3	RU	CL
163.0	CF	Left	Partial	3	RU	CL
163.0	SO	Left	Yes	1	PO	SO
163.0	CF	Left	Yes	1	PO	CL
163.1	SO	Left	Partial	1	RU	SO
163.1	CT	Left	No	2	RU	CL
163.1	CF	Left	Partial	1	PO	CL
163.2	JN	Left	No	4	RU	JW

¹River kilometer.

²CF=cliff ledge, CT=cliff top, HL=hillside, ID=island, JN=juniper tree, NE=nest, RW=rock in water, SB=sand bar, SJ=snag juniper, SO=shore, WO=willow thicket.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴PO=pool, RI=riffle, RU=run, UN=unknown.

⁵CL=cliff, JW=juniper woodland, SO=shore, WT=willow thicket.

Table 50. Bald eagle habitat use at the Ladders BA, Arizona, 2021.													
River km ¹	PW ^{2,3}	DW	PD	SS	PE	PP	CL	BA	PK	SH	OT	Total	Percent
161.5	9	--	--	--	--	--	--	--	--	--	--	9	0.4
161.9	28	--	--	--	--	--	--	--	--	--	--	28	1.2
162.0	161	--	--	--	--	--	--	--	--	--	--	161	6.7
162.1	8	--	--	--	--	--	1	--	--	--	--	9	0.4
162.5	72	--	--	--	--	--	--	--	--	--	3	75	3.1
162.6	--	6	--	--	--	--	--	--	--	--	--	6	0.3
162.7	32	--	--	--	--	--	--	--	--	--	--	32	1.3
162.8	289	--	--	--	--	--	--	--	3	--	1	293	12.2
162.9	669	70	--	--	--	18	11	14	3	11	5	801	33.5
163.0	652	9	35	28	21	2	4	--	8	--	--	759	31.7
163.1	163	4	--	--	--	--	2	--	--	--	--	169	7.1
163.2	51	--	--	--	--	--	--	--	--	--	--	51	2.1
Total	2,134	89	35	28	21	20	18	14	14	11	9	2,393	
Percent	89.2	3.7	1.5	1.2	0.9	0.8	0.8	0.6	0.6	0.5	0.4		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, DW=drinking water, PD= perched drying, SS=standing on shore, PE=perched eating, PP=perched preening, CL=perched close to mate, BA=bathing, PK=perched with prey, SH=standing in water, OT=other (GN=gathering nest material, PV= perched vocalizing).

APPENDIX L: LUNA BREEDING AREA SUMMARY

Table 51. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Driver	283	--	--	--	--	--	--	283	45.4
Angler	125	--	--	1	--	--	--	126	20.2
Birder	42	--	--	1	--	--	--	43	6.9
Hiker	38	--	--	--	--	--	--	38	6.1
Boater (fishing)	33	--	--	--	--	--	--	33	5.3
Picnicker	32	--	--	--	--	--	--	32	5.1
Photographer	13	--	--	--	--	--	--	13	2.1
Military jet	7	--	--	2	--	--	--	9	1.4
AZGFD biologist	7	--	--	1	--	--	--	8	1.3
Float tuber (fishing)	8	--	--	--	--	--	--	8	1.3
Kayak/canoe	5	--	--	--	--	--	--	5	0.8
U.S. Forest Service	6	--	--	--	--	--	--	6	1.0
Motorcycle	5	--	--	--	--	--	--	5	0.8
Helicopter	3	--	--	--	--	--	--	3	0.5
USFS biologist	3	--	--	--	--	--	--	3	0.5
Alpine Fire District	2	--	--	--	--	--	--	2	0.3
Logger	2	--	--	--	--	--	--	2	0.3
OHV	2	--	--	--	--	--	--	2	0.3
Apache Co. Sheriff	1	--	--	--	--	--	--	1	0.2
Nestwatcher	--	--	--	1	--	--	--	1	0.2
USFS construction	1	--	--	--	--	--	--	1	0.2
Total	618	--	--	6	--	--	--	624	

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

Table 52. Observed forage events and success, Luna BA, Arizona, 2021.

Sex	Birds		Carrion		Fish		Unknown		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U	E	S-U
Male	21	17-4	5	5-0	1	1-0	2	2-0	29	25-4
Female	18	14-4	2	2-0	1	1-0	1	1-0	22	18-4
Total	39	31-8	7	7-0	2	2-0	3	3-0	51	43-8

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 53. Observed prey types delivered to the nest, Luna BA, Arizona, 2021.

Sex	Birds	Carrion	Fish	Unknown	Total	Percent
Male	10	2	1	2	15	62.5
Female	5	2	1	1	9	37.5
Total	15	4	2	3	24	
Percent	62.5	16.7	8.3	12.5		

Sex	Birds	Fish	Total	Percent
	AC ¹	RT		
Male	10	1	11	64.7
Female	5	1	6	35.3
Total	15	2	17	
Percent	88.2	11.8		

¹AC=American coot, RT=rainbow trout.

Lake km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
0.3	PS	--	Yes	1	RS	--
0.7	HS	--	No	1	RS	--
1.4	PO	--	No	2	RS	--
1.8	HS	--	No	2	RC	--
2.4	HS	--	No	2	--	CF
2.6	WF	--	No	1	RS	--
2.6	SC	--	No	6	--	CF
2.7	PS	--	No	1	RS	--
2.7	PS	--	Yes	3	RS	--
2.8	PS	--	Yes	1	RS	--
4.8	PO	--	Yes	6	RC	--
4.8	PO	--	Yes	6	--	CF
4.8	HS	--	No	6	--	CF
4.8	HS	--	Yes	6	--	CF
4.9	PO	--	Yes	8	--	CF
5.0	PO	--	Yes	8	--	CF
5.0	HS	--	No	8	--	CF
5.1	FP	--	No	1	RC	--

¹Lake kilometer.

²FP=fence post, HS=hard snag, PO=old growth pine (20-30m+), PS=small pine (10-20m), SC=snag conifer, WF=waterfowl sign.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove, RS=reservoir main body.

⁵CF=conifer forest.

Table 56. Bald eagle habitat use at the Luna BA, Arizona, 2021.									
Lake km ¹	PW ^{2,3}	PR	PH	CL	PP	PK	CO	Total	Percent
0.3	9	--	--	--	--	--	--	9	0.1
0.7	308	--	--	--	--	--	--	308	2.1
1.4	140	--	--	--	--	--	--	140	0.9
1.8	20	--	--	--	--	--	--	20	0.1
2.4	219	--	--	--	--	--	--	219	1.5
2.6	688	100	94	--	--	--	--	882	5.9
2.7	349	--	378	--	--	--	--	727	4.9
2.8	150	--	20	--	--	--	--	170	1.1
4.8	6,282	4,473	11	409	127	3	1	11,306	75.9
4.9	192	--	--	--	--	--	--	192	1.3
5.0	319	414	--	--	--	--	2	735	4.9
5.1	195	--	--	--	--	--	--	195	1.3
Total	8,871	4,987	503	409	127	3	3	14,903	
Percent	59.5	33.5	3.4	2.7	0.9	<0.1	<0.1		

¹Lake kilometer.

²Observation time (minutes).

³PW=perched watching, PR=perched roosting, PH=perched hunting, CL=perched close to mate, PP=perched preening, PK=perched with prey, CO=copulating.

APPENDIX M: ORME BREEDING AREA SUMMARY

Table 57. Observed human activity and bald eagle behavior, Orme BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Small Plane	230	4	--	--	--	25	3	262	40.4
Helicopter	134	9	--	--	--	42	5	190	29.3
Helicopter, Apache	40	3	--	--	--	2	--	45	6.9
Driver	5	12	--	3	--	--	2	22	3.4
Helicopter, Sheriff	14	3	--	--	--	4	--	21	3.2
Hiker	8	9	--	1	--	2	--	20	3.1
Helicopter, Military	15	2	--	--	--	2	--	19	2.9
Horseback Rider	5	11	--	1	--	--	--	17	2.6
Agency Worker	4	7	--	--	--	5	--	16	2.5
Angler	2	--	1	1	--	--	2	6	0.9
Photographer	1	3	--	--	--	--	--	4	0.6
Picnicker	2	2	--	--	--	--	--	4	0.6
Nestwatcher	1	2	--	--	--	--	--	3	0.5
Swimmer	1	--	--	--	--	--	2	3	0.5
AZGFD Biologist	1	--	--	1	--	--	--	2	0.3
Cycler (Bicycle)	--	2	--	--	--	--	--	2	0.3
Farmer/Rancher	--	2	--	--	--	--	--	2	0.3
OHV	--	2	--	--	--	--	--	2	0.3
Sonic Boom	2	--	--	--	--	--	--	2	0.3
Woodcutter	1	1	--	--	--	--	--	2	0.3
Drone	--	--	--	--	--	1	--	1	0.2
Hunter	--	--	--	1	--	--	--	1	0.2
Military Jet	--	--	--	--	--	1	--	1	0.2
Motorized Parachute	1	--	--	--	--	--	--	1	0.2
Total	467	74	1	8	--	84	14	648	

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

Table 58. Observed forage events and success, Orme BA, Arizona, 2021.

Sex	Fish		Birds		Mammals		Unknown		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U	E	S-U
Male	4	0-4	1	1-0	1	0-1	--	--	6	1-5
Female	1	0-1	--	--	--	--	2	1-1	3	1-2
Total	5	0-5	1	1-0	1	0-1	2	1-1	9	2-7

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 59. Observed prey types delivered to the nest, Orme BA, Arizona, 2021.

Sex	Fish	Birds	Mammals	Carrion	Unknown	Total	Percent
Male	8	5	1	1	20	35	60.3
Female	11	3	--	--	8	22	37.9
Unknown	--	1	--	--	--	1	1.7
Total	19	9	1	1	28	58	
Percent	32.8	15.5	1.7	1.7	48.3		

Table 60. Bald eagle habitat analysis at the Orme BA, Arizona, 2021.						
River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
0.3V	DM	Right	No	3	--	MB
0.5V	CM	Right	Partial	3	RU	CW
0.5V	SG	Right	Partial	3	RI	CW
0.5V	SG	Right	Partial	3	RI	CW
0.5V	UP	Right	No	7	--	UP
0.6V	UP	Right	No	7	--	UP
0.6V	MS	Left	No	1	RU	MB
0.6V	CL	Right	No	5	RI	CW
0.6V	UP	Right	No	7	--	UP
0.7V	CL	Right	Partial	1	RU	CW
0.7V	DL	Right	Partial	1	RU	CW
0.7V	DL	Right	Partial	1	RU	CW
0.7V	DL	Right	Partial	1	RI	CW
0.7V	HS	Right	Partial	1	--	CW
0.7V	CS	Right	Yes	1	RI	CW
0.8V	DL	Right	No	1	RU	CW
0.8V	SB	Island	Partial	1	RU	GB
0.8V	HS	Left	No	1	RU	MB
0.8V	DL	Left	No	1	RU	CW
0.8V	UP	Right	No	7	--	UP
0.9V	MS	Left	No	1	RU	MB
1.5V	UP	Right	No	2	RU	UP
1.5V	UP	Right	No	2	RU	UP
1.7V	UP	Right	No	3	RU	UP
1.7V	UP	Right	No	2	RU	UP
3.6S	UP	Right	No	5	--	UP
4.5S	UP	Right	No	5	--	UP
4.7S	DL	Right	Partial	1	RU	CW
5.0S	UP	Right	No	6	--	UP
5.0S	HS	Right	No	2	BW	MB
5.1S	UP	Right	No	6	--	UP
5.3S	DL	Right	Partial	1	RI	CW
6.2S	BO	Right	Partial	7	RU	UP
6.5S	CF	Left	Partial	6	RU	CW
6.5S	CF	Left	Partial	1	RU	CL
6.5S	HS	Right	No	1	RU	MB

¹River kilometer. V=Verde River, S=Salt River.

²BO=boulder, CF=cliff side, CL=cottonwood large (20-30m), CM=cottonwood medium (10-20m), CS=cottonwood small (0-10m), DL=deciduous tree large (20-30m), DM=deciduous medium (10-20m), HS=hard snag, MS=mesquite tree, SB=shore, SG=soft snag, UP=utility pole.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴BW=backwater, RI=riffle, RU=run.

⁵CL=cliff, CW=cottonwood grove, GB=gravel bar, MB=mesquite bosque, UP=desert upland.

Table 61. Bald eagle habitat use at the Orme BA, Arizona, 2021.												
River km ¹	PW ^{2,3}	PU	PP	CL	PD	PK	PV	PH	PG	OT	Total	Percent
0.3V	--	15	--	--	--	--	--	--	--	--	15	0.1
0.5V	37	2	--	--	--	--	10	--	--	--	49	0.3
0.6V	6,605	29	1,124	163	76	187	146	--	--	6	8,336	47.9
0.7V	1,922	2,073	198	--	11	6	1	--	--	--	4,211	24.2
0.8V	71	350	--	--	--	--	--	--	34	--	455	2.6
0.9V	3,085	42	95	--	127	--	4	50	--	5	3,408	19.6
1.5V	23	--	--	19	--	--	--	--	--	--	42	0.2
1.7V	208	--	--	36	--	--	4	--	--	--	248	1.4
3.6S	92	--	--	--	--	--	--	--	--	--	92	0.5
4.5S	16	--	--	--	--	--	7	--	--	--	23	0.1
4.7S	96	--	--	--	--	--	--	--	--	--	96	0.6
5.0S	101	--	--	6	--	--	6	--	--	--	113	0.6
5.1S	94	--	--	--	--	--	--	--	--	--	94	0.5
5.3S	--	52	--	--	--	--	--	--	--	--	52	0.3
6.5S	187	--	--	--	--	--	--	--	--	--	187	1.1
Total	12,537	2,563	1,417	224	214	193	178	50	34	11	17,421	
Percent	72.0	14.7	8.1	1.3	1.2	1.1	1.0	0.3	0.2	0.1		

¹River kilometer. S=Salt River, V=Verde River.

²Observation time (minutes).

³PW=perched watching, PU=perched unknown, PP=perched preening, CL=perched close to mate, PD=perched drying, PK=perched with prey, PV=perched vocalizing, PH=perched hunting, PG=perched on ground, OT=other (perched eating, perched interaction, copulating).

APPENDIX N: PLEASANT BREEDING AREA SUMMARY

Table 62. Observed human activity and bald eagle behavior, Pleasant BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Boater	--	1	--	1	--	3	1	6	35.3
Jet	1	--	--	--	--	1	1	3	17.7
Small Plane	1	--	1	--	--	1	--	3	17.7
Jet ski	1	--	--	--	--	--	1	2	11.8
Agency Boat	1	1	--	--	--	--	--	2	11.8
Motorcycle	--	--	--	--	--	1	--	1	5.9
Total	4	2	1	1	--	6	3	17	

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

Table 63. Observed forage events and success, Pleasant BA, Arizona, 2021.

Sex	Fish		Total	
	E ¹	S-U ²	E	S-U
Male	--	--	--	--
Female	1	1-0	1	1-0
Total	1	1-0	1	1-0

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 64. Bald eagle habitat analysis at the Pleasant BA, Arizona, 2021.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
72.0	CF	Left	Partial	5	RC	CL
73.2	CT	Left	No	2	RC	CL
73.3	CF	Left	Partial	2	RC	CL
73.3	CF	Left	Yes	2	RC	CL
73.3	CT	Left	No	2	RC	CL
73.4	NE	Left	Partial	2	RC	CL
73.5	CF	Left	Yes	2	RC	CL
73.5	CT	Left	Partial	2	RC	CL
73.5	CT	Left	No	2	RC	CL
73.5	CF	Right	Partial	2	RC	CL
73.5	CF	Left	Partial	3	RC	CL
73.5	BO	Left	Yes	2	RC	CL
73.5	NE	Left	Yes	2	RC	CL
73.5	CF	Left	No	2	RC	CL
73.6	HL	Right	No	1	RC	UP
74.0	HL	Right	No	1	RC	UP

¹River kilometer.

²BO=boulder, CF=cliff ledge, CT=cliff top, HL=hillside, NE=nest.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove.

⁵CL=cliff, UP=desert upland.

Table 65. Bald eagle habitat use at the Pleasant BA, Arizona, 2021.									
River km ¹	PW ^{2,3}	PP	PE	GN	CO	PV	CL	Total	Percent
72.0	1	--	--	--	--	--	--	1	0.2
73.2	1	--	--	--	--	--	--	1	0.2
73.3	35	9	9	--	--	3	--	56	10.5
73.4	--	6	--	--	--	--	--	6	1.1
73.5	427	18	--	4	4	--	2	455	85.1
73.6	--	--	--	3	--	--	--	3	0.6
74.0	--	--	13	--	--	--	--	13	2.4
Total	464	33	22	7	4	3	2	535	
Percent	86.7	6.2	4.1	1.3	0.8	0.6	0.4		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, PP=perched preening, PE= perched eating, GN=gathering nest material, CO=copulating, CL=perched close to mate.

APPENDIX O: SCHOLZ BREEDING AREA SUMMARY

Table 66. Observed human activity and bald eagle behavior, Scholz BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Hiker	130	5	--	3	--	--	--	138	31.7
Picnicker	85	--	--	--	--	--	--	85	19.5
Swimmer	59	2	--	--	--	--	--	61	14.0
Fisherman	52	--	--	--	--	--	--	52	12.0
Canoe/Kayak	46	4	--	--	--	--	--	50	11.5
Birder	22	--	--	--	--	--	--	22	5.1
Stand Up Paddler	17	--	--	--	--	--	--	17	3.9
Runner	4	--	--	--	--	--	--	4	0.9
Cycler	3	--	--	--	--	--	--	3	0.7
Shooter	2	--	--	--	--	--	--	2	0.5
Tuber	2	--	--	--	--	--	--	2	0.5
Total	422	11	--	3	--	--	--	436	

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

Table 67. Observed forage events and success, Scholz BA, Arizona, 2021.

Sex	Fish		Birds		Unknown		Total	
	E ¹	S-U ²	E	S-U	E	S-U	E	S-U
Male	9	6-3	1	0-1	1	0-1	11	6-5
Female	20	18-2	--	--	1	1-0	21	19-2
Total	29	24-5	1	0-1	2	1-1	32	25-7

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 68. Observed prey types delivered to the nest, Scholz BA, Arizona, 2021.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	14	--	--	6	20	40.8
Female	22	2	1	4	29	59.2
Total	36	2	1	10	49	
Percent	57.1	16.3	2.0	4.1		

Sex	Fish	Total	Percent
	CS ¹		
Male	9	9	32.1
Female	19	19	67.9
Total	28	28	
Percent	100		

¹CS=catfish species.

Lake km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
0.2	SC	n/a	No	1	RS	CF
0.2	PO	n/a	No	5	RS	CF
0.3	SC	n/a	No	1	RS	CF
0.4	SO	n/a	No	1	RS	SO
0.7	PS	n/a	Yes	1	RS	CF
0.7	PO	n/a	No	5	RS	CF
0.7	SO	n/a	No	1	RS	SO
1.1	SC	n/a	No	1	RS	CF
1.1	SC	n/a	No	3	RS	CF
1.3	PO	n/a	Yes	5	RS	CF
1.3	PO	n/a	Partial	7	RS	CF
1.5	SO	n/a	No	1	RS	CF
1.7	PO	n/a	Partial	2	RS	CF
1.7	PS	n/a	Yes	1	RS	CF
1.8	SO	n/a	No	1	RS	SO
1.9	PS	n/a	Partial	1	RS	CF
2.0	PS	n/a	Partial	1	RS	CF
2.2	PS	n/a	Partial	1	RS	CF
2.2	SC	n/a	No	1	RS	CF
3.3	SC	n/a	No	1	RS	CF

¹Lake kilometer.

²PO=pine/conifer old growth (20-30m+), PS=pine/conifer small (<20m), SC=snag conifer, SO=shore.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RS=reservoir main body.

⁵CF=conifer forest, SO=shoreline.

Table 71. Bald eagle habitat use at the Scholz BA, Arizona, 2021.													
River km ¹	PW ^{2,3}	SS	PK	PP	DW	PD	ES	CL	BA	PV	PE	Total	Percent
0.2	1,304	--	--	--	--	--	--	72	--	--	--	1,376	18.2
0.3	155	--	--	--	--	--	--	--	--	--	--	155	2.0
0.4	--	--	--	--	--	--	--	--	36	--	--	36	0.5
0.7	680	114	--	--	13	40	52	--	--	11	--	910	12.0
1.1	1,409	--	144	21	--	53	--	--	--	--	--	1,627	21.5
1.3	1,255	--	--	--	--	--	--	--	--	--	--	1,255	16.6
1.5	--	34	--	77	116	--	--	--	24	--	7	258	3.4
1.7	1,051	--	2	50	--	--	7	--	--	--	3	1,113	14.7
1.8	--	21	--	--	3	12	14	--	8	--	--	58	0.8
1.9	13	--	4	--	11	--	--	--	--	--	--	28	0.4
2	58	--	--	--	--	--	--	--	--	--	3	61	0.8
2.2	612	--	--	--	--	32	--	--	--	31	1	676	8.9
3.3	11	--	--	--	--	--	--	--	--	--	--	11	0.1
Total	6,548	169	150	148	143	137	73	72	68	42	14	7,564	
Percent	86.6	2.2	2.0	2.0	1.9	1.8	1.0	1.0	0.9	0.6	0.2		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, SS=standing on shore, PK=perched with prey, PP=perched preening, DW=drinking water, PD=perched drying, ES=eating on shore, CL=perched close to mate, BA=bathing, PV= perched vocalizing, PE= perched eating.

APPENDIX P: SYCAMORE BREEDING AREA SUMMARY

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Horseback group	37	--	1	3	--	--	1	42	51.9
Small plane	10	--	--	--	--	--	--	10	12.4
OHV	3	4	--	--	--	--	--	7	8.6
Driver	4	--	--	1	--	--	--	5	6.2
Angler/fisher	3	--	--	--	--	--	--	3	3.7
Helicopter	3	--	--	--	--	--	--	3	3.7
Helicopter, Military	3	--	--	--	--	--	--	3	3.7
Picnicker	1	1	--	--	--	--	--	2	2.5
Canoe/kayak	1	--	--	--	--	--	--	1	1.2
Farmer/rancher	--	--	--	1	--	--	--	1	1.2
Helicopter, Apache	1	--	--	--	--	--	--	1	1.2
Helicopter, Sheriff	1	--	--	--	--	--	--	1	1.2
Swimmer	1	--	--	--	--	--	--	1	1.2
Woodcutter	1	--	--	--	--	--	--	1	1.2
Total	69	5	1	5	--	--	1	81	

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

Sex	Fish		Total	
	E ¹	S-U ²	E	S-U
Male	2	1-1	2	1-1
Female	--	--	--	--
Total	2	1-1	2	1-1

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 74. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2021.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
7.8	UP	Left	No	2	RI	SO
7.8	UP	Left	No	5	RI	UP
7.9	CL	Left	Partial	1	RI	SO
9.2	WO	Right	Partial	1	RI	WT
9.3	WO	Right	Yes	1	RI	WT
9.4	UP	Right	No	8	--	FL
9.6	WO	Right	Partial	1	RU	WT
9.7	HS	Left	No	6	RU	MB
10.0	WO	Left	Partial	1	RI	SO
10.1	CL	Left	Yes	6	RU	CW
10.1	UP	Right	No	1	RI	FL
10.1	CM	Left	Yes	6	RU	CW
10.1	MS	Right	No	1	RI	MB
10.2	HS	Right	No	1	RI	TX
10.2	UP	Right	No	1	RI	MB
10.7	HS	Left	No	4	RU	MB
10.9	SM	Right	No	6	RU	MB
S 0.2	ST	Left	No	8	--	CW

¹River kilometer.

²CL=cottonwood large (>20m), CM=cottonwood medium (10-20m), HS=hard snag, MS=mesquite tree, ST=snag top, SM=snag, mesquite, UP=utility pole, WO=willow tree.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RI=riffle, RU=run.

⁵CW=cottonwood grove, FL=farmland, MB=mesquite bosque, SO=shore, TX=tamarisk thicket, WT=willow thicket.

Table 75. Bald eagle habitat use at the Sycamore BA, Arizona, 2021.

River km ¹	PW ^{2,3}	PP	PH	PE	ET	PD	PK	Total	Percent
7.8	709	142	63	--	--	--	--	914	26.6
7.9	42	27	7	--	--	--	--	76	2.2
9.2	3	--	--	--	--	--	--	3	0.1
9.3	20	--	38	--	--	--	--	58	1.7
9.4	--	--	--	12	--	--	--	12	0.4
9.6	--	12	--	--	--	--	--	12	0.4
9.7	68	56	--	--	10	14	2	150	4.3
10.0	90	23	125	--	9	--	--	247	7.2
10.1	614	386	10	38	--	--	--	1,048	30.5
10.2	--	25	18	--	--	--	--	43	1.2
10.7	585	88	19	--	--	--	--	692	20.1
10.9	140	--	--	--	--	--	--	140	4.1
S 0.2	41	--	--	--	--	--	--	41	1.2
Total	2,312	759	280	50	19	14	2	3,436	
Percent	67.3	22.1	8.1	1.5	0.6	0.4	<0.1		

¹River kilometer. S=Sycamore Creek

²Observation time (minutes).

³PW=perched watching, PP=perched preening, PH=perched hunting, PE= perched eating on utility pole, ET=eating in tree, PD=perched drying, PK=perched with prey.

APPENDIX Q: WHISKEY SPRING BREEDING AREA SUMMARY

Table 76. Observed human activity and bald eagle behavior, Whiskey Spring BA, Arizona, 2021.

Human Activity	N ¹	W	R	F	L	B	U	Total	Percent
Boater	8	18	--	--	--	12	4	42	80.8
Small Plane	--	1	--	--	--	2	1	4	7.7
Helicopter	2	--	--	--	--	1	--	3	5.8
Agency Boat	1	--	--	--	--	--	--	1	1.9
Jet ski	--	--	--	--	--	--	1	1	1.9
Sheriff Helicopter	--	--	--	--	--	1	--	1	1.9
Total	11	19	--	--	--	16	6	52	

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

Table 77. Observed forage events and success, Whiskey Spring BA, Arizona, 2021.

Sex	Fish		Total	
	E ¹	S-U ²	E	S-U
Male	4	2-2	4	2-2
Female	1	1-0	1	1-0
Unknown	3	2-1	3	2-1
Total	8	5-3	8	5-3

¹E=A single forage event, not the number of attempts during 1 event.

²S-U= Successful – Unsuccessful forage events.

Table 78. Bald eagle habitat analysis at the Whiskey Spring BA, Arizona, 2021.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
68.1	CT	Right	Yes	1	RC	CL
68.2	CT	Right	No	1	RC	CL
68.2	CF	Right	Partial	1	RC	CL
68.2	NE	Right	Partial	1	RC	CL
68.3	CT	Left	No	1	RC	CL
68.4	CF	Right	No	3	RC	CL
68.7	SO	Left	No	1	RC	UP
68.7	RI	Left	No	1	RC	UP
68.8	CT	Left	Partial	1	RC	CL
68.9	CT	Left	No	1	RC	CL
68.9	CF	Left	Yes	1	RC	CL
68.9	NE	Left	Yes	1	RC	CL
69.0	CF	Left	Yes	1	RC	CL
69.0	CT	Left	No	1	RC	CL
69.0	CF	Left	Yes	1	RC	CL
69.0	HL	Left	Partial	1	RC	UP
69.0	CF	Left	Yes	1	RC	CL
69.1	BO	Left	Partial	1	RC	CL
69.1	CF	Left	No	1	RC	CL

¹River kilometer.

²BO=boulder, CF=cliff ledge, CT=cliff top, HL=hillside, NE=nest, PV=palo verde tree, RI=ridge, SO=shore.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove.

⁵CL=cliff, UP=desert upland.

Table 78 continued.

River km ¹	Perch Type ²	Side	Shade	Distance to H ₂ O ³	H ₂ O Type ⁴	Land Type ⁵
69.2	BO	Left	Yes	1	RC	CL
69.3	CF	Left	Yes	1	RC	CL
69.6	PV	Right	No	2	RC	UP
69.8	CF	Right	No	1	RC	CL
69.9	CT	Right	No	1	RC	CL
69.9	HL	Left	No	1	RC	UP
70.5	CT	Left	No	1	RC	CL

¹River kilometer.

²BO=boulder, CF=cliff ledge, CT=cliff top, HL=hillside, NE=nest, PV=palo verde tree, RI=ridge, SO=shore.

³1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

⁴RC=reservoir cove.

⁵CL=cliff, UP=desert upland.

Table 79. Bald eagle habitat use at the Whiskey Spring BA, Arizona, 2021.

River km ¹	PW ^{2,3}	CL	PE	PR	PI	ES	CO	GN	DW	PX	Total	Percent
68.1	6	--	--	--	--	--	--	--	--	--	6	0.3
68.2	97	1	--	--	--	--	--	--	--	--	98	4.3
68.3	32	--	--	--	--	--	--	--	--	--	32	1.4
68.4	27	--	--	--	--	--	--	--	--	--	27	1.2
68.7	4	6	6	--	--	8	--	--	1	--	25	1.1
68.8	752	117	--	34	16	--	1	--	--	--	920	40.1
68.9	220	26	58	--	--	--	1	--	--	1	306	13.3
69.0	691	27	--	--	1	--	--	1	--	--	720	31.4
69.1	57	--	--	--	--	--	--	--	--	--	57	2.5
69.2	50	--	--	--	--	--	--	--	--	--	50	2.2
69.3	5	--	--	--	--	--	--	--	--	--	5	0.2
69.6	6	--	--	--	--	--	--	--	--	--	6	0.3
69.8	28	--	--	--	--	--	--	--	--	--	28	1.2
69.9	15	--	--	--	--	--	--	--	--	--	15	0.7
70.5	2	--	--	--	--	--	--	--	--	--	2	<0.1
Total	1,992	177	64	34	17	8	2	1	1	1	2,297	
Percent	86.7	7.7	2.8	1.5	0.7	0.4	0.1	<0.1	<0.1	<0.1		

¹River kilometer.

²Observation time (minutes).

³PW=perched watching, CL=perched close to mate, PE= perched eating, PR=perched roosting, PI=perched interaction, ES=eating on shore, CO=copulating, GN=gathering nest material, DW=drinking water, PX=perched various.