ARIZONA BALD EAGLE MANAGEMENT PROGRAM
2023 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 2023. Those include: Justin Bright and Dan Garrison (Bachelor Cove); Leticia Cruz-Paredes and Eduardo Martinez-Leyva (Box Bar, Willow Springs, and Woods Canyon); Zach Fitzner and Russell Seeley (Concho); Jennifer Ottinger and Rebekah Snyder (Doka, Fort McDowell, Rodeo, and Sycamore); Cole Abrahamson and Edwin Viramontes (Goldfield); Ryann Rourk and Kile Stumbo (Cole's Bay, Pleasant, and Whiskey Spring); Joe and Marta Peddie (Luna); Emerson Milam and Cora McClelland (Orme, Willow Springs, and Woods Canyon); Ryann Rourk and Justin Bright (Scholz).

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ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2023 SUMMARY REPORT

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INTRODUCTION

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

Bald eagles in central Arizona were temporarily designated as a Distinct Population Segment (DPS) and listed as threatened in 2008 due to a court order requiring a 12-month status review of the Sonoran Desert Area population (USFWS 2008). As a result of the status review, the USFWS determined the population did not satisfy the definition of a DPS and was therefore not eligible for listing (USFWS 2010). Bald eagles in the Sonoran Desert Area were removed from the list of endangered and threatened species in 2011 (USFWS 2011). Further legal challenges resulted in a subsequent 12-month finding which supported the previous conclusions (USFWS 2012a). The 2012 finding was upheld by a U.S. District Court in 2014, and that decision was affirmed by an appellate court in 2017.

The bald eagle remains protected in the state under Arizona Revised Statute Title 17 and nationally under the Bald and Golden Eagle Protection Act (Eagle Act), Migratory Bird Treaty Act, Lacey Act, Airborne Hunting Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna. Along with delisting from the ESA, the USFWS revised the Eagle Act to codify the definition of "disturb" (USFWS 2007b) and finalize regulations to provide a mechanism to authorize take of eagles and eagle nests under limited circumstances (USFWS 2009). For implementation of take permits to be compatible with the Eagle Act, take must be "consistent with the goal of stable or increasing breeding populations." In the Southwest, take thresholds are extremely limited. In April 2012, the USFWS proposed revisions to eagle take permits which would have extended programmatic permits to a maximum of 30 years (USFWS 2012b), a rule which was challenged in court and overturned. As a result, the USFWS developed a new rule in 2016 to reinstate a 30-year permit and 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 28 members, with the Arizona Game and Fish Department (AGFD) as the lead implementation agency for bald eagle management projects. This report covers the 2023 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=52 BAs) [includes Arizona Upland Subdivision (n=46) and Lower Colorado River Valley Subdivision (n=6)], Rocky Mountain (Petran) Montane Conifer Forest (n=23), Plains and Great Basin Grasslands (n=9), 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 99 bald eagle BAs in 2023 occurred at elevations at or below 3,000 ft (914 m) (52.5% n=52), 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) (16.2%, n=16) or above 6,000 ft (>1,829 m) (31.3%, n=31). 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*).

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 included pinyon-juniper woodlands, shrub live oak (*Quercus turbinella*), and pointed (*Arctostaphylos pungens*) and pringle manzanita (*A. pringlei*).

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 AGFD.

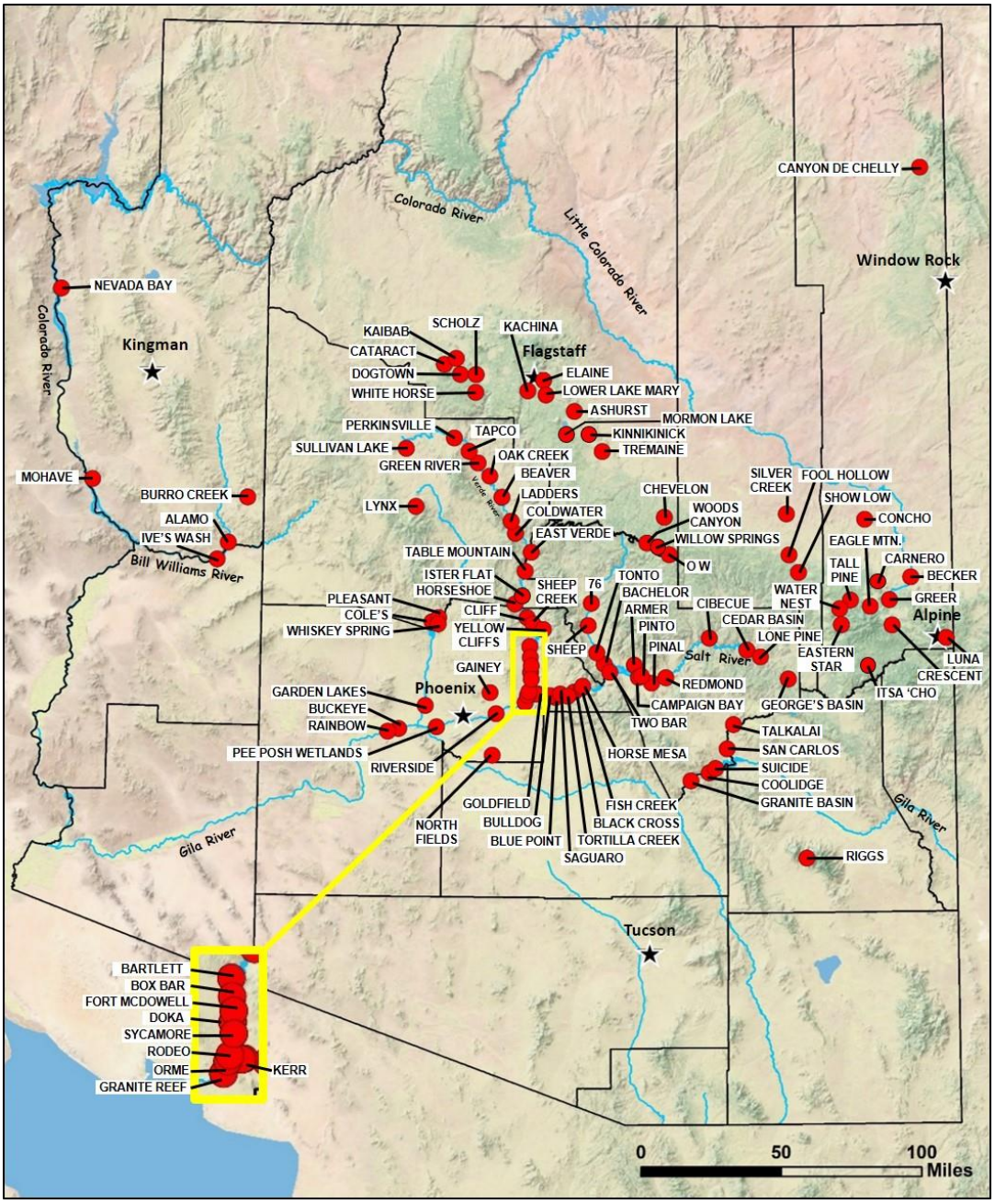

Figure 1. Location of known bald eagle breeding areas in Arizona, 2023.

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 disrupted or highly

modified riparian communities, primarily consisting of artificial water formations such as recharge basins, urban ponds and lakes, and canals.

In 2023, BAs were located along: Burro, Canyon, Cibecue, Moon, Oak, Pinal, Silver, Tonto, and Walnut creeks; Alamo, Apache, Ashurst, Bartlett, Canyon, Carnero, Cataract, Chevelon Canyon, Crescent, Dogtown, Fool Hollow, Greer, Horseshoe, Kaibab, Kinnikinick, Lower Lake Mary, Luna, Lynx, Mormon, Pleasant, Riggs, Roosevelt, Saguaro, San Carlos, Scholz, Show Low, Talkalai, Tonto, Tremaine, White Horse, Willow Springs, and Woods Canyon lakes or reservoirs; and the Agua Fria, Bill Williams, Black, Colorado, Little Colorado, Gila, North Fork White, 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 at least 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).

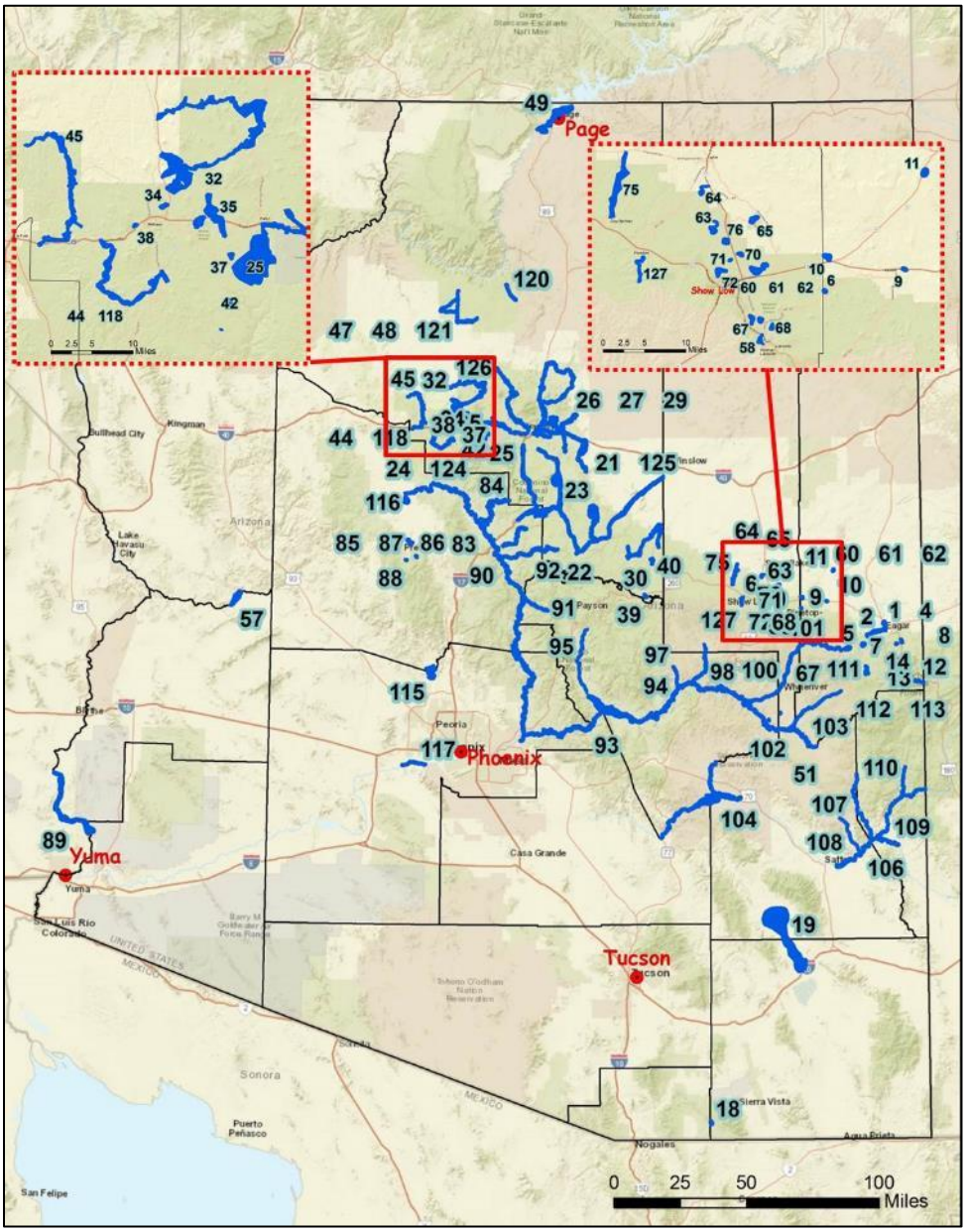

Figure 2. Map of the Arizona Bald Eagle Winter Count survey routes (blue outlines). County lines in black. See Appendix A for the associated route names.

METHODS

We continued to use, and strived to complete, the established standardized survey routes for the 2023 Arizona bald eagle winter count. Additionally, three 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 7-13, 2023 (within the national survey period of January 4-18) which included weekdays for agency personnel and a weekend for volunteers. The shorter 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 four 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, occurrence 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, 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 2023 Arizona bald eagle winter count tallied 188 bald eagles, including 135 adults (71.8%), 38 subadults (20.2%), and 15 unknown eagles (8.0%). Participants covered 77 of 104 standardized routes (74%) with a total survey effort of 8,194 minutes (136.6 hours) (Tables 1 and 2). An additional three non-standard routes were surveyed for a total of 264 minutes (4.4 hours) and zero bald eagles (Appendix A). The highest regional total number of bald eagles observed during ground surveys occurred in Gila County (1 route, 18 eagles) (Table 1), which was also the largest

concentration occurring on a single ground survey (Appendix A). A large number of bald eagles was also observed by helicopter along the Salt River and associated drainages (7 routes, 50 eagles).

The total of 188 bald eagles in 2023 was lower than the average of 243 birds observed annually during standardized counts in 2005-2022 (Table 2). The age composition of this year's count (72% adult, 20% subadult) was different than average ratio of adults to subadults in Arizona's winter counts since 2005, with a lower proportion of subadults this year. However, fewer survey routes were completed this year compared to most previous years and the percentage of "unknown" eagles was twice the average. While the difference in the number of routes surveyed makes it difficult to draw relevant comparisons to previous counts, supplementing the 2023 count with averaged data from 2013-2022 for the 27 routes that were not surveyed this year produces an estimated 213 total bald eagles (149 adults, 46 subadults, 18 unknown). This estimate suggests that the 2023 count would have been below average even 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=72), most responded that this year's weather was either normal (57%) or mild (36%), followed by very mild (4%) and harsh (3%). There were no responses for very harsh weather. Similarly, of those that rated ice cover (n=70), most responded that it was normal (58%), followed by less than normal (33%), much less than normal (6%), and more than normal (3%). There were no responses for much more than normal ice cover.

Table 1. Summary of the Arizona bald eagle winter count 2023.

Survey areas	Routes	Minutes (Hours)	Adults	Subadults	Unknown[1]	Total	Total/ Hr.
Apache County	14	1,060 (17.7)	14	2	2	18	1.0
Cochise County	2	300 (5.0)	1	0	0	1	0.2
Coconino County	16	3,639 (60.7)	15	9	3	27	0.3
Gila County	1	50 (0.8)	14	4	0	18	21.6
Graham County	Not surveyed by ground.						
Mohave County	1	125 (2.1)	3	0	0	3	1.4
Navajo County	14	551 (9.2)	2	0	5	7	0.8
Santa Cruz County	1	60 (1.0)	0	0	0	0	0.0
Yavapai County	6	1,574 (26.2)	6	2	5	13	0.5
Yuma & La Paz County	Not surveyed.						
Verde River drainage	3	215 (3.6)	18	1	0	19	5.3
Salt River drainage	7	353 (5.9)	45	5	0	50	8.5
Gila River drainage	8	221 (3.7)	5	8	0	13	3.5
Various helicopter	4	46 (0.8)	12	7	0	19	24.8
Totals	77	8,194 (136.6)	135	38	15	188	1.4

[1]Unknown age bald eagles and unidentified eagles.

Table 2. Summary of Arizona bald eagle winter counts 2005-2023.

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]	9,377*	99 (95%)	176 (66%)	78 (29%)	12 (5%)	266	1.7
2021	8,963	73 (70%)	130 (73%)	45 (25%)	2 (1%)	177	1.2
2022	9,111	95 (91%)	174 (70%)	63 (25%)	11 (4%)	248	1.6
2023	8,194	77 (74%)	135 (72%)	38 (20%)	15 (8%)	188	1.4
Average	9,231	94 (91%)	165 (69%)	68 (27%)	9 (4%)	240	1.6

[1]Unknown age bald eagles and unidentified eagles.
[2]Beginning of 104 standardized routes derived from the analysis of 1995-2005 surveys.
[3]Beginning of 102 standardized routes with Lake Meade and Lake Mohave routes dropped.
[4]Federal government shutdown affected survey effort and number of eagles.
[5]Beginning 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. 2022). The Department administered and performed the 2023 surveys in cooperation with the SWBEMC.

METHODS

We monitored breeding activity at current and historic BAs, nest sites discovered between 1992 and 2022, 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 2023. Winter count flights (January), and ORA flights (February to May), were used to locate nests and search for new BAs. Timing of the ORA flights corresponded with the timing of different breeding stages (incubation, hatching, nestling, and fledging).

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. 2022).

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”, “medium”, 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). “Medium” denotes nests that were not likely to have been

large enough for eagle use and were probable hawk *(Buteo* spp.) or common raven (*Corvus corax*) structures. The terms "small" and "short" refer to structures and nests of inadequate height and size for eagles. 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=99) were examined at least once for breeding activity. Out of 82 occupied BAs, 72 were active and 45 pairs successfully produced 65 fledglings (Table 3; Appendix C) for productivity of 0.79 statewide. For 46 BAs where nestlings were aged by feather development, the average egg laying date was estimated as January 31 (ranging from December 12 to April 1), and average hatch date was estimated as March 7 (ranging from January 16 to May 6). Laying and hatch dates were earlier at lower elevations, averaging January 16 and February 20 respectively at BAs at or below 3,000 ft (914 m) (n=26), January 30 and March 6 at BAs from 3,001 to 6,000 ft (914 to 1,829 m) (n=7), and March 2 and April 6 at BAs above 6,000 ft (n=13).

Noteworthy findings of the 2023 nest survey included six new bald eagle BAs (Carnero, Ister Flat, Itsa'cho, Kinnikinick, Mormon Lake, Willow Springs Lake), nine new alternate nests within BAs (Chevelon #6, Luna #3, Pinto #11, Rainbow #3, Riverside #4, Rodeo #7, San Carlos #8, Sheep Creek #2, and Woods Canyon #18), six fallen nests within BAs (Buckeye #3, Granite Reef #7, Pleasant #4, Pee Posh Wetlands #9, Riverside #2, and Tremaine #2), and ten new potential nests at six sites (Bear Canyon Lake #8, Blue Ridge #11-13, Campbell Mesa #1, Christopher Creek #2, JD Dam Lake #4, Santa Fe Reservoir #1-3).

Table 3. Summary of Arizona bald eagle productivity 2023.

Number of BAs	99	Number of Active BAs	72
Number of Occupied BAs	82	Number of Failed Breeding Attempts	27
Number of Eggs (minimum)	102	Number of Successful Breeding Attempts	45
Nest Success = 45/82	0.55	Number of Young Hatched	76
Mean Brood Size = 65/45	1.4	Number of Young Fledged	65
		Productivity = 65/82	0.79

DISCUSSION

Statewide productivity at Arizona bald eagle BAs in 2023 was 0.79 young fledged per occupied BA, with some differences in elevations and river systems. Most of this year's 82 occupied BAs 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 equal to the statewide average at the low elevation sites

(0.78, n=42; fledged 33), above average at the middle elevation sites (1.1, n=11; fledged 12), and below average at the high elevation sites (0.69, n=29; fledged 20). Over the last decade, sites at high elevations have experienced high productivity overall (averaging 1.1), making this year's decrease notable (Figure 3). Weather could have had an important influence on productivity at high elevations with record-breaking snowfall totals (up to three times normal levels) for the 2022-2023 winter months in many parts of Arizona. Also, much of the growth of the nesting population has occurred at these higher elevation sites in the past few years, and low productivity could be a result of having an influx of new, inexperienced breeders at these sites.

There were also differences in productivity between sites along the Salt and Verde Rivers, which together supported 37.8% (n=31) of this year's occupied BAs. Productivity was above the statewide average along the Verde River (1.4, n=14; fledged 19), where it was high at BAs on the regulated portions of the river (1.1, n=9; fledged 10) and higher on the unregulated portion (1.8, n=5; fledged 9). In contrast, overall productivity on the Salt River was relatively low (0.59, n=17; fledged 10), where BAs on the regulated and unregulated Salt River (downstream vs. upstream of the Highway 288 bridge) had below-average productivity (0.62, n=13; fledged 8 vs. 0.50, n=4; fledged 2).

While statewide productivity varies annually and averaged 0.91 over the last ten years (Figure 4, Table 4), 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 over three new BAs identified each year from 2006 to 2023. Since 2015, the majority of new BAs (61%) were found at elevations above 6,000 ft, including five of the six confirmed this year (Carnero, Its'cho, Kinnikinick, Mormon Lake, and Willow Springs). Along with their expansion to higher elevations, breeding eagles have built new nests on a variety of substrates in recent years, from snags, live trees, and cliffs to artificial platforms and a construction crane. Changes in occupancy, productivity, and distribution, and the continued discovery of new breeding areas and new nests, demonstrates the necessity of ORA and survey flights as a means to consistently monitor bald eagle demography.

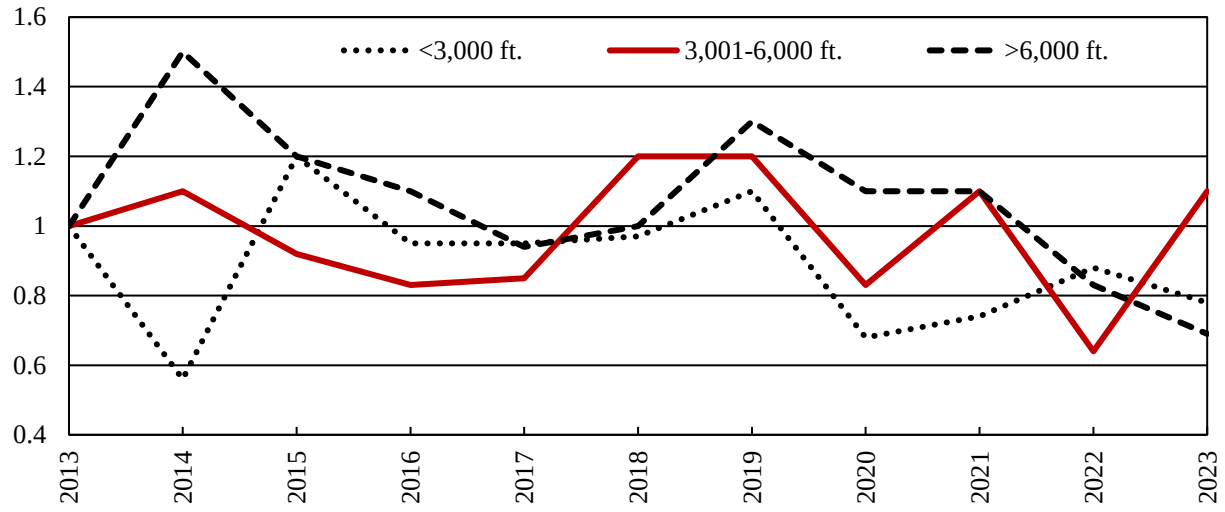

Figure 3. Productivity at bald eagle breeding areas in Arizona by elevation (in feet), 2013-2023.

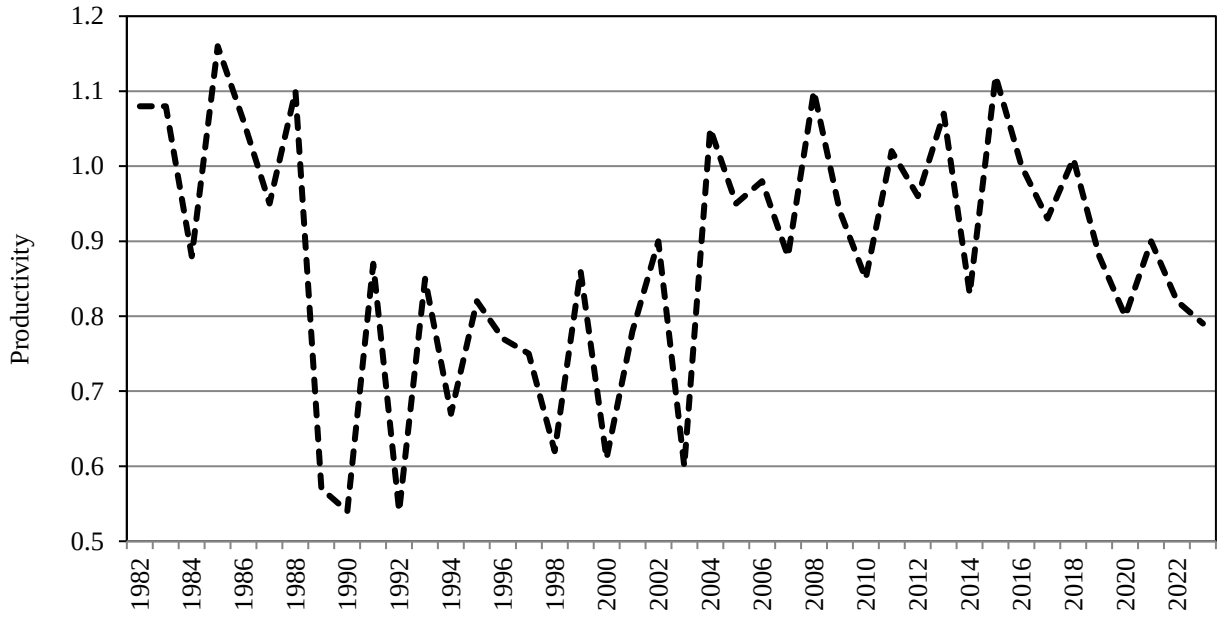

Figure 4. Productivity at bald eagle breeding areas in Arizona, 1982-2023.

Table 4. Arizona bald eagle ten-year productivity summary.

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Number of BAs	99	95	93	92	89	87	85	81	76	68
Number of occupied BAs	82	75	77	73	74	69	68	65	59	52
Occupancy rate (%)	83	79	83	79	83	79	80	80	78	77
Number of eggs (minimum)	102	104	104	92	97	102	97	97	90	73
Number of active BAs	72	63	66	66	67	63	60	60	56	47
Failed breeding attempts	27	24	21	27	26	19	25	19	17	17
Successful breeding attempts	45	39	44	36	41	44	35	41	39	30
Young hatched	76	78	87	71	72	87	82	79	75	58
Young fledged	65	61[a]	69[a]	56[a]	65	70	63	65	66	43
Nest success	0.55	0.53[a]	0.58[a]	0.51[a]	0.55	0.64	0.51	0.63	0.66	0.58
Mean brood size	1.4	1.6[a]	1.6[a]	1.6[a]	1.6	1.6	1.8	1.6	1.7	1.4
Productivity	0.79	0.82[a]	0.91[a]	0.80[a]	0.88	1.01	0.93	1.0	1.12	0.83

[a]Some 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.

Campbell Mesa. – On April 13, an osprey (*Pandion haliaetus*) was incubating in a new large nest (#1) in a snag at Walnut Canyon Lakes in Flagstaff. No eagles were seen.

Carnero Lake (new BA). – On March 27, SWCA Environmental Consultants observed an adult bald eagle incubating in a new large nest (#1) in a live ponderosa pine tree near the lake. Although incubation continued until at least April 14 (Figure 5), the nest was empty on May 16. This is not an area that AGFD has surveyed for nesting bald eagles in the past, so it is unknown how long a breeding territory has existed at this location.

Itsa'cho (new BA). – On March 15, an adult bald eagle was incubating in a new large nest (#1) in a live pine tree (Figure 5). A second large nest (#2) was found nearby. Two adults were observed in the area on April 14, but the nest was empty. This is not an area that AGFD has surveyed for nesting bald eagles in the past, so it is unknown how long a breeding territory has existed at this location. Due to the sensitivity of the nest location, the specific area is not named in this report.

Figure 5. Carnero (left) and Itsa'cho (right) breeding areas. Photos by Kyle McCarty and Jennifer Presler.

Kinnikinick Lake (new BA). – On May 1, an adult bald eagle was brooding two small nestlings, approximately two weeks old, in a new large nest (#1) in a live pine tree, and a second adult was perched in the nest (Figure 6). AGFD has surveyed this lake by air semi-annually during May and this year is the first time that nesting has been observed.

Mormon Lake (new BA). – In early May, we received a tip from the Mormon Lake fire station of a bald eagle at a nest in the area of Mormon Lake. On May 9, we observed an adult bald eagle with one 5.5-week old nestling (Figure 6). This is not an area that AGFD has surveyed for nesting bald eagles in the past, so it is unknown how long a breeding territory has existed at this location. However, unlike many years, Mormon Lake was full of water due to snowmelt from a very wet

winter and remained full throughout the spring, potentially attracting waterfowl and other prey sources for the eagles to utilize.

Figure 6. Kinnikinick (left) and Mormon Lake (right) breeding areas. Photos by Jennifer Presler and Kyle McCarty.

Table 5. Arizona bald eagle nest survey summary, 2023 new locations.

Location	Date(s)	Survey Method	Results
Black Canyon Lake	5/1	Helicopter	No nests or eagles.
Boni Tank	1/31	Helicopter	No nests or eagles.
Campbell Mesa	4/13	Helicopter	Osprey incubating in new nest #1.
Carnero Lake	4/14, 5/16	Helicopter	Adult incubating in new nest #1 on 4/14. Nest empty, failed by 5/16.
East Verde River	1/6	Helicopter	No nests or eagles.
Itsa'cho	1/31, 3/15, 4/14, 5/16	Helicopter	Adult incubating in nest #1 on 3/15. Nest empty, failed by 4/14.
Kinnikinick Lake	5/1	Helicopter	Adult with two nestlings, 2 weeks old. Second adult perched.
Mormon Lake	5/9, 5/12	Ground	One nestling, 5.5 weeks old, in new nest #1 on 5/9 and 5/12.
Pacheta Lake	1/31, 3/15, 4/14	Helicopter	No nests or eagles.
Reservation Lake	4/14	Helicopter	No nests or eagles.
Rogers Lake	5/1	Helicopter	No nests or eagles.
West Clear Creek	1/6	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 1, ospreys were incubating in nests #6 and #7. A new large nest (#8) was found in a live pine tree. No eagles were seen; however the new nest resembled an eagle construction rather than an osprey nest.

Blue Ridge Reservoir. – On May 1, an osprey was incubating in nest #8. Four new large nests were found in snags (#11-14), with an osprey incubating in #14. One osprey was potentially incubating in nest #11, and another osprey was perched at #12. No eagles were seen.

Christopher Creek. – On May 1, a new large nest (#2) was discovered at the top of a live pine tree. One osprey was perched within a mile of the new nest. No eagles were seen.

Granite (golden eagle BA). – On March 17, a golden eagle was incubating in nest #2. On May 3, the Prescott Audubon Society photographed one nestling approximately 6 weeks old.

Ister Flat (new BA). – During the 2022 nesting season, two adult bald eagles were seen perched by a nest (#1) in a snag but no eggs were laid. This year, an adult was incubating in nest #1 on March 17. The nesting attempt failed by April 13.

JD Dam Lake. – On April 13, two ospreys were standing in a new nest in a snag (#4). No eagles were seen.

Knoll Lake. – On May 1, an osprey was incubating in nest #6. No eagles were seen.

Mormon Pocket (golden eagle BA). – A golden eagle was incubating in nest #2 on March 17 and incubating or brooding on April 13. An adult was seen with one nestling, 2-3 weeks old, on May 1 (Figure 7).

Santa Fe Reservoir. – On May 1, an osprey was incubating in a new nest in a snag (#3), and a second large nest was also found in a snag (#4). No eagles were seen.

Willow Springs Lake (new BA). – On May 1, an adult bald eagle was incubating in a new large nest (#13) (Figure 7). AGFD has consistently monitored the lake since the early 2000s and numerous osprey nests have been detected during that time (#1-12), with occasional sightings of bald eagles. This year marks the first time an active bald eagle nest was documented at the lake.

Figure 7. Mormon Pocket golden eagle nest (left) and Willow Springs breeding area (right). Photos by Jennifer Presler.

Table 6. Arizona bald eagle nest survey summary, 2023 potential nest sites.			
Location*	Date(s)	Survey Method	Results
Bear Canyon Lake	5/1	Helicopter	Ospreys incubating in nests #6 and #7. New large nest found #8. No eagles.
Blue Ridge Reservoir	5/1	Helicopter	Ospreys incubating in nests #8. Four new large nests found #11-14. Ospreys at #11, #12, and incubating in #14. No eagles.
Christopher Creek	5/1	Helicopter	Nest #1 not found. New large nest found #2. No eagles.
Granite (2GE049)	1/6, 3/17	Helicopter	Golden eagle incubating in nest #2 on 3/17.
Hell Point (3GE017)	1/6, 3/17	Helicopter	All known nests empty. No eagles.
Ister Flat	1/6, 1/30, 3/17, 4/13	Helicopter	Adult incubating in nest #1 on 3/17. Nest empty, failed by 4/13.
JD Dam Lake	4/13	Helicopter	Pair of ospreys standing in a new nest #4. No eagles.
Knoll Lake	5/1	Helicopter	Osprey incubating in nest #6. No eagles.
Mormon Pocket (2GE031)	1/6, 3/17, 4/13, 5/1	Helicopter	Golden eagle incubating in nest #2 on 3/17. Incubating or brooding on 4/13. One nestling, 2-3 weeks old on 5/1.
Muldoon	3/17	Helicopter	All known nests empty. No eagles.
Pineasco Creek	1/12, 1/31, 3/15	Helicopter	All known nests empty. No eagles.
Santa Fe Reservoir	5/1	Helicopter	All known nests empty. Two new large nests found #3 and #4. Osprey incubating in nest #3.
Sunflower Flat	4/20	Helicopter	No nests or eagles.
Verde River (Camp Verde)	1/6, 3/17	Helicopter	Small nest, falling apart. No eagles.
Willow Springs Lake	5/1, 5/11, 5/25	Helicopter, Ground	Adult incubating in new large nest #13 on 5/1. Osprey incubating in nest #4 and new large nest #14. Pairs of ospreys at nests #2, #5, and #12.

*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.

Mule Hoof. – On January 12, a new medium-large nest was found on a cliff. No eagles were seen.

Table 7. Arizona bald eagle nest survey summary, 2023 historic breeding areas.			
Location	Date(s)	Survey Method	Results
Bagley	1/10, 1/30	Helicopter	All known nests empty. No eagles.
Canyon	1/10	Helicopter	No new nests or eagles.
Needle Rock	1/6, 1/30	Helicopter	No new nests or eagles.
Tower	1/6	Helicopter	All known nests empty. No eagles.
Mule Hoof	1/12	Helicopter	All known nests empty. One new medium-large nest on cliff #4. 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.

Becker. – One adult bald eagle was seen in the area on January 31. Two adults were seen on March 3 and an adult was perched near nest #2 on March 28 (Figure 8).

Blue Point. – On January 10, two adults were perched at nest #10. No nesting activity was detected this year. On September 13, an adult bald eagle with blue band 15/P was found injured at Saguaro Lake with a fracture of the right proximal radius and ulna. This eagle was originally confirmed as the breeding male at the Bagley BA in 2009-2010 and at the Blue Point BA since 2011. The eagle was transferred to Liberty Wildlife Rehabilitation for surgery and long-term care.

Buckeye. – On January 6, nest #3 was fallen. No eagles or new nests were seen.

Campaign Bay. – This was the tenth consecutive year that the Campaign Bay BA has been unoccupied, and it will now be designated as a historic BA.

Chevelon. – On May 1, two adult bald eagles were observed with a 4.5-week old nestling in a new nest (#6) in a snag (Figure 8). Nest #5 was empty and not maintained, and the nest tree died.

Figure 8. Becker (left) and Chevleon (right) breeding areas. Photos by Kyle McCarty and Jennifer Presler.

Coldwater. – This was the tenth consecutive year that the Coldwater BA has been unoccupied, and it will now be designated as a historic BA.

Cole's Bay. – On January 6, one adult bald eagle was perched near nest #1. Nestwatchers reported two adults in the area during February and March, and observed the eagles maintaining nest #1, perching together, and copulating, but no eggs were laid.

Granite Reef. – On January 10, nest #7 was fallen. Two adult bald eagles were perched in the area on January 30, but no new nests were found. Nestwatchers did not observe any nesting activity this year.

Kerr. – Two adult bald eagles were seen on January 10, with one adult standing in nest #3 and a second one seen flying toward the nest. An adult and immature bald eagle were perched near nest #3 on January 30, and two adults were standing in the nest on March 17.

Lone Pine. – On January 12, one adult was seen perched near nest #9, which was empty.

Luna. – Although AGFD did not conduct aerial or ground surveys at Luna Lake this year, Nestwatchers monitored the site and reported incubation behavior starting between February 13 and 17 in nest #3, which was the starter platform installed by AGFD in August of 2022 (McCarty et al. 2022).

Lynx. – On January 6, we observed nest #6 had been rebuilt. The nest had been noted as fallen in 2019.

Pee Posh Wetlands. – On January 6, an adult bald eagle was incubating in nest #9. A 5-week old nestling was seen on March 17. On March 24, personnel from the City of Phoenix reported that the nest tree had fallen and the nestling was on the ground. In coordination with the Gila River Indian Community, an AGFD wildlife manager was able to recover the nestling and took it to Liberty Wildlife for examination. The nestling was found in overall good health with some minor scrapes and bruising. On March 25, in coordination with the Salt River Pima-Maricopa Indian Community (SRPMIC), we fostered the nestling to the Orme BA where two nestlings of similar age were being monitored by Nestwatchers. All three young later fledged successfully.

Pleasant. – On January 6, nest #4 was fallen, and two adults were perched in the area of nests #3 and #5. A single adult was seen on January 30. Nestwatchers monitored the breeding area through March and observed a pair of adults, but no eggs were laid.

Pinto. – In September 2022, SRP reported a new large nest under construction on a set of distribution poles in the breeding area, and an adult bald eagle was seen perched on a pole near the nest. In coordination and under permit with the USFWS, SRP installed an alternate set of stand-alone poles 260 feet away. The nest materials were then transferred from the active power poles to a platform on the stand-alone poles with assistance from AGFD on November 21 (Figure 9). We assigned the platform as nest #11. On January 31, 2023, an adult bald eagle was incubating in nest #10.

Rainbow. – In April, we were informed of a bald eagle nest on a construction crane in Buckeye. Eagles were first observed at the nest on January 26 with a photo by the public of an adult apparently incubating. On April 28, we observed two nestlings approximately 9 weeks old in the nest (Figure 9), and an adult perched on top of the abandoned crane. There were multiple inactive great blue heron (*Ardea herodias*) nests along the crane, and the eagle nest likely had been constructed on one of them. This nest is within the Rainbow BA and will be assigned as nest #3.

Figure 9. Pinto (left) and Rainbow (right) breeding areas. Photos by Jennifer Presler and Kyle McCarty.

Redmond. – On January 31, an adult bald eagle was seen perched about one mile downstream of nest #5, which was empty.

Riverside. – In November 2022, SRPMIC observed a new large nest (#4) in a live tree with a pair of adult bald eagles at the nest. On January 10, 2023, an adult was incubating in the new nest.

Rodeo. – On January 6, an adult bald eagle was incubating in a new large nest (#7) in a snag.

San Carlos. – On January 10, two adult bald eagles were seen near a new large nest (#8) in a live cottonwood tree. An adult was incubating in the new nest on January 31 (Figure 10).

Sheep Creek. – On January 6, two adult bald eagles were observed flying and perched near a new large nest (#2) in a live cottonwood tree along the creek, and an adult was incubating in the new nest on January 30. On March 17, an unattended egg was seen in the nest and the breeding attempt was considered failed.

Suicide. – On January 31, an adult bald eagle was perched in the breeding area, however all known nests were empty.

Talkalai. – On January 10, one adult was seen in the area. Nest #10 was partially fallen on January 31. The San Carlos Apache Tribe reported a pair of adults at the lake, but no nesting activity.

Tapco. – On February 16, a single adult was perched in the breeding area. All known nests were empty.

Tonto. – On January 10, one adult bald eagle was perched near nest #6. Nestwatchers monitoring at the nearby Bachelor Cove breeding area did not observe any nesting activity at Tonto this year.

Tremaine. – On February 27, an adult bald eagle was incubating in nest #2. On April 18, the U.S. Forest Service (USFS) found the nest tree had collapsed, ending the nesting attempt (Figure 10).

Figure 10. San Carlos (left) and Tremaine (right) breeding areas. Photos by Jennifer Presler and Charles Stocksdale.

White Horse Lake. – On April 13, we observed a pair of bald eagles perched together in a tree by the lake. Based on size, they appeared to be a female (near-adult plumage, not banded) and male (adult plumage with a silver band on the right leg and unknown band status of the left leg). No new nests were found. On May 1, an osprey was incubating in nest #8 and another osprey was standing in nest #6.

Woods Canyon. – In late April, the USFS reported bald eagles nesting in the same general area as previous years. On May 1, we observed an adult bald eagle incubating in a new nest (#18) in a snag. The pair had used a different nest (#13) in the same snag in 2019-2020, but that nest was not seen this year and was presumed fallen.

Table 8. Arizona bald eagle nest survey summary, 2023 breeding areas (continued next page).

Location	Date(s)	Method	Results
Becker	1/31, 3/3, 3/28	Helicopter	All known nests empty. One adult in area on 1/31 and two adults in area on 3/3. One adult perched at nest #1 on 3/28.
Blue Point	1/10, 1/30	Helicopter	All known nests empty. Pair of adults at nest #1 on 1/10.
Buckeye	1/6, 1/30	Helicopter	Nest #3 fallen on 1/6. No eagles.
Campaign Bay	1/10, 3/15	Helicopter	No nests or eagles.
Chevelon	5/1, 6/2, 6/8	Helicopter, Ground	Two adults with one nestling, 4.5 weeks old, in a new nest #6.
Coldwater	1/6, 1/30, 3/17	Helicopter	All known nests empty. No eagles.
Cole's Bay	1/6, 1/30, 3/14	Helicopter	All known nests empty. One adult perched on 1/6.
George's Basin	1/12, 1/31, 3/15, 4/14	Helicopter	All known nests empty. One adult flying in area on 1/31.
Granite Reef	1/10, 1/30	Helicopter	All known nests empty. Pair of adults perched on 1/30.
Kerr	1/10, 1/30, 3/17	Helicopter	All known nests empty. Two adults on 1/10. One adult and one immature on 1/30. Two adults on 3/17.
Lone Pine	1/12, 1/31, 3/15, 4/14	Helicopter	All known nests empty. One adult near nest #9 on 1/12.

Table 8 continued.

Location	Date(s)	Method	Results
Luna	--	--	Nestwatchers report incubation in new platform nest #3 in mid-February.
Lynx	1/6, 3/17, 4/20	Helicopter, Ground	Nest #6 was found rebuilt on 1/6. Adult with at least one nestling on 3/17.
Pee Posh Wetlands	1/6, 1/30, 3/17	Helicopter	Adult incubating in nest #9 on 1/6. Nest #9 fallen on March 24.
Pinto	1/10, 1/31, 3/15	Helicopter	Adult incubating in nest #10 on 1/31.
Pleasant	1/6, 1/30, 3/14	Helicopter	All known nests empty. Nest #4 fallen. Two adults perched on 1/6. One adult on 1/30.
Rainbow	1/6, 1/30, 4/28, 5/10	Helicopter, Ground	Two nestlings, 9 weeks old, in new nest #3. One adult perched.
Redmond	1/10, 1/31, 3/15	Helicopter	All known nests empty. One adult perched downstream on 1/31.
Riverside Ruin	1/10, 1/30, 3/16, 4/13, 4/28	Helicopter, Ground	Adult incubating in new nest #4 on 1/10.
Rodeo	1/6, 1/30, 3/17, 4/13	Helicopter	Adult incubating in new nest #7 on 1/6.
San Carlos	1/10, 1/31, 3/15	Helicopter	Two adults in area of a new large nest #8 on 1/10. Adult incubating in new nest on 1/31.
Sheep Creek	1/6, 1/30, 3/17	Helicopter	Two adults near a new large nest #2 on 1/6. Adult incubating in the new nest on 1/30.
Suicide	1/10, 1/31, 3/15	Helicopter	All known nests empty. One adult perched on 1/31.
Tapco	1/6, 2/16, 3/17	Helicopter, Ground	All known nests empty. One adult perched on 2/16.
Tonto	1/10, 1/31	Helicopter	All known nests empty. One adult perched on 1/10.
Tremaine	2/27	Helicopter	Adult incubating in nest #2 on 2/27. USFS reported the nest tree fallen on 4/18.
White Horse Lake	3/17, 4/13, 5/1	Helicopter	Two adults perched together on 4/13. Osprey incubating in nest #8 on 5/1.
Woods Canyon Lake	5/1, 5/25	Helicopter, Ground	Adult incubating in new large nest #18 on 5/1. Nest #13 fallen.

Breeding Areas in Surrounding States (Table 9)

Black Canyon BA (Nevada). – On March 14, two adults were perched near nest #1, which was empty (Figure 11). No other nests were found. Both adults were unbanded.

Figure 11. Empty nest at Black Canyon breeding (left) and unbanded adults (right). Photos by Jennifer Presler.

Table 9. Bald eagle breeding area observations in surrounding states, 2023.			
Location	Date(s)	Survey Method	Results
Black Canyon, NV	3/14	Helicopter, Ground	Pair of adults perched near nest #1.
Copper Basin, CA	3/14	Helicopter	All known nests empty. No eagles.
Whipple Mountains, CA	3/14	Helicopter	All known nests empty. No eagles.

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.
    - 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.
    - 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, Nelson, 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, San Tan Valley, 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 2023. 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 Bay, Concho, Goldfield, Luna, Pleasant, Whiskey Spring, and Woods Canyon), those without closures (Fort McDowell, Granite Reef, Orme, Rodeo, Scholz Lake, Sycamore, and Willow Springs), and those monitored opportunistically for information (Doka and Tonto). In the fall of 2022, 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. Communication was also achieved via phone, email, and during visits to field sites by AGFD personnel.

Fieldwork began February 3 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, two-way handheld 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, Concho, Willow Springs, and Woods Canyon BAs the 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, the nestwatchers limited their recording of human activity to the lake area east of the highway. At the Willow Springs and Woods Canyon BAs, due to a high volume of recreationists at the lake, nestwatchers only recorded eagle responses to activities within about 200 m of the nest or an eagle, as well as visitors to the observation point and any activity that elicited a significant response from an eagle.

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.

RESULTS AND DISCUSSION

The ABENWP monitored 19 breeding areas (either full or part-time) in 2023 including Bachelor Cove, Box Bar, Cole's Bay, Concho, Doka, Fort McDowell, Goldfield, Granite Reef, Luna, Orme, Pleasant, Rodeo, Scholz Lake, Sycamore, Tonto, Whiskey Spring, Willow Springs, and Woods Canyon (Appendix C). The Cole's Bay, Doka, Fort McDowell, Granite Reef, and Tonto BAs were either 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 12)
Observation Period. – February 3 to April 23. Total monitoring 523 hours over 55 days.

Bald Eagle Identification. – Both eagles were in adult plumage. 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 522 human activities. Terrestrial activity of ten types represented 80.8% of activities, watercraft (fishing by boat, canoe/kayak) 15.2%, and aircraft activity (small plane, helicopter, jet) 4.0%. One type of activity elicited one significant response from the breeding pair. The bald eagles flushed in response to one hiker.

Food Habits. – The nestwatchers observed ten forage events, with fish accounting for 80.0%, birds 10.0%, and mammals 10.0%. The male was successful in 85.7% (n=7) and the female in 66.7% (n=3) of forage events. The breeding pair was observed delivering 104 prey items to the nest, of which the male delivered 74.0%, the female 25.0%, and an unknown adult 1.0%. Fish comprised 78.8%, mammals 12.5%, birds 4.8%, and unknown prey 3.8% of the deliveries. Of the 11 prey items further identified, 27.3% (n=3) were bass species (e.g., *Micropterus sp.*), 18.2% (n=2) each were catfish species (e.g. *Pylodictis olivaris* or *Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), and American coot (*Fulica americana*), and 9.1% (n=1) each were common carp (*Cyprinus carpio*) and gizzard shad (*Dorosoma cepedianum*).

Habitat Use. – The Bachelor Cove nestwatchers identified 17 separate perch locations spanning 0.9 km of Roosevelt Lake, ranging from lk 82.2 to 83.1. The bald eagle pair spent 66.0% of the observed time at lake km (lk) 82.2, 24.8% at lk 82.5, 8.3% at lk 82.4, and 0.9% at the remaining locations.

Figure 12. Bachelor Cove (left) and Box Bar (right) breeding areas. Gila and Maricopa Counties, Arizona.

Box Bar Breeding Area (Appendix F, Figure 12)
Observation Period. – February 3 to May 21. Total monitoring 696 hours over 79 days.

Bald Eagle Identification. –The male was in adult plumage and not banded (unknown origin), and the female was in near-adult to adult plumage and was not banded.

Management Activities. – 1) The USFS enacted a closure around the nest area and placed or maintained "No Entry" signs.

Human Activity. – Nestwatchers recorded 937 human activities. Terrestrial activity of 14 types represented 84.6%, water pursuits (kayak, swimmer, tuber, paddle board) 14.5%, and aircraft (helicopter, drone) 0.4% of activities. Three activities elicited four significant responses from the breeding pair. The eagles were restless in response to two motorcycles and flushed in response to one hiker and one kayak.

Food Habits. – The nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 47 prey items to the nest, of which the male delivered 59.6% and the female 40.4%. Fish comprised 74.4%, mammals 2.1%, birds 2.1%, and unknown prey 21.3% of the deliveries. Of the 7 prey items further identified, 57.1% were catfish species, 28.6% were tilapia (*Tilapia* spp.), and 14.3% were waterfowl species.

Habitat Use. – The Box Bar nestwatchers identified ten separate perch locations spanning 0.8 km of the Verde River ranging from river kilometer (rk) 25.0 to 25.8. The bald eagles spent 83.0% of the observed time at rk 25.5, 12.2% at rk 25.9, 2.8% at rk 25.8, and 1.9% at the remaining locations.

Concho Breeding Area (Appendix G, Figure 13)
Observation Period. – February 4 to May 20. Total monitoring 664 hours over 78 days.

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

Management Activities. – 1) "No Entry" signs were placed or maintained around the perimeter of the nest area. 2) On March 31, two female nestlings were banded with blue VID bands "95B" and "96B" at 6 weeks old.

Human Activity. – Nestwatchers recorded 123 human activities. Terrestrial activity of nine types represented 98.3% and aircraft activity (helicopters) 1.6%. Three types of activities elicited four significant responses from the breeding pair. The bald eagles flushed in response to two people walking, one helicopter, and one nestwatcher.

Food Habits. – The nestwatchers observed 42 forage events, with birds accounting for 45.2%, mammals 21.4%, fish 14.3%, and unknown prey types 19.0%. The male was successful in 92.0% (n=25) and the female 100% (n=17) of forage events. The breeding pair was observed delivering 47 prey items to the nest, of which the male delivered 63.8% and the female 36.2%. Birds comprised 42.6%, mammals 19.1%, fish 12.8%, and unknown prey types 25.5% of the deliveries. Of the 26 prey items further identified, 61.5% were American coots, 26.9% were Gunnison's prairie dogs, and 3.8% each were common merganser (*Mergus merganser*), rainbow trout (*Oncorhynchus mykiss*), and rabbit species.

Habitat Use. – The Concho nestwatchers identified 21 separate perch locations at the lake. The bald eagle pair spent 41.5% of the observed time at lk 1.4, 22.5% at lk 1.3, 16.8% at lk 1.5, 3.7% at lk 1.41, 3.6% at lk 1.0, and 11.9% at the remaining locations.

Figure 13. Concho (left) and Goldfield (right) breeding areas. Apache County and Maricopa County, Arizona.

Goldfield Breeding Area (Appendix H, Figure 13)
Observation Period. – February 3 to May 3. Total monitoring 579 hours over 66 days.

Bald Eagle Identification. – Both resident eagles were in adult plumage. Nestwatchers reported the male had a blue VID band on the left leg, and a USFWS band on the right leg (unknown origin, but blue band consistent with Arizona origin), and the female was unbanded (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 3,045 human activities during the observation period. Terrestrial activities of 16 types represented 53.5%, water pursuits (paddleboard, canoe/kayak, tuber, boat) 42.7%, and aircraft (helicopter, small plane, and drone) 3.8%. Two types of activity elicited four significant responses from the breeding pair. The bald eagles flushed in response to three helicopters and one hiker.

Food Habits. – The nestwatchers observed ten forage events, with fish accounting for 80.0%, mammals 10.0%, and unknown prey types 10.0%. The male was successful in 71.4% (n=7) and the female 100% (n=3) of forage events. The breeding pair was observed delivering 22 prey items to the nest, of which the male delivered 63.6% and the female 36.4%. Fish comprised 86.4%, mammals 4.6%, and unknown prey types 9.1% of the deliveries. None of the prey items were further identified.

Habitat Use. – The Goldfield nestwatchers identified 25 perch locations, spanning a 2.2 km stretch of the Salt River ranging from rk 8.6 to 10.8. The bald eagle pair spent 45.6% of the observed time at rk 9.7, 21.7% at rk 9.9, 17.3% at rk 9.4, 3.5% at rk 9.2, and 11.8% at the remaining locations.

Luna Breeding Area (Appendix I, Figure 14)
Observation Period. – February 3 to April 3. Total monitoring 384 hours over 44 days.

Bald Eagle Identification. – Nestwatchers reported that both resident eagles were in adult plumage and unbanded.

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

Human Activity. – The nestwatchers recorded 242 human activities. Terrestrial activity of 12 different types accounted for 97.9%, aircraft (jets, drones) 1.7%, and water pursuits (kayaks/canoes) 0.4%. Three types of activities elicited three significant responses from the breeding pair. The eagles flushed in response to one military jet and left the area in response to one driver and one drone.

Food Habits. – The nestwatchers observed 26 forage events, with birds accounting for 100%. The male was successful in 84.2% (n=19) and the female in 71.4% (n=7) of forage events. The breeding pair was observed delivering 17 prey items to the nest, of which the male delivered 88.2% and the female 11.8%. Birds comprised 100% of these deliveries, including 94.1% American coots and 5.9% common raven.

Habitat Use. – Nestwatchers identified 16 separate habitat use areas around Luna Lake. The bald eagle pair spent 45.4% of the observed time at lk 2.4, 35.2% at lk 2.2, 8.3% at lk 2.3, 5.8% at lk 2.6, and 5.3% at the remaining locations.

Figure 14. Luna (left) and Orme (right) breeding areas. Apache County and Maricopa County, Arizona.

Orme Breeding Area (Appendix J, Figure 14)
Observation Period. – February 4 to May 4. Total monitoring 566 hours over 90 days.

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

Management Activities. – 1) The SRPMIC continues to restrict non-tribal member use to the area. 2) On March 20, one male and one female nestling were blue VID banded "91/B" and "92/B" at 6 weeks old. 3) On March 24, a 6-week old male nestling (blue VID banded "94/B") was fostered to Orme from the Pee Posh Wetlands BA after the nest tree fell at that site.

Human Activity. – Nestwatchers recorded 241 human activities. Aircraft (helicopters, small planes) represented 87.6%, terrestrial activities 11.6%, and water pursuits (boaters) 0.4%. One type of activity elicited two significant responses from the breeding pair. The bald eagles flushed in response to two AGFD biologists.

Food Habits. – The nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 59 prey items to the nest, of which the male delivered 67.8% and the female 32.2%. Fish comprised 55.9%, mammals 39.0%, birds 1.7%, reptiles 1.7%, and carrion 1.7% of the deliveries. Of the 34 prey items further identified, 35.3% were rainbow trout, 29.4% were rabbit species, 23.5% were catfish species, 5.9% were yellow bullhead catfish (*Ameiurus natalis*), and 2.9% each were largemouth bass (*Micropterus salmoides*) and ground squirrel species.

Habitat Use. – The Orme nestwatchers identified 18 perch locations spanning 0.8 km along the Verde River ranging from rk 0.2 to 0.8 and the Salt River at rk 1.2. The bald eagle pair spent 62.2%

of the observed time at rk 0.4, 23.1% at rk 0.6, 10.6% at rk 0.1, 1.8% at rk 0.7, and 2.3% at the remaining locations.

Rodeo Breeding Area (Appendix K, Figure 15)
Observation Period. – Part-time observations from February 3 to March 5. Full-time observations from March 6 to April 16. Total monitoring 216 hours over 38 days.

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

Management Activities. – 1) The Fort McDowell Yavapai Nation (FMYN) restricts non-tribal member use of the river area. 2) On March 31, nestwatchers found one of the nestlings had fallen from the nest. In coordination with FMYN, AGFD recovered the nestling and transferred it to Liberty Wildlife. The nestling died of its injuries on April 6.

Human Activity. – Nestwatchers recorded 22 human activities. Aircraft (helicopters and small planes) accounted for 63.6% and terrestrial activities for 36.3%. One type of activity elicited one significant response from the breeding pair. The eagles left the area in response to one biologist.

Food Habits. – Nestwatchers observed one forage event, with the female foraging for unknown prey and unknown result. The breeding pair was observed delivering 21 prey items to the nest, of which the male delivered 66.7%, the female 28.5%, and an unknown adult 4.8%. Fish comprised 42.9%, birds 4.8%, mammals 4.8%, and unknown prey types 47.5% of the deliveries. None of the prey items were further identified.

Habitat Use. – The Rodeo nestwatchers identified 10 separate perch locations spanning 3.9 km along the Verde River, ranging from river kilometer (rk) 3.1 to 7.0. The bald eagle pair spent 64.1% of the observed time at rk 4.0, 27.2% at rk 3.1, 3.6% at rk 4.1, 2.4% at rk 4.6, 2.2% at rk7.0, and 0.5% at the remaining locations.

Figure 15. Rodeo (left) and Scholz (right) breeding areas. Maricopa County and Coconino County, Arizona.

Scholz Lake Breeding Area (Appendix L, Figure 15)
Observation Period. – May 10 to July 7. Total monitoring 385 hours over 51 days.

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

Management Activities. – 1) Nestwatchers educated recreationists about bald eagles.

Human Activity. – Nestwatchers recorded 118 human activities. Terrestrial activities of five types accounted for 81.4% and water pursuits (canoe/kayak, paddleboard) for 18.6%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – Nestwatchers observed 13 forage events, with fish accounting for 100%. The male was successful in 70.0% (n=10), the female in 100% (n=2), and an unknown adult in 100% (n=1) of forage events. The breeding pair was observed delivering 56 prey items to the nest, of which the male delivered 33.9%, the female 33.9%, and an unknown adult 32.1%. Fish comprised 41.1%, mammals 17.9%, and unknown prey types 41.1% of the deliveries. Of the three prey items further identified, 66.7% were smallmouth bass (*Micropterus dolomieu*) and 33.3% were bluegill.

Habitat Use. – Nestwatchers identified 22 separate perch locations around the lake. The bald eagle pair spent 72.0% of the observed time at lake kilometer (lk) 1.3, 16.7% at lk 1.5, 3.9% at lk 1.2, 1.5% at lk 1.0, 1.3% at lk 1.1, 1.0% at lk 0.9, and 3.6% at the remaining locations.

Sycamore Breeding Area (Appendix M, Figure 16)
Observation Period. – Full-time observations from February 3 to March 5. Total monitoring 150 hours over 23 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 25 human activities. Terrestrial activities of five types accounted for 80.0% and aircraft (helicopters and small planes) 20.0%. None of the activities elicited a significant response from the breeding pair.

Food Habits. – Nestwatchers observed one forage event, with the female successfully foraging one fish. Since eggs did not hatch, there were no prey deliveries to the nest.

Habitat Use. – The Sycamore nestwatchers identified 11 separate perch locations, spanning 3.3 km along the Verde River ranging from rk 7.8 to 11.1. The bald eagle pair spent 28.0% of the observed time at rk 11.1, 22.0% at rk 7.8, 18.6% at rk 9.9, 12.2% at rk 10.0, 10.9% at rk 10.1, 7.2% at rk 10.3, and 1.1% at rk 9.8.

Figure 16. Sycamore (left) and Whiskey Spring (right) breeding areas. Maricopa County, Arizona.

Whiskey Spring Breeding Area (Appendix N, Figure 16)
Observation Period. – February 4 to March 4, March 31 to May 3. Total monitoring 303 hours over 43 days.

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

Management Activities. – 1) Maricopa County Parks and Recreation Department enacted the seasonal closure for the breeding area 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 719 human activities. Watercraft (boats, jet skis, kayaks) represented 92.3%, aircraft (planes, jets, helicopters, sonic booms) 6.1%, and terrestrial activities 1.6%. Two types of activities elicited 11 significant responses from the breeding pair. The bald eagles were restless in response to three boats, flushed in response to six boats, and left the area in response to two helicopters. Of the 667 watercraft that were documented approaching the southern closure buoy line, a total of 131 (19.6%) did not comply and entered the closure.

Food Habits. – The nestwatchers observed six forage events, with fish accounting for 100%. The male was successful in 0% (n=1), the female in 50% (n=4), and an unknown adult in 0% (n=1) of forage events. The breeding pair was observed delivering seven prey items to the nest, of which the male delivered 57.1%, the female 28.6%, and an unknown adult 14.3%. Fish comprised 100% of these deliveries. None of the prey items were further identified.

Habitat Use. – The Pleasant nestwatchers identified 13 separate perch locations along the Agua Fria River arm of Lake Pleasant. Perches spanned a total of 1.4 km ranging from rk 68.2 to 69.6. The breeding pair spent 58.0% of the observed time at rk 68.8, 18.9% at rk 69.1, 9.9% at rk 68.2, 3.9% at rk 68.7, 3.6% at rk 69.0, 2.1% at rk 69.6, and 3.7% at the remaining locations.

Willow Springs Lake Breeding Area (Appendix O, Figure 17)
Observation Period. – May 26 to August 6. Total monitoring 412 hours over 54 days.

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

Management Activities. – 1) Nestwatchers educated recreationists about the bald eagles.

Human Activity. – Nestwatchers recorded 3,117 human activities. Water pursuits of six types accounted for 55.1%, terrestrial activities of ten types for 44.6%, and aircraft (drones, helicopters) 0.3%. Three types of activities elicited five significant responses from the breeding pair. The bald eagles were restless in response to three helicopters and flushed in response to one angler and one hiker.

Food Habits. – The nestwatchers observed nine forage events, with fish accounting for 77.8% and unknown prey for 22.2%. The male was successful in 50.0% (n=2) and the female in 57.1% (n=7) of forage events. The breeding pair was observed delivering 45 prey items to the nest, of which the male delivered 71.1% and the female 28.9%. Fish comprised 93.3% and unknown prey 6.7% of the deliveries. Of the 42 prey items further identified, 95.2% were rainbow trout and 4.8% were trout species.

Habitat Use. – Nestwatchers identified nine perch locations around the lake. The bald eagle pair spent 81.5% of the observed time at lk 6.2, 18.0% at lk 6.1, and 0.6% at the remaining locations.

Figure 17. Willow Springs (left) and Woods Canyon (right) breeding area. Coconino County, Arizona.

Woods Canyon Lake Breeding Area (Appendix P, Figure 17)
Observation Period. – May 6 to July 6. Total monitoring 387 hours over 55 days.

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

Management Activities. – 1) The USFS enacted a closure around the nest area. 2) Nestwatchers educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 1,875 human activities. Terrestrial activities of nine types accounted for 83.8%, water pursuits of six types 16.1%, and aircraft 0.2%. Two types of activities elicited two significant responses from the breeding pair. The bald eagles flushed in response to one nestwatcher and one hiker.

Food Habits. – The nestwatchers observed 21 forage events, with fish accounting for 100%. The male was successful in 53.8% (n=13) and the female in 75% (n=8) of forage events. The breeding pair was observed delivering 45 prey items to the nest, of which the male delivered 55.6% and the female 44.4%. Fish comprised 88.9%, mammals 6.7%, and unknown prey types 4.4% of the deliveries. Of the 39 prey items further identified, 94.9% were rainbow trout and 5.1% were trout species.

Habitat Use. – The Woods Canyon nestwatchers identified 24 perch locations around the lake. The bald eagle pair spent 44.4% of the observed time at lk 0.7, 22.2% at lk 0.9, 10.5% at lk 1.0, 6.8% at lk 0.2, 6.5% at lk 4.9, 2.8% at lk 0.6, 2.4% at lk 4.7, and 4.5% at the remaining locations.

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

1) Despite nesting close to the heavily trafficked Roosevelt Lake, both the resident Bald Eagles and their nestlings did not mind most of the human interactions they encountered. Currently, there is minimal signage indicating the active Bald Eagle nest at the bottom of FR-647. Recommendations from 2021 and 2022 suggest that more prominent closure signs be installed, in addition to a "No Parking" sign at the bottom of FR-647, and a sign at the top of FR-647 that states something to the effect of, "Active eagle nest, no stopping next 500 feet). However, we believe that new signs may cause a paradoxical effect. As it stands, the nest is relatively unknown by locals and most people who drove down the road or picnicked in the cove did not even notice the eagles. If more prominent signage were installed and increased awareness of the nest, it's possible that the eagles would face more human pressure. We think that until human pressure begins to cause a noticeable impact on nest activities, new signs are unnecessary. Plus, nestwatchers are close enough to the nest where they can prevent a closure violation before it happens — this happened several times during the 2023 monitoring season.

Box Bar

1) With the installation of the new closure around the Box Bar BA, the older signs on the east side (along the river) were removed, and new, more separated signs were placed, leaving ample gaps where people can enter the closure without noticing the signs. We recommend increasing the number of signs to cover these gaps. Also, there used to be signs in Spanish, which were helpful in increasing the awareness of Hispanic visitors. We also recommend placing these back, especially along the river trail.
2) Although the size of the closure has been increased and some signage has been added to help protect the eagles, nestwatchers would like to recommend that the Box Bar Recreational Area continues to be considered as a priority area to be patrolled by USFS, AZGFD and other law enforcement officers, at least while the breeding area is active, as the number of closure violations and other activities potentially dangerous for the eagles may keep increasing as the number of visitors does as well.
3) The resident eagles continue using the electrical poles inside the Rio Verde Ranch, we recommend that safety measures are installed or reviewed, especially around the area where the local landscaping company dumps all brush and vegetal matter collected from their work in the nearby gulf club.
4) A beehive was found in a branch of the nest tree when inspecting it for a possible banding session. We recommend to remove that beehive in as humane way if possible as, besides preventing banding the nestling, it can be a potential threat for them at fledge time or before.

Concho

1) It is recommended that closure signs be posted closer to the shore on the lakeside where the nest is located. At least two instances of people attempting to walk around the lake near the shore were observed. Approaching the nest in this way, the walker does not encounter any signs and in some cases is too far from the observation point to be stopped by nestwatchers.
2) In terms of facilitating better communication between the nestwatchers and visitors who are spotted approaching the nest area on the southeast shore, AGFD might also consider providing a kayak to be used on site. The observation point where the nestwatchers was stationed was on the far opposite side of the lake from the nest area. If a visitor is suddenly spotted there, it was difficult to move along the perimeter of the lake on foot close enough to communicate with the visitor in time to mitigate the risk of nest disturbance. Having a kayak might allow the nestwatchers to cross the lake quickly and approach visitors found in restricted areas more effectively.
3) Cattle seem to be degrading the water quality of the nesting area, and cattle ranchers on ATVs can be a real disturbance to the eagles. It is recommended that the AGFD reconsider allowing ranching access to Concho Lake and possibly fence cattle out of the area.

Fort McDowell (all BAs)

1) Many of the guests at the RV Park were interested in the nesting bald eagles and were greatly concerned thinking the pair had abandoned the Rodeo breeding area (because the eagles moved to a new nest). Due to the high interest of these guests, it may be possible to train a few volunteers to check on the breeding pair while nestwatchers are away on break. This season, we had a nestling fall during one of our breaks. Having a few people checking in periodically throughout the day may have helped nestwatchers and AGFD respond more quickly to this rescue, and ultimately, may have saved that nestling's life.
2) Place a SWBEMC Sensitive Wildlife Area sign in the Fort McDowell breeding area prior to the 2024 breeding season. A sign was given to the Fort McDowell at the Environmental Department for installation later this year.
3) The Fort McDowell eagle pair failed to hatch eggs for the second year in a row. Early in the season, tire tracks were found going out to the nest tree in both years. It may help to have nestwatchers at the Fort McDowell nest on weekends early in the season to keep vehicles out of the nest area until the chicks have hatched and are able to thermoregulate.
4) If possible, develop some regulations concerning the use of drones on FMYN lands. No drones were observed this year, but a guest from the RV park mentioned someone was flying a drone at the park on our days off in March. All of the nests may be vulnerable to drones and some consistent regulations from the Yavapai Nation would be helpful to keep drones away from active eagle nests.
5) Strongly encourage woodcutters with permits in the vicinity of FMYN breeding areas to cut wood elsewhere from December through June if a nearby nest is active. This truly is vital to the success of future nesting attempts. Woodcutters will spend several days in one area and should be at least a half mile from an active nest. A woodcutter was heard regularly in the Sycamore BA after we stopped observations at the nest. Since the eagles were no longer nesting, we were not concerned with the activity at the time.

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.

Goldfield

1) The breeding area could always benefit from more signage along the closure boundary to prevent unaware visitors from encroaching on the nest. Additionally, AGFD or USFS might consider walking the perimeter of the closure sometime before the nestwatch season to confirm the existence and integrity of any signage already expected to be in place, as they could be displaced by people, water, or other disruptors.
2) While the trailhead kiosk at Goldfield Recreation Area bears a small map of the nest closure and a paper describing the Nestwatch Program efforts, it was often unnoticed or overlooked by the visitors we talked to. A larger, more prominent advisory that grabbed the attention of bypassers could further prevent recreational disturbance.
3) Consider working with the USFS to permit nestwatchers continued breeding area access in the event of future recreational area closures, such as those in response to dangerous water levels. Securing nestwatcher placement at an observation point through the season could yield more consistency in observation of the nest.
4) Continue to educate pilots and law enforcement agencies of locally nesting eagles and encourage them to keep a respectable distance when flying over their breeding areas

Luna

1) Establish closure boundaries for the north side breeding area, getting signage in place before breeding season.
2) All USFS projects impacting the Luna Lake Breeding Area should be discussed in advance with AGFD bald eagle management team and nestwatchers prior to implementation.

Orme

1) The use of road closure structures to block access to roads proximal to nesting trees proved effective in reducing the amount of human activity within the closure. Structures should be set up across the entire road and provide an obstacle for vehicles to dissuade use and be placed on both the dirt road perpendicular to the paved road at Pole 4 and the dirt road that runs parallel to the river both upriver and downriver from the nest. After a storm, it is good to check on the road signs as they easily wash away or fall over.
2) The preserve was entirely closed to community members for several weeks during the latter part of the nesting cycle due to flooding during which human activity was reduced to nearly zero. Aside from the two nestwatchers and the occasional Ranger, there was no vehicle traffic on the typically well-traveled paved road. It is believed to have been beneficial to the bald eagles.
3) Introductions to law enforcement, supervisors, and other SPRPMIC biologists upon arrival at Orme breeding area were very helpful and are encouraged to happen again.
4) The Earth Day event at the SRPMIC office in Scottsdale was a huge success. It was fun and educational and the nestwatchers eagerly conducted positive public outreach considering the low levels at the observation point. A junior nestwatcher program/event is

highly supported and believed to be valuable to both community members and the nestwatch project in addition to the overall conservation of bald eagles.

Pleasant (all BAs)

1) Issue a second radio to nestwatchers for safety purposes. When monitoring multiple areas the nestwatchers are often separated for hours at a time without cell phone service, and one was often alone on the boat. There are abundant hazards at Lake Pleasant including rattlesnakes, scorpions, rocky terrain, and water. Nestwatchers often had to choose whether it was best to leave the radio with the nestwatcher on land or the nestwatcher who took the boat to a different location.
2) Improve education and communication with the public about the eagle closure on the Agua Fria River, especially why the closure exists. The public, including some fishermen who initially disagreed with the closure, responded well to ecological and behavioral details that give good reason for a closure (e.g. eagles could abandon the nest, crush their eggs if flushed, etc).
3) Continue to observe the Cole's Bay breeding area to determine if human activity is causing the pair to not lay a clutch in the area, as they appear to have a strong pair and site bond but have not incubated despite being observed in the area for three consecutive years.
4) Consider adding a rectangular closure sign to one of the buoys in the middle of the southern buoy line or maybe a more permanent signpost installed on the downstream right side of the shoreline near the buoy line. The "Do Not Enter" and "Keep Out" text on the buoys is pretty easy to miss unless you're quite close to them and they're facing the right direction. When we talked with recreationists who entered the closure, many of them said they thought they were simply "No Wake Zone" buoy lines similar to other coves on Lake Pleasant. A flashy red sign might grab people's attention.
5) Remove closure markers when the closure is no longer in effect to reduce confusion about when the closure is in effect.

Scholz Lake

1) We recommend that more significant markers be installed in the area surrounding the nest cove. Such signage must be officially supported with AGFD and/or USFS logos and any relevant legislation. The signs that currently exist are handmade, plain and do not seem to attract any attention from passersby. Currently, there is no official closure around the nest at the Scholz Lake breeding area due to low human pressure. However, access to the nest cove by paddling was easier this season due to significant snowmelt and runoff which flooded the marshy cove. Compared to prior satellite images, paddlers gained at least 300 meters of water surface to approach the nest. If these water levels become more common, the nest and most of the preferred perches would be under increased human pressure. Additionally, the growing popularity of Scholz Lake will increase hiking traffic along the pre-existing loop trail that travels less than 100 meters from the nest.
2) Add a public waste bin, as well as fishing line and tackle disposal tubes. Many of the folks recreating at Scholz Lake stayed on the southern corner, picnicking or fishing. There are currently no methods for waste disposal at Scholz Lake. The waste bin could be located in the parking lot, while the fishing line and tackle disposal tubes could be located at the dam on the southern corner of the lake.

3) Improve contact and relationship between the nestwatch program and the Kaibab National Forest. Nestwatchers did not have an official supervisory or managerial contact within the Kaibab National Forest for support while in the field.
4) Keep tabs on wildfire conditions and events within the proximity of Scholz Lake, as they are quite common in the area during the breeding season, and inform Nestwatchers if/when accidental or controlled burns occur.

Willow Springs

1) Place a closure around the nest tree that is well marked with closely spaced, high visibility signs. The closure must include the section of Forest Service road 149F immediately behind the nest tree and reach down as close as possible to the shoreline, but we also suggest that some space is left for hikers and fishermen to walk along it, similar to how it is done at the nearby Woods Canyon Lake breeding area.
2) Place educational signs about nesting eagles at the main parking area near the boat ramp and the Sardine Point and SR 260 parking areas. Maps showing where closure areas are located would help limit the number of people trespassing and/or disturbing the eagles. Information about not flying drones near the eagles' nest would be useful too.
3) Place fishing line and tackle disposal tubes at visible places on the south channels of the lake. Fishing activity in that area is very high and the amount of discarded fishing line and tackle along the shore is surprising. Nestwatchers removed several bags of it and observed several ducklings and other birds entangled with it.

Woods Canyon

1) Post drone flying information. 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 observation point locations) and provide nestwatchers with current information about laws permitting (or prohibiting) flying drones inside the different recreational areas.
2) Add more or bigger fishing lines and tackle disposal tubes. The ones already installed get filled quickly and are usually overflowing with that and other trash. More at the docks and one at the Spillway parking lot are especially needed.
3) Place a closure ahead of time. Results from past seasons 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. Although resident adult eagles in the lake can become very tolerant to human activities over the years, new adults that replace non-returning residents may experience a shocking impact when human activity in their breeding area drastically increases overnight.
4) Continue using the red "STOP" signs to mark the closure, as they are easier to see and understand. Place the signs at shorter intervals, as current signs were placed too far apart, and people commonly entered the closure in between them without noticing them.

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APPENDIX A: 2023 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 10. 2023 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	65	2	0	0	0
2	Little Colorado River	33	0	0	0	0
3	S. Fork LCR – Campground	82	2	0	0	0
4	Casa Malpais – LCR	30	0	0	0	0
5	Greer Lakes	120	1	0	0	0
6	Sponseller Lake	28	0	0	0	0
7	Mexican Hay Lake	58	0	0	0	0
8	White Mountain Hereford Ranch	120	0	0	0	0
9	The Ranch Lake	19	0	0	0	1
10	Ortega Lake	Not surveyed.				
11	Concho Lake	35	2	0	0	0
12	Luna Lake	180	5	2	0	0
13	Nelson Reservoir	85	1	0	0	0
14	Nutrioso Reservoir	55	0	0	0	0
16	San Francisco River	150	1	0	1	0
Total		**1,060**	**14**	**2**	**1**	**1**
Cochise County						
18	Parker Canyon Lake	70	0	0	0	0
19	Willcox Playa	230	1	0	0	0
Total		**300**	**1**	**0**	**0**	**0**
Coconino County						
21	Long Lake Complex	263	0	0	0	0
22	Stoneman Lake	205	2	2	0	1
23	FH-3	40	0	0	0	0
24	I-17, Section to Flagstaff	234	2	0	0	1
25	Bellemont	405	2	2	0	0
26	Townsend/Winona A/B	546	0	0	0	0
27	HWY 89 North /Sunset Crater – Wupatki	406	2	3	0	0
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	318	3	1	1	0
29	Continental Country Club Lakes	213	2	0	0	0
30	Chevelon Canyon Lake	165	2	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	200	0	0	0	0
40	West Chevelon Canyon	240	0	0	0	0
41	Willow Creek	Not surveyed.				
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	Not surveyed.				
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	Not surveyed.				
121	Highway 64	Not surveyed.				
122	Camp Navajo	166	0	0	0	0
123	Partridge Creek	Not surveyed.				
124	Odell Lake	40	0	0	0	0
125	Highway 87 north	58	0	0	0	0
126	Highway 180	140	0	0	0	0
Total		**3,639**	**15**	**9**	**1**	**2**
Gila County						
129	Buckhead Mesa landfill	50	14	4	0	0
Total		**50**	**14**	**4**	**0**	**0**
Graham County						
51	Point of Pines Lake area (ground)	Not surveyed.				
Mohave County						
57	Alamo Lake	125	3	0	0	0
Total		**125**	**3**	**0**	**0**	**0**
Navajo County						
58	Lake of the Woods	30	0	0	0	0
59	Rainbow Lake	60	0	0	2	3
61	Whipple Lake	5	0	0	0	0
62	Long Lake	40	0	0	0	0
63	Lone Pine Dam	25	0	0	0	0
64	Schoens Reservoir	30	0	0	0	0
65	White Mountain Lake	0	0	0	0	0
67	Jacques Marsh	59	0	0	0	0
68	Scott's Reservoir	30	1	0	0	0
69	Show Low Lake	60	0	0	0	0
70	Pintail Lake	25	0	0	0	0
71	Telephone Lake	27	0	0	0	0
72	Fool Hollow Lake	120	1	0	0	0
75	Cottonwood Wash/ Clay Springs	0	0	0	0	0
76	White Lake	10	0	0	0	0
127	Mortenson Wash	30	0	0	0	0
Total		**551**	**2**	**0**	**2**	**3**
Santa Cruz County						
82	Pena Blanca Lake	60	0	0	0	0
Total		**60**	**0**	**0**	**0**	**0**
Yavapai County						
83	Wet Beaver Creek	490	0	0	0	0
84	Oak Creek	480	2	0	0	0
85	Willow Lake	240	2	0	0	5

Table 10 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
86	Lynx Lake	165	0	0	0	0
87	Watson Lake	90	0	0	0	0
88	Goldwater Lake	109	2	2	0	0
Total		**1,574**	**6**	**2**	**0**	**5**
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	0	0	0	0	0
Total		**0**	**0**	**0**	**0**	**0**

Table 11. 2023 Arizona bald eagle winter count helicopter survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
90	Verde River	188	18	1	0	0
91	Lower East Verde River	11	0	0	0	0
92	Lower West Clear Creek	16	0	0	0	0
93	Lower Salt River	124	22	5	0	0
94	Upper Salt River	75	5	0	0	0
95	Lower Tonto Creek	24	5	0	0	0
97	Lower Canyon Creek	10	0	0	0	0
98	Lower Cibecue Creek	Not surveyed.				
100	White River	17	1	0	0	0
101	North Fork White River	27	3	0	0	0
102	Lower Black River	76	9	0	0	0
103	Big and Little Bonito Creeks	Not surveyed.				
104	San Carlos River–Talkalai Lake	33	2	3	0	0
105	San Carlos Reservoir	30	1	0	0	0
106	Upper and Lower Gila River	41	1	5	0	0
107	Eagle Creek	37	0	0	0	0
108	Bonita Creek	15	0	0	0	0
109	Lower San Francisco River	33	0	0	0	0
110	Blue River	12	0	0	0	0
111	Sunrise Lake	2	0	0	0	0
112	Big Lake	Not surveyed.				
114	Crescent Lake	Not surveyed.				
115	Lake Pleasant	37	5	0	0	0
116	Del Rio Ponds	1	2	0	0	0
117	Tres Rios	20	1	0	0	0
128	Point of Pines aerial	6	5	7	0	0
Total		**835**	**80**	**21**	**0**	**0**

Table 12. 2023 Arizona bald eagle winter count non-standardized survey route results.

Route Number	Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagles	Unknown Eagles
976	West Clear Creek	Yavapai	150	0	0	0	0
986	Kachina Wetlands	Coconino	60	0	0	0	0
991	Clint's Well to Camp Verde	Coconino, Yavapai	54	0	0	0	0
Total			**264**	**0**	**0**	**0**	**0**

APPENDIX B: TERMINOLOGY AND RAPTOR REPRODUCTIVE STATUS CRITERIA

Breeding Area (BA): An area containing one or more nests within the range of a mated pair of birds. Operationally, a BA is recognized only after an active nest has been documented. Once a BA is established, we consider it a BA whether it is occupied by bald eagles in a given year or not, until or unless it is designated historic (i.e., ten consecutive years unoccupied).

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

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

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

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: 2023 ARIZONA BALD EAGLE PRODUCTIVITY

Table 13. Arizona bald eagle breeding area productivity, 2023.

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs[3]	Hatch Date	Young	Fledged	Fledge Date
Alamo	S	4	<1/9	2	1/30-2/21	1	1	>4/21
Armer Gulch	U	No existing nest and no new nests found. No eagles.						
Ashurst	S	3	3/17-4/13	1	4/13-5/25	1	1	>7/11
Bachelor Cove*	S	3	<1/10	2	1/10-1/31	2	2	3/15-4/23
Bartlett	S	5	<1/6	2	1/30-3/7	2	2	>4/13
Beaver	S	1	<1/6	1	1/6-3/17	1	1	>5/1
Becker	O	All known nests empty. Two adults in area.						
Black Cross	S	1	<1/10	1	1/10-3/1	1	1	4/7-4/14
Blue Point	O	All known nests empty. Pair of adults standing in nest #10 on 1/10.						
Box Bar*	S	5	1/6-1/30	1	1/30-2/22	1	1	5/18
Buckeye	U	No existing nest and no new nests found. No eagles.						
Bulldog	F	3	<1/10	1	Failed 1/10-1/30 during incubation.			
	F	3	1/30-3/1	1	3/1-4/13	1	Failed 4/13-6/2.	
Burro Creek	U	All known nests empty. No eagles.						
Campaign Bay	U	No existing nest and no new nests found. No eagles.						
Canyon de Chelly	S	3	<4/27	1	4/27-6/5	1	1	>6/5
Carnero Lake	F	1	<3/27	1	Failed 3/27-5/16 during incubation.			
Cataract Lake	F	4	<3/17	1	Failed 3/17-4/13 during incubation.			
Cedar Basin	F	9	1/31-3/15	1	Failed 3/15-5/16 during incubation.			
Chevelon	S	6	<5/1	1	<5/1	1	1	>6/8
Cibecue	F	9	1/31-3/15	2	3/15-4/14	2	Failed 4/14-5/16.	
Cliff	U	No existing nest and no new nests found. No eagles.						
Coldwater	U	All known nests empty. No eagles.						
Cole's	O	Pair of adults in nest area.						
Concho*	S	2	<1/31	2	2/13-2/17	2	2	5/15-5/21
Coolidge	F	5	<1/10	2	Failed by 3/15 during incubation.			
Crescent	F	1	3/28-4/14	1	Failed 4/14-5/16.			
Dogtown	S	3	<3/17	1	4/13-5/1	1	1	>6/28
Doka*	S	9	1/6-1/30	1	2/27-3/4	1	1	5/16
Eagle Mountain	F	1	1/12-3/28	1	Failed 3/28-5/16.			
East Verde	U	All known nests empty. No eagles.						
Eastern Star	F	1	<3/28	1	Failed 3/28-4/14 during incubation.			
Elaine	U	All known nests empty. No eagles.						
Fish Creek	S	1	1/10-1/30	1	3/1-4/13	1	1	>5/1
Fool Hollow	F	4	12/31-1/12	1	Failed 1/10-1/30 during incubation.			
Fort McDowell*	F	21	12/8-12/15	1	Failed 2/3-2/6 during incubation.			
Gainey Ranch	F	3	1/12-1/17	1	Failed 3/19 during incubation.			
Garden Lakes	S	2	12/11-12/17	1	1/11-1/27	1	1	4/24-4/26
George's Basin	U	All known nests empty. One adult seen flying on 1/31.						
Goldfield*	S	5	<1/10	1	1/30-2/6	1	1	4/23-4/28

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

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2022.

[3]Represents 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	Fledged	Fledge Date
Granite Basin	U	All known nests empty. No eagles.						
Granite Reef	O	Pair of adults in area.						
Green River	S	2	<1/6	2	1/6-3/17	2	2	>5/1
Greer Lakes	F	7	<3/3	1	Failed 3/28-4/7 during incubation.			
Horse Mesa	F	4	<1/10	1	Failed 3/1-4/14 during incubation.			
Horseshoe	S	13	1/6-1/30	3	1/30-3/17	3	3	>5/18
Ister Flat	F	1	1/30-3/17	1	Failed 3/17-4/13 during incubation.			
Itsa' Cho	F	1	1/31-3/15	1	Failed 3/15-4/14 during incubation.			
Ive's Wash	F	3	<1/9	1	Failed 1-30-3/14 during incubation.			
Kachina Village	S	1	<2/15	1	3/17-4/13	1	1	6/30
Kaibab Lake	S	8	<3/17	2	3/17-4/13	2	2	>5/25
Kerr*	O	Pair of adults in area.						
Kinnikinick	S	1	<5/1	2	<5/1	2	1	>7/11
Ladders	S	4	1/30-2/16	1	2/16-3/17	1	1	>5/14
Lone Pine	U	All known nests empty. One adult perched near nest #9 on 1/12.						
Lower Lake Mary	S	5	<3/17	1	3/17-4/13	1	1	>6/16
Luna*	F	3	2/13-3/17	1	3/17	1	Failed 3/26-4/3.	
Lynx	S	6	1/8-3/8	2	3/8-3/17	2	2	5/24-6/5, 6/5-6/26
Mohave	U	All known nests empty. No eagles.						
Mormon Lake	S	1	<5/9	1	<5/9	1	1	>6/12
Nevada Bay	F	1	<3/14	2	3/14-4/26	2	Failed 4/26-6/2.	
North Fields	S	1	<12/6	2	12/30-1/17	2	1	4/1
Oak Creek	S	5	1/30-2/16	2	2/16-3/17	2	2	>5/25
Orme*	S	7	<1/6	2	2/3-2/12	2,1F	2, 1F	4/13-5/2
	Fledged 3 nestlings (including one fostered from Pee Posh Wetlands).							
OW	U	All known nests empty. No eagles.						
Pee Posh Wetlands	F	9	<1/6	1	<3/17	1	Nest tree fell on 3/24. Nestling fostered to Orme.	
Perkinsville	U	All known nests empty. Reports of eagles in the area.						
Pinal	S	9	1/10-1/31	2	1/31-3/15	2	2	>5/19
Pinto	F	10	1/10-1/31	1	Failed 1/31-2/13 during incubation.			
Pleasant	O	Pair of adults in nest area.						
Rainbow	S	3	<1/26	2	1/26-4/27	2	2	4/28-5/10
Redmond	O	All known nests empty. Two adults seen on 3/16.						
Riggs	S	1	<4/17	1	4/17-5/5	1	1	7/1-7/4
Riverside	S	4	<1/10	2	1/30-2/10	2	1	4/13-4/28
Rodeo*	S	7	<1/6	2	1/6-2/6	2	1	4/9-4/13
Saguaro	S	2	<1/10	1	1/30-3/1	1	1	4/13-4/28
San Carlos	S	8	1/11-1/31	2	1/31-3/15	2	2	>4/24
Scholz Lake*	S	1	<3/17	1	4/13-5/1	1	1	>7/7

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

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2022.

[3]Represents 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	Fledged	Fledge Date
76	S	7	1/10-1/31	2	1/31-3/15	2	2	>5/11
Sheep	S	8	1/10-1/31	1	1/31-3/15	1	1	>5/1
Sheep Creek	F	2	1/6-1/30	1	Failed 1/30-3/17 during incubation.			
Show Low Lake	S	2	2/22-2/25	1	4/3-4/10	1	1	6/25
Silver Creek	S	3	1/31-2/5	2	2/5-3/25	2	2	>5/24
Suicide	U	All known nests empty. One adult perched near nest #2 on 1/31.						
Sullivan Lake	F	4	1/6-1/23	1	Failed by 3/17 during incubation.			
Sycamore*	F	7	1/6-1/30	1	Failed 2/26-3/5 during incubation.			
Table Mountain	U	All known nests empty. No eagles.						
Talkalai	O	All known nests empty. Pair of adults reported.						
Tall Pine	F	1	1/12-3/28	1	Failed 3/28-5/16.			
Tapco	U	All known nests empty. One adult in nest area on 2/16.						
Tonto	O	All known nests empty. Pair of adults in nest area.						
Tortilla Creek	S	1	1/30-3/1	2	3/1-4/7	2	2	>6/2
Tremaine	F	2	<2/27	1	Failed 2/27-4/18 during incubation.			
Two Bar	S	2	<1/10	1	1/30-3/1	1	1	>4/28
Water Nest	S	2	<3/28	2	3/28-5/16	2	2	>6/27
Whiskey Spring*	F	2	1/17-1/23	1	Failed by 2/3 during incubation.			
		2	<2/26	1	Failed by 3/3 during incubation.			
		2	3/14-3/21	1	4/29-4/30	1	Failed 4/30-5/2.	
White Horse	O	All known nests empty. Pair of adults perched by lake on 4/13.						
Willow Springs*	S	13	<5/1	2	5/1-5/11	2	2	7/26, 8/4
Woods Canyon*	S	1	<4/21	1	4/21-5/1	1	1	7/3
Yellow Cliffs	S	1	1/6-1/30	2	1/30-3/17	2	2	>5/18

[1]Breeding area status codes (Postupalsky 1974): U=unoccupied, O=occupied, S=successful, F=failed.
[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997-1999; Jacobson and others 2004-2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008-2012; McCarty et al. 2013-2022.
[3]Represents minimum number of eggs laid.
*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

APPENDIX D: NEST SURVEY RESULTS

Table 14. Results of the 2023 bald eagle winter count, ORA, and nest survey flights (continued next page).

Location	Time	Comments
January 6, 2023		
Orme BA	0802	Adult incubating in nest #7. Second adult by nest. Third adult in area.
Rodeo BA	0807	Adult incubating in new nest #7
Sycamore BA	0814	All known nests empty. One adult perched.
Doka BA	0817	All known nests empty. No eagles.
Fort McDowell BA	0822	Adult incubating in nest #21.
Box Bar BA	0826	Two adults standing in nest #5.
Needle Rock BA	0826	No nests or eagles.
Bartlett BA	0830	Adult incubating in nest #5.
Yellow Cliffs BA	0841	All known nests empty. No eagles.
Sheep Creek BA	0857	Two adults flying and perched near a new large nest (#2) in a tree.
Cliff BA	0904	No nests or eagles.
Horseshoe BA	0917	All known nests empty. No eagles.
Ister Flat potential nest site	0922	All known nests empty. No eagles.
Table Mountain BA	0932	All known nests empty. No eagles.
East Verde BA	0942	All known nests empty. No eagles.
East Verde River	0958	No nests or eagles.
Coldwater BA	1009	All known nests empty. No eagles.
Ladders BA	1014	All known nests empty. No eagles.
Beaver BA	1029	Adult incubating in nest #1.
West Clear Creek	1132	No nests or eagles.
Oak Creek BA	1157	All known nests empty. No eagles.
Green River BA	1202	All known nests empty. No eagles.
Tapco BA	1207	All known nests empty. No eagles.
Tower historic BA	1213	All known nests empty. No eagles.
Mormon Pocket golden eagle BA	1218	All known nests empty. No eagles.
Perkinsville BA	1220	All known nests empty. No eagles.
Hell Point golden eagle BA	1233	All known nests empty. No eagles.
Granite golden eagle BA	1242	All known nests empty. No eagles.
Sullivan Lake BA	1249	All known nests empty. Pair of adults perched.
Lynx BA	1428	All known nests empty. Nest #6 re-built. No eagles.
Pleasant BA	1500	Nest #4 fallen. All other known nests empty. Two adults perched.
Whiskey Spring BA	1509	All known nests empty. No eagles.
Cole's Bay BA	1531	All known nests empty. One adult perched.
Garden Lakes BA	1559	Adult incubating in nest #2.
Buckeye BA	1607	Nest #3 fallen. No new nests or eagles.
Rainbow BA	1610	All known nests empty. No eagles.
Pee Posh Wetlands BA	1629	Adult incubating in nest #9.
January 10, 2023		
Riverside BA	0759	Adult incubating in new nest #4.
Granite Reef BA	0808	Nest #7 fallen. No new nests or eagles.
Kerr BA	0810	One adult standing in nest #3. Second adult flew toward nest.
Orme BA	0816	Adult incubating. Second adult by nest. Third adult in area.
Goldfield BA	0820	Adult incubating in nest #5. Second adult perched.
Bulldog BA	0827	Adult incubating in nest #3.

Table 14 continued.

Location	Time	Comments
Blue Point BA	0830	Two adults perched at nest #10.
Bagley historic BA	0835	Nest #1 empty. No eagles.
Saguaro BA	0839	Adult incubating in nest #2.
Tortilla Creek BA	0842	All known nests empty. Two adults in area.
Black Cross BA	0850	Adult incubating in nest #1.
Fish Creek BA	0855	All known nests empty. No eagles.
Horse Mesa BA	0859	Adult incubating in nest #4.
Two Bar BA	0910	Adult incubating in nest #2.
Bachelor Cove BA	0915	Adult incubating in nest #3.
Tonto BA	0920	All known nests empty. One adult perched.
Sheep BA	0927	All known nests empty. Two adults in area.
76 BA	0937	All known nests empty. Two adults in area.
Pinto BA	1100	All known nests empty. No eagles.
Campaign Bay BA	1109	All known nests empty. No eagles.
Pinal BA	1132	All known nests empty. One adult flying.
Redmond BA	1139	All known nests empty. No eagles.
Canyon historic BA	1210	No nests. Pair of golden eagles perched.
Talkalai BA	1336	All known nests empty. One adult in area.
San Carlos BA	1355	New large nest found (#8). Two adults in area.
Suicide BA	1425	All known nests empty. No eagles.
Coolidge BA	1447	Adult incubating in nest #5.
Granite Basin BA	1455	All known nests empty. No eagles.
		January 12, 2023
Cibecue BA	0958	All known nests empty. No eagles.
Mule Hoof historic BA	1004	New large nest found (#4). No eagles.
Cedar Basin BA	1028	All known nests empty. One adult at nest #9, second adult in area.
Lone Pine BA	1035	All known nests empty. Adult perched near nest #9.
Tall Pine BA	1129	All known nests empty. No eagles.
Show Low BA	1240	All known nests empty. No eagles.
Pineasco Creek nest site	1305	All known nests empty. No eagles.
George's Basin BA	1316	All known nests empty. No eagles.
Eagle Mountain BA	1433	All known nests empty. No eagles.
Fool Hollow BA	1538	Adult incubating in nest #4. Second adult flying.
		January 30, 2023
Riverside BA	0755	Adult incubating.
Granite Reef BA	0802	No known nests. Two adults perched on poles near dam.
Kerr BA	0803	One adult perched by nest #3. One immature also perched.
Orme BA	0805	Adult incubating. Second adult perched.
Goldfield BA	0809	Adult incubating.
Bulldog BA	0812	Nest empty, failed.
Blue Point BA	0815	All known nests empty. No eagles.
Bagley historic BA	0816	All known nests empty. No eagles.
Saguaro BA	0817	Adult incubating.
Tortilla Creek BA	0819	All known nests empty. One adult flying.
Black Cross BA	0823	Adult incubating or brooding.
Fish Creek BA	0825	Adult incubating in nest #1.
Horse Mesa BA	0828	Adult incubating. New large nest found (#6).
Two Bar BA	0835	Adult incubating.
Rodeo BA	0848	Adult incubating.

Table 14 continued.

Location	Time	Comments
Sycamore BA	0851	Adult incubating in nest #7.
Doka BA	0852	Adult incubating in nest #9.
Fort McDowell BA	0854	Adult incubating.
Box Bar BA	0857	Adult incubating in nest #5.
Bartlett BA	0859	Adult incubating or brooding. Second adult at nest.
Yellow Cliffs BA	0903	Adult incubating in nest #1.
Sheep Creek BA	0906	Adult incubating in nest #2.
Horseshoe BA	0910	Adult incubating in nest #13.
Ister Flat BA	0912	All known nests empty. No eagles.
Table Mountain BA	0919	All known nests empty. No eagles.
East Verde BA	0925	All known nests empty. One adult perched by nest #8.
Coldwater BA	0931	All known nests empty. No eagles.
Pee Posh Wetlands BA	1045	Adult incubating.
Garden Lakes BA	1050	Adult standing in nest #2 with one small nestling and one egg.
Buckeye BA	1058	No new nests or eagles.
Rainbow BA	1101	All known nests empty. No eagles.
Ive's Wash BA	1139	Adult incubating in nest #3.
Alamo Lake BA	1144	Adult incubating in nest #4.
Cole's Bay BA	1219	All known nests empty. No eagles.
Whiskey Spring BA	1221	One unattended egg. No eagles.
Pleasant BA	1223	All known nests empty. One adult in area.
January 31, 2023		
76 BA	0836	Adult incubating in nest #7. Second adult perched.
Sheep BA	0844	Adult incubating in nest #8.
Tonto BA	0850	All known nests empty. No eagles.
Bachelor Cove BA	0856	Adult with two nestlings, up to 1 week old.
Armer Gulch BA	0902	No new nests or eagles.
Pinto BA	0910	Adult incubating in nest #10. Second adult perched.
Pinal BA	0912	Adult incubating in nest #9.
Redmond BA	0918	All known nests empty. One adult perched 1 mile downstream.
Cibecue BA	1108	All known nests empty. No eagles.
Cedar Basin BA	1125	All known nests empty. One adult perched by nest.
Lone Pine BA	1129	All known nests empty. No eagles.
Pineasco Creek nest site	1139	All known nests empty. No eagles.
George's Basin BA	1143	All known nests empty. One adult flying.
Itsa'cho BA	1200	Two new large nests (#1 and #2). No eagles.
Pacheta Lake	1207	No nests or eagles.
Crescent BA	1213	All known nests empty. No eagles.
Greer Lakes BA	1223	All known nests empty. No eagles.
Becker BA	1231	All known nests empty. One adult perched at lake.
Concho BA	1330	Adult incubating in nest #2.
Silver Creek BA	1345	All known nests empty. No eagles.
Fool Hollow BA	1356	Nest empty, failed. One adult at lake.
Show Low BA	1441	All known nests empty. No eagles.
Granite Basin BA	1546	All known nests empty. One adult perched.
Coolidge BA	1555	Two unattended eggs. No eagles.
Suicide BA	1557	All known nests empty. One adult perched.
San Carlos BA	1603	Adult incubating in nest #8.
Boni Tank	1615	No nests or eagles.

Table 14 continued.

Location	Time	Comments
Talkalai BA	1630	All known nests empty. Nest #10 mostly fallen. No eagles.
March 3, 2023		
Becker BA	0826	All known nests empty. Pair of adults in area.
Nelson Reservoir nest site	0917	All known nests empty. New large nest found (#2). No eagles.
Crescent BA	0942	All known nests empty. One adult flew to nest #1.
Greer Lakes BA	0948	Adult incubating in nest #7.
Show Low BA	1243	Adult incubating in nest #2.
March 14, 2023		
Whiskey Spring BA	0732	All known nests empty. No eagles.
Cole's Bay BA	0735	All known nests empty. No eagles.
Pleasant BA	0739	All known nests empty. No eagles.
Burro Creek BA	0819	All known nests empty. No eagles.
Alamo BA	0834	Adult with one nestling, 4 weeks old.
Ive's Wash BA	0838	Nest #3 empty, failed.
Bill Williams historic BA	0907	No nests or eagles.
Copper Basin BA (CA)	0922	All known nests empty. No eagles.
Whipple Mountains BA (CA)	0930	All known nests empty. No eagles.
Mohave BA	1016	All known nests empty. No eagles.
Nevada Bay BA	1115	Adult incubating in nest #1.
Black Canyon BA (NV)	1127	All known nests empty. Pair of adults perched.
March 15, 2023		
76 BA	0750	Two nestlings, 2 weeks old.
Sheep BA	0757	Adult with one nestling, 3 weeks old.
Bachelor Cove BA	0803	Adult with two nestlings, 7 weeks old. Second adult perched.
Two Bar BA	0807	One nestling, 5.5-6 weeks old.
Pinto BA	0815	Nest #10 empty, failed. Adult perched nearby.
Pinal BA	0817	Adult with two nestlings, 1-2 weeks old.
Redmond BA	0823	All known nests empty. No eagles.
Cibecue BA	0836	Adult incubating in nest #9.
Cedar Basin BA	1003	Adult incubating in nest #9. Second adult in area.
Lone Pine BA	1008	All known nests empty. No eagles.
Pineasco Creek nest site	1019	All known nests empty. No eagles.
George's Basin BA	1025	All known nests empty. One immature in area.
Itsa'cho BA	1042	Adult incubating in nest #1.
Pacheta Lake	1048	No nests or eagles.
San Carlos BA	1312	Adult with two nestlings, 4-4.5 weeks old.
Suicide BA	1317	All known nests empty. No eagles.
Coolidge BA	1321	Nest #5 empty, failed. No eagles.
Granite Basin BA	1326	All known nests empty. No eagles.
March 17, 2023		
Pee Posh Wetlands BA	0752	One nestling, 5 weeks old.
Lynx BA	0826	Adult in nest #6 with at least one nestling, 1 week old.
Sullivan Lake BA	0840	All known nests empty. Pair of adults perched.
Granite golden eagle BA	0843	Golden eagle incubating in nest #2.
Muldoon nest site	0846	All known nests empty. No eagles.
Hell Point golden eagle BA	0847	All known nests empty. No eagles.
Perkinsville BA	0855	All known nests empty. No eagles.
Mormon Pocket golden eagle BA	0857	Golden eagle incubating in nest #2.
Cataract BA	0911	Adult incubating in nest #4. Two other adults in area.

Table 14 continued.

Location	Time	Comments
Kaibab Lake BA	0916	Adult incubating or brooding in nest #8.
Dogtown BA	1001	Adult incubating in nest #3.
Scholz Lake BA	1005	Adult incubating in nest #1.
Sunflower Flat nest site	1009	Nest #1 not found (fallen). No eagles.
White Horse Lake BA	1010	All known nests empty. No eagles.
Kachina BA	1025	Adult incubating or brooding in nest #1.
Elaine BA	1030	All known nests empty. No eagles.
Lower Lake Mary BA	1035	Adult incubating in nest #5.
Ashurst BA	1039	All known nests empty. One adult perched at lake.
Tapco BA	1100	All known nests empty. No eagles.
Green River BA	1109	Two nestlings, 4.5 weeks old. Pair of adults in area.
Oak Creek BA	1113	Adult with at least one nestling, 1 week old.
Beaver BA	1250	Adult with one nestling, 4 weeks old.
Ladders BA	1257	One nestling in nest #4, 2 weeks old. One adult flying.
Coldwater BA	1259	All known nests empty. No eagles.
East Verde BA	1307	All known nests empty. No eagles.
Table Mountain BA	1315	All known nests empty. No eagles.
Ister Flat BA	1320	Adult incubating in nest #1.
Horseshoe BA	1323	Adult with three nestlings, 2-2.5 weeks old.
Sheep Creek BA	1330	One egg in nest #2, failed. One adult perched at nest #1.
Yellow Cliffs BA	1334	Adult with two nestlings, 2.5 weeks old. Second adult flying.
Bartlett BA	1336	Adult with two nestlings, 6 weeks old.
Box Bar BA	1340	One nestling, 3.5-4 weeks old. One adult by nest.
Doka BA	1344	Adult with one nestling, 2-2.5 weeks old.
Sycamore BA	1348	One egg, failed. No eagles.
Rodeo BA	1351	Adult with two nestlings, 6-7 weeks old.
Orme BA	1353	Adult with two nestlings, 4.5-5 weeks old.
Kerr BA	1355	Two adults standing in nest #3.
March 28, 2023		
Show Low BA	1153	Adult incubating.
Eastern Star BA	1209	One unattended egg in nest #1. Failed. No eagles.
Water Nest BA	1214	Adult incubating in nest #2.
Tall Pine BA	1218	Adult incubating in nest #1.
Eagle Mountain BA	1224	Adult incubating in nest #1
Greer Lakes BA	1229	Adult incubating.
Crescent BA	1235	All known nests empty. No eagles.
Nelson Reservoir nest site	1254	All known nests empty. No eagles.
Becker BA	1315	All known nests empty. One adult perched by nest.
Concho BA	1436	Two nestlings, 4.5-5 weeks old, in nest #2. One adult in area.
Silver Creek BA	1604	Adult in nest #3 with two nestlings, 2 weeks old.
Fool Hollow BA	1617	All known nests empty. One adult in area.
April 13, 2023		
Green River BA	1125	Two nestlings, 8.5 weeks old.
Mormon pocket golden eagle BA	1133	Golden eagle incubating or brooding.
Perkinsville BA	1135	All known nests empty. No eagles.
JD Dam Lake nest site	1144	Pair of ospreys standing in a new nest (#4). No eagles.
White Horse Lake BA	1150	All known nests empty. Pair of adults perched together.
Scholz Lake BA	1156	Adult incubating or brooding.
Dogtown BA	1200	Adult incubating.

Table 14 continued.

Location	Time	Comments
Cataract BA	1206	Nest empty, failed.
Kaibab Lake BA	1208	Adult with two nestlings, 4-4.5 weeks old.
Kachina BA	1225	Adult brooding at least one small nestling.
Elaine BA	1230	All known nests empty. No eagles.
Campbell Mesa nest site	1234	New large nest (#1) found in snag with osprey incubating.
Lower Lake Mary BA	1327	Adult potentially brooding young (prey in nest).
Ashurst BA	1331	Adult incubating in nest #3.
Beaver BA	1433	One nestling, 8 weeks old. One adult perched.
Ladders BA	1440	One nestling, 5 weeks old.
East Verde BA	1449	All known nests empty. No eagles.
Table Mountain BA	1457	All known nests empty. One adult flying.
Ister Flat BA	1504	Nest empty, failed.
Horseshoe BA	1507	Adult with three nestlings, 5.5-6 weeks old.
Yellow Cliffs BA	1623	Two nestlings, 6 weeks old.
Bartlett BA	1627	Two nestlings, 10 weeks old. Adult flew to nest.
Box Bar BA	1631	One nestling, 7.5-8 weeks old. Two adults perched.
Doka BA	1634	One nestling, 6.5 weeks old. One adult flying.
Rodeo BA	1638	One nestling, 10-11 weeks old.
Orme BA	1639	Two nestlings, 9.5 weeks old.
Goldfield BA	1641	One nestling, 9.5-10 weeks old. One adult perched.
Bulldog BA	1645	Adult with one nestling, 3 weeks old.
Saguaro BA	1648	Adult with one nestling, 9.5 weeks old.
Tortilla Creek BA	1651	Adult with two nestlings, 3-3.5 weeks old.
Black Cross BA	1654	Nest empty, presumed fledged.
Fish Creek BA	1658	One nestling, 6-7 weeks old. Adult flew to nest.
Horse Mesa BA	1701	Nest empty, failed.
Riverside BA	1725	One nestling, 9-10 weeks old.
April 14, 2023		
Two Bar BA	0806	One nestling, 9.5-10 weeks old.
Pinal BA	0818	Two nestlings, 4.5-5 weeks old.
Cibecue BA	1315	Two nestlings, 2.5-3 weeks old. One adult perched.
Cedar Basin BA	1441	Adult incubating.
Lone Pine BA	1444	All known nests empty. No eagles.
George's Basin BA	1454	All known nests empty. No eagles.
Itsa'cho BA	1510	Nest empty, failed. Two adults flying and perched.
Pacheta Lake	1515	No nests or eagles.
Reservation Lake	1521	No nests or eagles.
Crescent BA	1527	Adult incubating in nest #1.
Greer Lakes BA	1532	Nest empty, failed.
Carnero BA	1538	Adult incubating in new nest (#1).
Eagle Mountain BA	1544	One egg in nest. Adult flying nearby.
Tall Pine BA	1550	Adult incubating in nest #1.
Water Nest BA	1554	Adult incubating in nest #2.
Eastern Star BA	1558	Nest #1 empty, failed.
Show Low BA	1612	Adult with one small nestling, 1 week old.
Sheep BA	1752	Adult with one nestling, 7 weeks old.
April 28, 2023		
Goldfield BA	0740	One nestling branching, 11.5-12 weeks old.
Bulldog BA	0744	One nestling, 4.5 weeks old.

Table 14 continued.

Location	Time	Comments
Saguaro BA	0801	Fledgling perched near nest.
Tortilla Creek BA	0822	Adult with two nestlings, 5 weeks old.
Fish Creek BA	0849	One nestling, 8.5 weeks old.
Two Bar BA	0941	Fledgling perched near nest. Adult perched nearby.
Riverside BA	1041	Nest empty. Nestling presumed fledged.
May 1, 2023		
Fish Creek BA	0746	One nestling, 9 weeks old.
Pinal BA	0801	Two nestlings, 7 weeks old.
Sheep BA	0815	Adult with one nestling, 9.5 weeks old.
76 BA	0823	Two nestlings, 8.5-9 weeks old.
Christopher Creek nest site	0840	New large nest (#2) in live pine tree.
OW BA	0850	All known nests empty. No eagles.
Black Canyon Lake	0857	No nests or eagles.
Willow Springs Lake nest site	0919	Adult incubating in new large nest (#13). Osprey incubating in new large nest (#14) and in nest #4. Osprey standing in nest #12. Pair of ospreys standing in nest #2.
Woods Canyon BA	0923	Adult incubating in new nest (#18).
Bear Canyon Lake nest site	0928	Ospreys incubating in nests #6 and #7. New large nest found in live tree (#8), empty.
Knoll Lake BA	1026	Osprey incubating in nest #6. No eagles.
Chevelon BA	1050	Two adults at new nest (#6) in snag with one nestling, 4.5 weeks old.
Blue Ridge Reservoir nest site	1600	Ospreys incubating in nest #8 and in new large nests #11 and #14. Osprey perched at new large nest #12. New large nest #13, empty.
Kinnikinick BA	1133	Adult brooding 1-2 very small nestlings in new large nest (#1). Second adult perched.
Ashurst BA	1139	Adult incubating or brooding.
Lower Lake Mary BA	1142	Two adults with one nestling, 3 weeks old.
Kachina BA	1151	Adult with one nestling, 3-4 weeks old.
Rogers Lake	1243	No nests or eagles.
White Horse Lake BA	1252	Osprey incubating in nest #8. Osprey standing in nest #6. No eagles.
Scholz Lake BA	1300	Adult with one nestling, 2-2.5 weeks old.
Dogtown BA	1305	Adult brooding nestlings (prey in nest).
Kaibab Lake BA	1309	Adult with two nestlings, 6-7 weeks old.
Cataract BA	1311	All known nests empty. No eagles.
Santa Fe Reservoir	1315	Two new large nests found (#3, #4). Osprey incubating in nest #3.
Mormon Pocket golden eagle BA	1333	Adult with one nestling, 2-3 weeks old.
Green River BA	1340	Two nestlings, 10.5-11 weeks old.
Oak Creek BA	1344	Two nestlings, 7 weeks old.
Beaver BA	1351	One nestling, 10-11 weeks old.
Ladders BA	1359	One nestling, 7.5 weeks old.
Horseshoe BA	1419	Three nestlings, 6.5-8 weeks old.
Yellow Cliffs BA	1428	Two nestlings, 8.5 weeks old.
Whiskey Spring BA	1448	Adult with one hatchling.
May 16, 2023		
Silver Creek BA	0800	Two nestlings in nest #3, 9 weeks old.
Cibecue BA	1100	One nestling dead in nest. No adults.
Cedar Basin BA	1112	Nest empty, failed. One adult perched in area.
Itsa'cho BA	1136	Nest empty, confirmed failed.

Table 14 continued.

Location	Time	Comments
Crescent BA	1148	One unattended egg. No eagles.
Carnero BA	1157	Nest empty, failed.
Eagle Mountain BA	1202	Nest empty, failed.
Water Nest BA	1208	Adult with two nestlings, 3-4 weeks old
Tall Pine BA	1215	Adult incubating or brooding. Second adult perched.
May 18, 2023		
Yellow Cliffs BA	0742	Two nestlings, 11 weeks old.
Horseshoe BA	0752	Three nestlings, 9-10 weeks old.
June 2, 2023		
Bulldog BA	0736	Nestling dead in nest. Failed.
Tortilla Creek BA	0742	Two nestlings, 10 weeks old.
Chevelon BA	0913	One nestling, 9 weeks old.

APPENDIX E: BACHELOR COVE BREEDING AREA SUMMARY

Table 15. Observed human activity and bald eagle behavior, Bachelor Cove BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Vehicle	303	2	--	--	--	--	--	305	58.5
Fishing by Boat	78	--	--	--	--	--	--	78	15.0
OHV	56	--	--	--	--	--	--	56	10.7
Hiker	20	1	--	1	--	--	--	22	4.0
Plane/ Jet	8	10	--	--	--	--	--	18	3.5
Motorcycle	9	1	--	--	--	--	--	10	1.9
Agency Worker	9	--	--	--	--	--	--	9	1.7
Angler	9	--	--	--	--	--	--	9	1.7
Gunshots	5	--	--	--	--	--	--	5	1.0
Helicopter	2	1	--	--	--	--	--	3	0.6
Biker	2	--	--	--	--	--	--	2	0.4
Birder	2	--	--	--	--	--	--	2	0.4
Camper	1	1	--	--	--	--	--	2	0.4
Canoe/ Kayak	1	--	--	--	--	--	--	1	0.2
Total	505	16	--	1	--	--	--	522	

[1]Bald 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, 2023.

Sex	Fish		Birds		Mammals		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	5	5-0	1	0-1	1	1-0	7	6-1
Female	3	2-1	--	--	--	--	3	2-1
Total	8	7-1	1	0-1	1	1-0	10	8-2

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

Table 17. Observed prey types delivered to the nest, Bachelor Cove BA, Arizona, 2023.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	61	8	5	3	77	74.0
Female	20	5	0	1	26	25.0
Unknown	1	0	0	0	1	1.0
Total	82	13	5	4	104	
Percent	78.8	12.5	4.8	3.8		

Table 18. Observed prey species delivered to the nest, Bachelor Cove BA, Arizona 2023.

Sex	Fish					Birds	Total	Percent
	BS[1]	CS	BL	CC	SH	AC		
Male	3	1	2	1	1	2	10	90.9
Female	--	1	--	--	--	--	1	9.1
Total	3	2	2	1	1	2	11	
Percent	27.3	18.2	18.2	9.1	9.1	18.2		

[1]BS=bass species, CS= catfish species, BL=bluegill, CC=common carp, SH=shad, AC=American coot.

Table 19. Bald eagle habitat analysis at the Bachelor Cove BA, Arizona, 2023.

Lake km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type	Land Type[4]
82.2	SP	Right	No	3	--	UP
82.2	SP	Right	No	5	--	UP
82.2	SP	Right	No	4	--	UP
82.2	SP	Right	Partial	3	--	UP
82.2	SP	Right	No	3	--	UP
82.2	SP	Right	No	3	--	UP
82.2	CF	Right	Partial	2	--	TA
82.2	SP	Right	Partial	2	--	UP
82.4	SP	Right	Partial	6	--	UP
82.4	SP	Right	Partial	6	--	UP
82.4	CF	Right	Partial	6	--	TA
82.5	SP	Right	Partial	6	--	CL
82.5	SG	Right	Partial	6	--	CL
82.6	SP	Right	Partial	6	--	UP
82.6	SP	Right	Partial	6	--	UP
83.1	PT	Right	No	1	--	CL
83.1	PT	Right	No	1	--	CL

[1]Lake kilometer.
[2]CF=cliff ledge, PT=pinnacle top, SG=soft snag, SP=palo verde snag.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]CL=cliffs, TA=talus,- UP=upland desert.

Table 20. Bald eagle habitat use at the Bachelor Cove BA, Arizona, 2023.

Lake km[1]	PW[2,3]	PV	PH	PK	PU	PE	PP	CO	Total	Percent
82.2	12,311	105	--	3	12	2	3	1	12,437	66.0
82.4	1,539	9	--	6	1	9	--	1	1,565	8.3
82.5	4,624	22	--	25	8	--	--	1	4,680	24.8
82.6	34	1	--	--	--	--	--	--	35	0.2
83.1	97	--	37	--	--	--	--	--	134	0.7
Total	18,605	137	37	34	21	11	3	3	18,851	
Percent	98.7	0.7	0.2	0.2	0.1	0.1	<0.1	<0.1		

[1]Lake kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PV= perched vocalizing, PH=perched hunting, PK=perched with prey, PU=perched unspecified, PE= perched eating, PP=perched preening, CO=copulation.

APPENDIX F: BOX BAR BREEDING AREA SUMMARY

Table 21. Observed human activity and bald eagle behavior, Box Bar BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	561	--	--	1	--	--	--	562	60.0
Picnicker	69	--	--	--	--	--	--	69	7.4
Horseback	44	--	--	--	--	--	--	44	4.7
Swimmer	41	--	--	--	--	--	--	41	4.4
Tuber	41	--	--	--	--	--	--	41	4.4
Kayak	36	--	--	1	--	--	--	37	3.9
Agency worker	35	--	--	--	--	--	--	35	3.7
Fisherman	27	--	--	--	--	--	--	27	2.9
Birder	25	--	--	--	--	--	--	25	2.7
Paddleboard	17	--	--	--	--	--	--	17	1.8
Photographer	13	--	--	--	--	--	--	13	1.4
Camper	10	--	--	--	--	--	--	10	1.1
Drone	3	--	--	--	--	--	--	3	0.3
Motorcycle	1	--	2	--	--	--	--	3	0.3
Nestwatcher	3	--	--	--	--	--	--	3	0.3
Cycler	2	--	--	--	--	--	--	2	0.2
Hunter	--	2	--	--	--	--	--	2	0.2
Helicopter	--	1	--	--	--	--	--	1	0.1
Runner	1	--	--	--	--	--	--	1	0.1
Woodcutter	--	1	--	--	--	--	--	1	0.1
Total	929	4	2	2	--	--	--	937	

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

Table 22. Observed prey types delivered to the nest, Box Bar BA, Arizona, 2023.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	19	1	1	7	28	59.6
Female	16	--	--	3	19	40.4
Total	35	1	1	10	47	
Percent	74.4	2.1	2.1	21.3		

Table 23. Observed prey species delivered to the nest, Box Bar BA, Arizona 2023.

Sex	Fish		Birds	Total	Percent
	CS[1]	TI	WS		
Male	2	--	1	3	42.9
Female	2	2	--	4	57.1
Total	4	2	1	7	
Percent	57.1	28.6	14.3		

[1]CS=catfish species, TI=tilapia, WS=waterfowl species.

Table 24. Bald eagle habitat analysis at the Box Bar BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
25.0	UP	Right	No	5	RU	MB
25.3	SD	Right	No	2	RU	MB
25.4	CL	Right	No	3	RU	CW
25.4	SG	Left	No	1	RU	MB
25.4	MS	Right	No	5	RU	MB
25.5	CL	Right	No	3	RU	CW
25.5	CL	Right	Partial	4	RU	CW
25.5	CL	Right	Partial	3	RU	CW
25.8	CL	Right	No	4	RU	CW
25.8	WI	Left	Partial	1	RU	MB

[1]River kilometer.
[2]CL=cottonwood large (>20m), MS=mesquite, SD=cottonwood snag, SG=soft snag, UP=utility (electrical) pole, WI=willow.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RU=run.
[5]CW=cottonwood grove, MB=mesquite bosque.

Table 25. Bald eagle habitat use at the Box Bar BA, Arizona, 2023.

River km[1]	PW[2,3]	PP	CL	PD	PV	PH	PX	GN	OT	Total	Percent
25.0	53	--	--	--	3	--	--	13	6	75	0.4
25.3	6	--	--	--	--	--	--	--	--	6	<0.1
25.4	271	--	--	--	--	--	--	--	--	271	1.4
25.5	14,976	216	274	14	15	--	40	--	2	15,537	83.0
25.8	430	26	--	40	--	18	--	--	15	529	2.8
25.9	2,000	216	--	62	4	--	--	--	--	2,282	12.2
999.9	--	--	--	--	20	--	--	--	--	20	0.1
Total	17,736	458	274	116	42	18	40	13	23	18,720	
Percent	94.7	2.4	1.5	0.6	0.2	0.1	0.2	0.1	0.1		

[1]Lake kilometer. 999.9=unknown.
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, CL=perched close to mate, PD=perched drying, PV= perched vocalizing, PH=perched hunting, PX=perched various, GN=gathering nest materials, OT=other (perched with prey, bathing, perched eating).

APPENDIX G: CONCHO BREEDING AREA SUMMARY

Table 26. Observed human activity and bald eagle behavior, Concho BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Dog walkers	48	--	--	--	--	--	--	48	39.0
Walkers	38	--	--	2	--	--	--	40	32.5
Car/truck	10	--	--	--	--	--	--	10	8.1
Cows	9	--	--	--	--	--	--	9	7.3
Dogs	7	--	--	--	--	--	--	7	5.7
OHV	4	--	--	--	--	--	--	4	3.3
Helicopter	1	--	--	1	--	--	--	2	1.6
Fisherman	1	--	--	--	--	--	--	1	0.8
Nestwatcher	--	--	--	1	--	--	--	1	0.8
Photographer	1	--	--	--	--	--	--	1	0.8
Total	119	--	--	4	--	--	--	123	

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

Table 27. Observed forage events and success, Concho BA, Arizona, 2023.

Sex	Birds		Mammals		Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	13	11-2	5	5-0	2	2-0	5	5-0	25	23-2
Female	6	6-0	4	4-0	4	4-0	3	3-0	17	17-0
Total	19	17-2	9	9-0	6	6-0	8	8-0	42	40-2

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

Table 28. Observed prey types delivered to the nest, Concho BA, Arizona, 2023.

Sex	Birds	Mammals	Fish	Unknown	Total	Percent
Male	15	5	3	7	30	63.8
Female	5	4	3	5	17	36.2
Total	20	9	6	12	47	
Percent	42.6	19.1	12.8	25.5		

Table 29. Observed prey species delivered to the nest, Concho BA, Arizona 2023.

Sex	Birds		Mammals		Fish	Total	Percent
	AC[1]	CM	PD	RS	RT		
Male	12	--	4	1	1	18	69.2
Female	4	1	3	--	--	8	30.8
Total	16	1	7	1	1	26	
Percent	61.5	3.8	26.9	3.8	3.8		

[1]AC=American coot, CM=common merganser, PD=Gunnison's prairie dog, RS=rabbit species, RT=rainbow trout.

Table 30. Bald eagle habitat analysis at the Concho BA, Arizona, 2023.

Lake km[1]	Perch Type[2]	Shade	Distance to H_2O[3]	Water Type	Land Type[4]
0.8	ST	No	3	--	CF
0.9	JN	Partial	1	--	CF
0.9	JN	Partial	3	--	CF
0.95	SO	No	1	--	SO
1.0	SJ	No	1	--	CF
1.05	SO	No	1	--	SO
1.15	JN	Partial	2	--	CF
1.21	SO	No	1	--	SO
1.3	CL	Yes	1	--	CW
1.3	SD	Partial	1	--	CW
1.4	CL	Partial	1	--	CW
1.4	SO	No	1	--	SO
1.41	CL	Partial	1	--	CW
1.45	SO	No	1	--	SO
1.5	CL	Yes	1	--	CW
1.5	SO	Partial	1	--	SO
1.6	CL	Partial	1	--	CW
1.61	SO	No	1	--	SO
1.75	CL	Yes	1	--	CW
1.85	CL	Partial	1	--	CW
2.15	CL	Yes	2	--	CW

[1]Lake kilometer.
[2]CL=cottonwood large (20-30m), JN=live juniper, SD=cottonwood snag, SJ=snag juniper, SO=shore, ST=snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]CF=conifer forest, CW=cottonwood grove, SO=shore.

Table 31. Bald eagle habitat use at the Concho BA, Arizona, 2023.

Lake km[1]	PW[2,3]	PR	PP	PH	PK	PE	PG	PD	CL	OT	Total	Percent
0.8	665	--	--	3	--	--	--	--	--	--	668	2.4
0.9	578	--	--	--	--	--	--	--	--	18	596	2.2
0.95	192	--	--	--	--	55	61	--	--	20	328	1.2
1.0	951	--	34	--	3	--	--	--	--	--	988	3.6
1.05	292	--	--	24	--	--	58	--	--	14	388	1.4
1.15	173	60	--	--	--	--	--	--	--	--	233	0.8
1.21	5	--	--	--	--	--	--	--	--	--	5	<0.1
1.3	5,717	334	89	--	23	14	--	--	--	15	6,192	22.5
1.4	10,595	65	196	234	238	--	4	9	64	9	11,414	41.5
1.41	916	60	35	--	--	--	--	18	--	--	1,029	3.7
1.45	44	--	--	--	42	--	--	--	--	48	134	0.5
1.5	4,138	--	165	61	54	26	2	85	16	69	4,616	16.8
1.6	404	--	11	--	--	--	--	--	--	6	421	1.5
1.61	--	--	--	--	--	--	2	--	--	18	20	0.1
1.75	116	150	--	--	--	93	--	--	--	--	359	1.3
1.85	3	--	--	110	--	--	--	--	--	3	116	0.4
2.15	1	--	--	--	--	--	--	--	--	--	1	<0.1
Total	24,790	669	530	432	360	188	127	112	80	220	27,508	
Percent	90.1	2.4	1.9	1.6	1.3	0.7	0.5	0.4	0.3	0.8		

[1]Lake kilometer.

[2]Observation time (minutes).

[3]PW=perched watching, PR=perched roosting, PP=perched preening, PH=perched hunting, PK=perched with prey, PE=perched eating, PG= perched on ground, CL=perched close to mate, OT=other (eating on shore, drinking water, perched unknown, BA=bathing).

APPENDIX H: GOLDFIELD BREEDING AREA SUMMARY

Table 32. Observed human activity and bald eagle behavior, Goldfield BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	621	--	--	1	--	--	--	622	20.4
Paddleboard	504	--	--	--	--	--	--	504	16.6
Unspecified visitor	479	--	--	--	--	--	--	479	15.7
Canoe/Kayak	453	--	--	--	--	--	--	453	14.9
Tuber	326	--	--	--	--	--	--	326	10.7
Horseback Rider	180	--	--	--	--	--	--	180	5.9
Angler	96	--	--	--	--	--	--	96	3.2
Photographer	91	--	--	--	--	--	--	91	3.0
Dog	75	--	--	--	--	--	--	75	2.5
Helicopter	51	11	--	2	--	--	--	64	2.1
Driver	22	--	--	--	--	--	--	22	0.7
USFS Employee	19	--	--	--	--	--	--	19	0.6
Helicopter, Apache	13	3	--	--	--	--	--	16	0.5
Helicopter, Sheriff	10	4	--	1	--	--	--	15	0.5
Airboat	12	2	--	--	--	--	--	14	0.5
Birder	12	--	--	--	--	--	--	12	0.4
Small Plane	7	4	--	--	--	--	--	11	0.4
Metal Detector	9	--	--	--	--	--	--	9	0.3
Bicycle	7	--	--	--	--	--	--	7	0.2
Helicopter, Military	6	--	--	--	--	--	--	6	0.2
Drone	5	--	--	--	--	--	--	5	0.2
OHV	5	--	--	--	--	--	--	5	0.2
AGFD Employee	4	--	--	--	--	--	--	4	0.1
Hunter	4	--	--	--	--	--	--	4	0.1
Agency Employee	3	--	--	--	--	--	--	3	0.1
Boater	2	--	--	--	--	--	--	2	0.1
Runner	1	--	--	--	--	--	--	1	<0.1
Total	3,017	24	--	4	--	--	--	3,045	

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

Table 33. Observed forage events and success, Goldfield BA, Arizona, 2023.

Sex	Fish		Mammals		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	5	3-2	1	1-0	1	1-0	7	5-2
Female	3	3-0	--	--	--	--	3	3-0
Total	8	6-2	1	1-0	1	1-0	10	8-2

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

Table 34. Observed prey types delivered to the nest, Goldfield BA, Arizona, 2023.					
Sex	Fish	Mammals	Unknown	Total	Percent
Male	13	1	--	14	63.6
Female	6	--	2	8	36.4
Total	19	1	2	22	
Percent	86.4	4.6	9.1		

Table 35. Bald eagle habitat analysis at the Goldfield BA, Arizona, 2023.						
River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
8.6	CM	Right	No	1	RB	--
8.7	SO	Right	No	1	--	SO
8.7	CM	Right	Partial	5	--	DU
8.7	SO	Left	No	1	--	SO
8.9	CS	Right	No	1	RB	--
9.0	CS	Right	No	5	--	DU
9.0	CM	Left	Partial	1	RB	--
9.0	SS	Right	No	1	RU	--
9.1	CM	Right	Partial	5	--	DU
9.1	CM	Right	No	4	--	DU
9.2	CM	Right	No	6	--	DU
9.2	SD	Right	No	4	--	DU
9.4	CM	Right	No	6	--	DU
9.6	CM	Left	Partial	1	RB	--
9.7	CM	Right	No	6	--	DU
9.7	CS	Right	No	5	--	DU
9.8	CS	Right	No	1	RB	--
9.8	SM	Left	No	4	--	DU
9.8	SS	Right	No	1	--	DU
9.9	CM	Left	Partial	1	RB	--
9.9	CL	Left	Partial	3	--	DU
10.5	CS	Left	Yes	1	RU	--
10.6	CM	Left	Partial	1	RU	--
10.7	CF	Right	No	1	RU	--
10.8	CF	Right	No	1	RU	--

[1]River kilometer.
[2]CF=cliff ledge, CL=cottonwood large/20-30m, CM=cottonwood medium/10-20m, CS=cottonwood small/0-10m, SD=cottonwood snag, SM=snag mesquite, SO=shore, SS=soft snag.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RB=river bend, RU=run.
[5]DU=desert upland, SO=shore.

Table 36. Bald eagle habitat use at the Goldfield BA, Arizona, 2023.

River km[1]	PW[2,3]	PH	PU	PX	PP	CL	PR	ES	PD	OT	Total	Percent
8.4	--	--	--	--	--	--	--	--	--	6	6	<0.1
8.6	4	55	--	--	--	--	--	--	--	--	59	0.3
8.7	273	6	13	--	18	--	--	107	--	13	430	2.3
8.9	18	295	--	--	--	--	--	--	--	1	314	1.7
9.0	105	77	--	--	8	--	--	--	--	30	220	1.2
9.1	147	--	--	--	--	--	--	--	--	--	147	0.8
9.2	631	--	--	2	7	--	--	--	--	6	646	3.5
9.3	6	--	--	--	--	--	--	--	--	--	6	<0.1
9.4	2,820	--	18	--	177	38	52	--	39	14	3,158	17.3
9.5	28	--	--	--	--	--	--	--	--	--	28	0.2
9.6	--	--	--	--	22	--	--	--	--	7	29	0.2
9.7	7,538	2	--	49	370	281	77	--	26	12	8,355	45.6
9.8	54	--	203	--	26	--	--	--	--	10	293	1.6
9.9	1,797	328	941	868	17	--	--	--	--	27	3,978	21.7
10.5	--	--	--	95	--	--	--	--	--	--	95	0.5
10.6	--	--	--	41	--	--	--	--	--	--	41	0.2
10.7	--	333	--	--	--	--	--	--	--	--	333	1.8
10.8		165	--	--	--	--	--	--	--	--	165	0.9
Total	13,421	1,261	1,175	1,055	645	319	129	107	65	126	18,303	
Percent	73.3	6.9	6.4	5.8	3.5	1.7	0.7	0.6	0.4	0.7		

[1]River kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PU=perched unknown, PX=perched various, PP=perched preening, CL=perched close to mate, PR=perched roosting, ES=eating on shore, PD= perched drying, OT=other (PE=perched eating, PK=perched with prey, PV=perched vocalizing, GN=gathering nest materials, SS=standing on shore, EN=eating in nest, ET=eating in tree).

APPENDIX I: LUNA BREEDING AREA SUMMARY

Table 37. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Drivers	129	--	--	--	1	--	--	130	53.7
Birders	36	--	--	--	--	--	--	36	14.9
Fisherman	16	--	--	--	--	--	--	16	6.6
Picnickers	15	--	--	--	--	--	--	15	6.2
Hikers	14	--	--	--	--	--	--	14	5.8
Photographer	11	--	--	--	--	--	--	11	4.5
OHV	5	--	--	--	--	--	--	5	2.1
Alpine Fire Dept	4	--	--	--	--	--	--	4	1.7
US Forest Service	3	--	--	--	--	--	--	3	1.2
Drone flyer	1	--	--	--	1	--	--	2	0.8
Military Jet	1	--	--	1	--	--	--	2	0.8
AGFD Biologist	1	--	--	--	--	--	--	1	0.4
Kayaks/ Canoes	1	--	--	--	--	--	--	1	0.4
NEC	1	--	--	--	--	--	--	1	0.4
Rancher	1	--	--	--	--	--	--	1	0.4
Total	239	--	--	1	2	--	--	242	

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

Table 38. Observed forage events and success, Luna BA, Arizona, 2023.

Sex	Birds		Total	
	E[1]	S-U[2]	E	S-U
Male	19	16-3	19	16-3
Female	7	5-2	7	5-2
Total	26	21-5	26	21-5

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

Table 39. Observed prey types delivered to the nest, Luna BA, Arizona, 2023.

Sex	Birds	Total	Percent
Male	15	15	88.2
Female	2	2	11.8
Total	17	17	
Percent	100		

Table 40. Observed prey species delivered to the nest, Luna BA, Arizona 2023.

Sex	Birds		Total	Percent
	AC[1]	CR		
Male	14	1	15	88.2
Female	2	--	2	11.8
Total	16	1	17	
Percent	94.1	5.9		

[1]AC=American coot, CR=common raven.

Table 41. Bald eagle habitat analysis at the Luna BA, Arizona, 2023.

Lake km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.3	PS	Right	No	1	RS	--
0.7	HS	Right	No	2	RC	--
2.2	PO	Right	Yes	2	RS	--
2.2	SH	Left	No	7	--	CF
2.3	PO	Left	Yes	7	--	CF
2.3	PO	Left	Yes	7	--	CF
2.4	HS	Left	No	7	--	CF
2.4	PS	Left	Yes	7	--	CF
2.5	WF	Left	No	1	RS	--
2.6	SC	Left	No	6	--	CF
2.6	PS	Left	Yes	2	RS	--
2.7	PS	Left	Yes	2	--	CF
5.0	PO	Right	No	8	RC	--
5.1	FP	Right	No	1	RC	--
5.1	RW	Right	No	1	RC	--
5.1	PO	Right	No	1	RC	--

[1]Lake kilometer.
[2]FP=fence post, HS=hard snag, PO=old growth pine (20-30m+), PS=small pine (10-20m), RW=rock in water, SC=snag conifer, SH=shrub, WF=waterfowl sign.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RC=reservoir cove, RS=reservoir main body.
[5]CF=conifer forest.

Table 42. Bald eagle habitat use at the Luna BA, Arizona, 2023.

Lake km[1]	PW[2,3]	PR	CL	PH	PP	ET	PK	Total	Percent
0.3	--	--	--	25	--	--	--	25	0.2
0.7	--	--	--	76	--	--	--	76	0.7
2.2	1,745	1,990	22	--	102	19	--	3,878	35.2
2.3	203	713	--	--	--	--	--	916	8.3
2.4	4,191	371	380	--	52	--	--	4,994	45.4
2.5	45	--	--	--	--	--	--	45	0.4
2.6	487	--	--	150	--	--	--	637	5.8
2.7	40	--	--	101	--	--	--	141	1.3
5.0	155	--	--	--	--	--	--	155	1.4
5.1	132	--	--	4	--	--	--	136	1.2
5.2	--	--	--	--	--	--	2	2	<0.1
Total	6,998	3,074	402	356	154	19	2	11,005	
Percent	63.6	27.9	3.7	3.2	1.4	0.2	<0.1		

[1]Lake kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PR=perched roosting, CL=perched close to mate, PH=perched hunting, PP=perched preening, ET=eating in tree, PK=perched with prey.

APPENDIX J: ORME BREEDING AREA SUMMARY

Table 43. Observed human activity and bald eagle behavior, Orme BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter (private)	153	--	--	--	--	--	--	153	16.3
Small Plane	36	6	--	--	--	--	--	36	3.8
Horseback Rider	8	4	--	--	--	--	--	12	1.3
Helicopter (Apache)	11	--	--	--	--	--	--	11	1.2
Helicopter (Military)	7	--	--	--	--	--	--	7	0.7
Driver	--	6	--	--	--	--	--	6	0.6
Cyclist	4	--	--	--	--	--	--	4	0.4
Helicopter (Sheriff)	4	--	--	--	--	--	--	4	0.4
Angler/Fisher	--	3	--	--	--	--	--	3	0.3
AZGFD Biologist	--	--	--	2	--	--	--	2	0.2
Boater	--	2	--	--	--	--	--	2	0.2
Nestwatcher	--	1	--	--	--	--	--	1	0.1
Total	223	16	--	2	--	--	--	241	

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

Table 44. Observed prey types delivered to the nest, Orme BA, Arizona, 2023.

Sex	Fish	Mammals	Birds	Reptile	Carrion	Total	Percent
Male	23	16	--	--	1	40	67.8
Female	10	7	1	1	--	19	32.2
Total	33	23	1	1	1	59	
Percent	55.9	39.0	1.7	1.7	1.7		

Table 45. Observed prey species delivered to the nest, Orme BA, Arizona 2023.

Sex	Fish				Mammals		Total	Percent
	RT[1]	CS	BC	LB	RS	GS		
Male	11	6	2	1	5	1	26	76.5
Female	1	2	--	--	5	--	8	23.5
Total	12	8	2	1	10	1	34	
Percent	35.3	23.5	5.9	2.9	29.4	2.9		

[1]RT=rainbow trout, CS=catfish species, BC=bullhead catfish, LB=largemouth bass, RS=rabbit species, GS=ground squirrel species.

Table 46. Bald eagle habitat analysis at the Orme BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
V 0.0	HS	Right	No	2	--	CW
V 0.1	UP	Right	No	3	--	UP
V 0.1	SG	Right	No	1	--	CW
V 0.3	CM	Right	No	2	--	CW
V 0.3	UP	Right	No	4	--	UP
V 0.3	--	Right	No	--	--	CW
V 0.3	UP	Right	No	4	--	UP
V 0.4	HS	Right	No	2	--	CW
V 0.4	UP	Right	No	3	--	UP
V 0.4	CL	Right	No	1	--	CW
V 0.5	SP	Right	No	2	--	CW
V 0.5	--	Right	Partial	1	PO	CW
V 0.6	NE	Right	No	1	RU	CW
V 0.6	HS	Right	No	2	--	CW
V 0.7	CW	Right	Yes	1	PO	CW
V 0.7	CW	Right	Partial	1	PO	--
V 0.8	UP	Right	No	3	--	UP
S 1.2	RI	Left	No	6	--	CL

[1]River kilometer (V=Verde River, S=Salt River).
[2]CL=cliff ledge, CM=cottonwood medium (10-20m), CW=cottonwood large (20-30m), HS=hard snag, NE=nest, RI=ridge, SG=soft snag, SP=stump, UP=utility pole.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]PO=river pool, RU=run.
[5]CL=cliffs, CW=cottonwood grove, UP=desert upland.

Table 47. Bald eagle habitat use at the Orme BA, Arizona, 2023.

River km[1]	PW[2,3]	PH	PP	PD	PE	PV	CL	PK	PX	Total	Percent
0.1	456	1,010	7	57	--	--	--	--	--	1,530	10.6
0.3	145	--	--	--	--	1	--	--	2	148	1.0
0.4	7,216	110	1,314	208	80	15	38	12	--	8,993	62.2
0.5	11	28	--	--	41	--	--	--	5	85	0.6
0.6	1,364	1,764	112	38	--	65	--	--	--	3,343	23.1
0.7	261	--	--	--	--	--	--	--	--	261	1.8
0.8	61	20	--	--	--	--	--	--	--	81	0.6
1.2	20	--	--	--	--	--	--	--	--	20	0.1
Total	9,534	2,932	1,433	303	121	81	38	12	7	14,461	
Percent	65.9	20.3	9.9	2.1	0.8	0.6	0.3	0.1	<0.1		

[1]River kilometer (Verde River).
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, PD=perched drying, PE=perched eating, PV=perched vocalizing, CL=perched close to mate, PK=perched with prey, PX=perched various.

APPENDIX K: RODEO BREEDING AREA SUMMARY

Table 48. Observed human activity and bald eagle behavior, Rodeo BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter	4	--	--	--	--	3	--	7	31.8
Driver	4	--	--	--	--	--	--	4	18.2
Helicopter, Sheriff	3	--	--	--	--	--	--	3	13.6
Helicopter, Military	2	--	--	--	--	--	--	2	9.1
Woodcutter	1	--	--	--	--	1	--	2	9.1
Agency, FMYN Environmental	--	--	--	--	--	1	--	1	4.6
AGFD Biologist	--	--	--	--	1	--	--	1	4.6
Helicopter, Apache	1	--	--	--	--	--	--	1	4.6
Small Plane	1	--	--	--	--	--	--	1	4.6
Total	16	--	--	--	1	5	--	22	

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

Table 49. Observed prey types delivered to the nest, Rodeo BA, Arizona, 2023.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	6	1	--	7	14	66.7
Female	3	--	--	3	6	28.5
Unknown	--	--	1	--	1	4.8
Total	9	1	1	10	21	
Percent	42.9	4.8	4.8	47.5		

Table 50. Bald eagle habitat analysis at the Rodeo BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
3.1	UP	Left	No	1	RI/RU	CW
3.1	WO	Right	Partial	1	RI/RU	CW
3.6	CL	Left	Yes	5	RU	CW
4.0 (nest)	SD	Left	No	7	RU	CW
4.0	SD	Left	No	7	RU	CW
4.0	ST	Left	No	7	RU	CW
4.1	SD	Left	No	7	RU	CW
4.6	ST	Right	No	3	RU	GB
5.5	SD	Left	No	2	RU	CW
7.0	DP	Left	No	2	PN	GM

[1]River kilometer.
[2]CL=cottonwood large (>20m), DP=dirt pile, SD=snag, cottonwood, ST=snag top, UP=utility pole, WO=willow tree.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[5]PN=pond, RI=riffle, RU=run.
[6]CW=cottonwood grove, GB=gravel bar, GM=gravel mine.

Table 51. Bald eagle habitat use at the Rodeo BA, Arizona, 2023.

River km[1]	PW[2,3]	PP	CL	PH	Total	Percent
3.1	1,601	154	267	42	2,064	27.2
3.6	23	--	--	--	23	0.3
4.0	4,735	109	5	--	4,849	64.1
4.1	252	20	--	--	272	3.6
4.6	148	--	--	31	179	2.4
5.5	16	--	--	--	16	0.2
7.0	71	--	--	97	168	2.2
Total	6,846	283	272	170	7,571	
Percent	90.4	3.7	3.6	2.3		

[1]River kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, CL=perched close to mate, PH=perched hunting.

APPENDIX L: SCHOLZ BREEDING AREA SUMMARY

Table 52. Observed human activity and bald eagle behavior, Scholz BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	27	--	--	--	--	46	--	73	61.9
Canoe/Kayak	2	4	--	--	--	13	--	19	16.1
Fisherman	6	--	--	--	--	11	--	17	14.4
Paddleboard	--	--	--	--	--	2	1	3	2.5
Gunshot	--	--	--	--	--	2	--	2	1.7
Hunter	--	--	--	--	--	2	--	2	1.7
OHV	2	--	--	--	--	--	--	2	1.7
Total	37	4	--	--	--	76	1	118	

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

Table 53. Observed forage events and success, Scholz BA, Arizona, 2023.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	10	7-3	10	7-3
Female	2	2-0	2	2-0
Unknown	1	1-0	1	1-0
Total	13	10-3	13	10-3

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

Table 54. Observed prey types delivered to the nest, Scholz BA, Arizona, 2023.

Sex	Fish	Mammals	Unknown	Total	Percent
Male	8	6	5	19	33.9
Female	13	2	4	19	33.9
Unknown	2	2	14	18	32.1
Total	23	10	23	56	
Percent	41.1	17.9	41.1		

Table 55. Observed prey species delivered to the nest, Scholz BA, Arizona 2023.

Sex	Fish		Total	Percent
	SB[1]	BL		
Male	2	1	3	100
Female	--	--	--	--
Total	2	1	3	
Percent	66.7	33.3		

[1]SB=smallmouth bass, BL=bluegill.

Table 56. Bald eagle habitat analysis at the Scholz BA, Arizona, 2023.

Lake km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.1	SC	--	No	1	--	CF
0.6	PO	--	Partial	1	--	CF
0.8	PO	--	Partial	1	--	CF
0.9	SC	--	No	1	RC	--
0.9	SC	--	No	1	RC	--
0.9	SC	--	No	1	RC	--
1.0	SC	--	No	1	RC	--
1.1	SC	--	No	1	RC	--
1.1	SC	--	No	1	RC	--
1.2	SC	--	No	3	--	CF
1.3	SC	--	No	7	--	CF
1.3	PO	--	Partial	2	--	CF
1.3	SC	--	No	2	--	CF
1.4	PO	--	Partial	1	--	CF
1.5	SC	--	No	1	RC	--
1.5	SC	--	No	1	RC	--
1.5	SC	--	No	1	RC	--
1.5	SC	--	No	1	RC	--
1.6	SC	--	No	1	RC	--
1.7	SC	--	No	1	--	CF
2.1	PO	--	Partial	1	RC	--
2.2	SC	--	No	1	RC	--

[1]Lake kilometer.
[2]PO=pine/conifer old growth (20-30m+), SC=snag conifer.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RC=reservoir cove.
[5]CF=conifer forest.

Table 57. Bald eagle habitat use at the Scholz BA, Arizona, 2023.

River km[1]	PW[2,3]	PF	PV	PH	PU	PP	PE	PG	PK	GN	Total	Percent
0.1	45	--	--	--	--	--	--	--	--	--	45	0.3
0.6	91	--	--	5	--	--	--	7	--	--	103	0.7
0.8	4	--	1	--	--	--	--	--	--	--	5	0.0
0.9	140	--	--	--	--	--	--	--	--	--	140	1.0
1.0	208	--	1	--	--	--	--	--	--	--	209	1.5
1.1	173	--	2	--	--	--	--	--	--	--	175	1.3
1.2	546	--	--	--	1	--	--	--	--	--	547	3.9
1.3	5,091	4,770	56	--	35	19	--	--	--	1	9,972	72.0
1.4	108	--	1	--	--	--	--	--	--	--	109	0.8
1.5	2,251	--	7	44	--	8	7	--	3	--	2,320	16.7
1.6	62	--	12	--	--	--	--	--	--	--	74	0.5
1.7	71	--	4	--	--	--	--	--	--	--	75	0.5
2.1	45	--	3	--	--	--	--	--	--	--	48	0.3
2.2	33	--	2	--	--	--	--	--	--	--	35	0.3
Total	8,868	4,770	89	49	36	27	7	7	3	1	13,857	
Percent	64.0	34.4	0.6	0.4	0.3	0.2	0.1	0.1	<0.1	<0.1		

[1]River kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PF=perched close to fledgling, PV= perched vocalizing, PH=perched hunting, PU=perched unknown, PP=perched preening, PE= perched eating, PG=perched on ground, PK=perched with prey, GN=gathering nest materials.

APPENDIX M: SYCAMORE BREEDING AREA SUMMARY

Table 58. Observed human activity and bald eagle behavior, Sycamore BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Driver	6	--	--	--	--	--	--	6	24.0
Horseback Rider	5	--	--	--	--	--	--	5	20.0
Agency, Police	5	--	--	--	--	--	--	5	20.0
Helicopter	2	--	--	--	--	1	--	3	12.0
OHV	1	--	--	--	--	1	--	2	8.0
Shooter	2	--	--	--	--	--	--	2	8.0
Small Plane	1	--	--	--	--	--	--	1	4.0
Helicopter, Military	1	--	--	--	--	--	--	1	4.0
Total	23	--	--	--	--	2	--	25	

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

Table 59. Observed forage events and success, Sycamore BA, Arizona, 2023.

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

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

Table 60. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
7.8	UP	Left	No	2	RU	SO
9.8	SD	Left	No	1	RI	SO
9.9	SD	Left	No	1	RI	SO
9.9	SP	Left	No	1	RI	SO
9.9	SO	Left	No	2	RI	GB
10.0	WO	Left	No	1	RI	SO
10.1 (nest)	SD	Left	Yes	6	RU	CW
10.1	UP	Right	No	1	RU	FL
10.1	SD	Left	No	6	RU	CW
10.3	SG	Left	No	5	RU	GB
11.1	SD	Left	No	6	RU	CW

[1]River kilometer.
[2]SD=snag, cottonwood, SG=soft snag, SO=shore, SP=stump or fallen tree, UP=utility pole, WO=willow tree.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[5]RI=riffle, RU=run.
[6]CW=cottonwood grove, FL=farmland, GB=gravel bar, SO=shore.

Table 61. Bald eagle habitat use at the Sycamore BA, Arizona, 2023.

River km[1]	PW[2,3]	PH	PP	ET	ES	CL	Total	Percent
7.8	614	162	33	--	--	--	809	22.0
9.8	12	--	27	--	--	--	39	1.1
9.9	133	480	29	10	32	--	684	18.6
10.0	216	217	3	14	--	--	450	12.2
10.1	215	--	164	21	--	--	400	10.9
10.3	153	69	42	--	--	--	264	7.2
11.1	892	--	109	--	--	30	1,031	28.0
Total	2,235	928	407	45	32	30	3,677	
Percent	60.8	25.2	11.1	1.2	0.9	0.8		

[1]River kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, ET=eating in tree, ES=eating on shore, CL=perched close to mate.

APPENDIX N: WHISKEY SPRING BREEDING AREA SUMMARY

Table 62. Observed human activity and bald eagle behavior, Whiskey Spring BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Boat	451	79	3	6	--	30	15	584	81.2
Jet ski	62	15	--	--	--	3	3	83	11.5
Helicopter	9	2	--	--	2	4	--	17	2.4
Small plane	8	2	--	--	--	3	3	16	2.2
Military jet	5	2	--	--	--	1	--	8	1.1
Gunshots	1	--	--	--	--	1	--	2	0.3
Sheriff helicopter	1	1	--	--	--	--	--	2	0.3
Sheriff's boat	--	--	--	--	--	--	2	2	0.3
Kayak	1	--	--	--	--	--	--	1	0.1
Motorcycle/dirt bike	--	--	--	--	--	1	--	1	0.1
OHV	1	--	--	--	--	--	--	1	0.1
Sonic boom	--	--	--	--	--	1	--	1	0.1
Truck	--	--	--	--	--	--	1	1	0.1
Total	539	101	3	6	2	44	24	719	

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

Table 63. Watercraft compliance at the southern closure boundary, Whiskey Spring BA, Arizona, 2023.

Date	Boats at Closure	Boats in Closure	Jet Skis at Closure	Jet Skis in Closure	Total
2/4-2/12	12	13	4	--	29
2/17-2/26	17	6	--	--	23
3/3-3/12	5	8	1	--	14
3/31-4/9	93	31	5	7	136
4/14-4/23	224	30	39	3	296
4/28-5/3	122	23	14	10	169
Total	473	111	63	20	667

Table 64. Observed forage events and success, Whiskey Spring BA, Arizona, 2023.

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

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

Table 65. Observed prey types delivered to the nest, Whiskey Spring BA, Arizona, 2023.			
Sex	Fish	Total	Percent
Male	4	4	57.1
Female	2	2	28.6
Unknown	1	1	14.3
Total	7	7	
Percent	100		

Table 66. Bald eagle habitat analysis at the Whiskey Spring BA, Arizona, 2023.						
River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
68.2	CF	Right	Partial	1	RB	CL
68.3	SO	Right	Partial	1	RB	SO
68.4	CF	Right	Partial	1	RB	CL
68.7	BO	Left	Partial	1	RB	SO
68.7	CF	Left	Partial	1	RB	CL
68.8	RI	Left	Partial	1	RB	CL
68.8	CT	Left	No	1	RB	CL
68.8	SO	Right	No	1	RU	SO
68.9	RI	Left	No	1	RB	CL
69.0	CT	Left	Partial	1	RU	CL
69.1	CF	Left	Partial	1	RU	CL
69.1	CF	Left	Partial	1	RU	CL
69.6	PV	Right	No	3	RC	CL

[1]River kilometer.
[2]BO=boulder, CF=cliff ledge, CT=cliff top, PV=palo verde tree, RI=ridge, SO=shore.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RB=river bend, RC=reservoir cove, RU=river run.
[5]CL=cliff, SO=shore.

Table 67. Bald eagle habitat use at the Whiskey Spring BA, Arizona, 2023.												
River km[1]	PW[2,3]	SS	PV	ES	PH	PP	DW	PI	CO	SH	Total	Percent
68.2	162	--	--	--	--	--	--	--	--	--	162	9.9
68.3	--	1	--	14	14	--	--	--	--	--	29	1.8
68.4	21	--	--	--	--	--	--	--	--	--	21	1.3
68.7	51	--	--	10	--	--	3	--	--	--	64	3.9
68.8	818	56	45	22	--	8	--	2	2	--	953	58.0
68.9	9	--	--	--	--	1	--	--	--	1	11	0.7
69.0	58	--	1	--	--	--	--	--	--	--	59	3.6
69.1	308	--	3	--	--	--	--	--	--	--	311	18.9
69.6	34	--	--	--	--	--	--	--	--	--	34	2.1
Total	1,461	57	49	46	14	9	3	2	2	1	1,644	
Percent	88.9	3.5	3.0	2.8	0.9	0.5	0.2	0.1	0.1	0.1		

[1]River kilometer.
[2]Observation time (minutes).
[3]PW=perched watching, SS=standing on shore, PV=perched vocalizing, ES=eating on shore, PH=perched hunting, PP=perched preening, DW=drinking water, PI=perched interaction, CO=copulating, SH=standing in water.

APPENDIX O: WILLOW SPRINGS BREEDING AREA SUMMARY

Table 68. Observed human activity and bald eagle behavior, Willow Springs BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Picnicker	550	111	--	--	--	--	--	661	21.2
Kayak	604	47	--	--	--	--	--	651	20.9
Paddleboard	437	46	--	--	--	--	--	483	15.5
Fisherman	440	7	--	1	--	--	--	448	14.4
swimmer	309	46	--	--	--	--	--	355	11.4
Hiker	227	18	--	1	--	--	--	246	7.9
Tuber	79	2	--	--	--	--	--	81	2.6
Fishing by boat	75	--	--	--	--	--	--	75	2.4
Boater	74	--	--	--	--	--	--	74	2.4
Dogs Off Leash	12	4	--	--	--	--	--	16	0.5
Nestwatcher	--	5	--	--	--	--	--	5	0.2
Drone	--	5	--	--	--	--	--	5	0.2
Nestwatcher	--	4	--	--	--	--	--	4	0.1
Runner	4	--	--	--	--	--	--	4	0.1
Cycler	2	1	--	--	--	--	--	3	0.1
Helicopter	--	--	3	--	--	--	--	3	0.1
Birder	2	--	--	--	--	--	--	2	0.1
Photographer	1	--	--	--	--	--	--	1	<0.1
Total	2,816	296	3	2	--	--	--	3,117	

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

Table 69. Observed forage events and success, Willow Springs BA, Arizona, 2023.

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

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

Table 70. Observed prey types delivered to the nest, Willow Springs BA, Arizona, 2023.

Sex	Fish	Unknown	Total	Percent
Male	30	2	32	71.1
Female	12	1	13	28.9
Total	42	3	45	
Percent	93.3	6.7		

Table 71. Observed prey species delivered to the nest, Willow Springs BA, Arizona 2023.

Sex	Fish		Total	Percent
	RT[1]	TS		
Male	28	2	30	71.4
Female	12	--	12	28.6
Total	40	2	42	
Percent	95.2	4.8		

[1]RT=rainbow trout, TS=trout species.

Table 72. Bald eagle habitat analysis at the Willow Springs BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
4.9	PO	Right	Yes	1	RS	CF
6.1	PO	Left	Yes	2	RS	CF
6.1	PO	Left	Yes	1	RS	CF
6.2	SC	Left	No	1	RS	CF
6.2	PO	Left	Yes	3	RS	CF
6.2	PO	Left	Yes	1	RS	CF
6.2	PO	Left	No	3	RS	CF
6.3	PO	Left	Yes	1	RS	CF
6.4	SC	Left	No	2	RS	CF

[1]River kilometer.
[2]PO= pine/conifer, old growth 20-30+m, SC=snag conifer.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=coniferous forest.

Table 73. Bald eagle habitat use at the Willow Springs BA, Arizona, 2023.

River km[1]	PW[2,3]	PH	PV	PP	CL	PE	PK	Total	Percent
4.9	30	--	--	--	--	--	--	30	0.2
6.1	2,679	100	--	--	--	10	5	2,794	18.0
6.2	11,650	801	93	67	45	8	4	12,668	81.5
6.3	25	--	--	--	--	--	--	25	0.2
999.9	--	--	30	--	--	--	--	30	0.2
Total	14,384	901	123	67	45	18	9	15,547	
Percent	92.5	5.8	0.8	0.4	0.3	0.1	0.1		

[1]River kilometer. 999.9=out of view.
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PV= perched vocalizing, PP=perched preening, CL=perched close to mate, PE= perched eating, PK=perched with prey.

APPENDIX P: WOODS CANYON BREEDING AREA SUMMARY

Table 74. Observed human activity and bald eagle behavior, Woods Canyon BA, Arizona, 2023.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Hiker	1,438	--	--	1	--	--	--	1,439	76.7
Kayak	225	2	--	--	--	--	--	227	12.1
Fisherman	65	--	--	--	--	--	--	65	3.5
Paddleboard	40	1	--	--	--	--	--	41	2.2
Runner	26	--	--	--	--	--	--	26	1.4
Picnicker	22	1	--	--	--	--	--	23	1.2
Boater	19	--	--	--	--	--	--	19	1.0
Fishing by boat	7	--	--	--	--	--	--	7	0.4
Cycler	5	--	--	--	--	--	--	5	0.3
Tuber	5	--	--	--	--	--	--	5	0.3
Birder	4	--	--	--	--	--	--	4	0.2
Drone	--	4	--	--	--	--	--	4	0.2
Nestwatcher	2	--	--	1	--	--	--	3	0.2
Photographer	3	--	--	--	--	--	--	3	0.2
Camper	2	--	--	--	--	--	--	2	0.1
Swimmer	2	--	--	--	--	--	--	2	0.1
Total	1,865	8	--	2	--	--	--	1,875	

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

Table 75. Observed forage events and success, Woods Canyon BA, Arizona, 2023.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	13	7-6	13	7-6
Female	8	6-2	8	6-2
Total	21	13-8	21	

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

Table 76. Observed prey types delivered to the nest, Woods Canyon BA, Arizona, 2023.

Sex	Fish	Mammals	Unknown	Total	Percent
Male	21	2	2	25	55.6
Female	19	1	--	20	44.4
Total	40	3	2	45	
Percent	88.9	6.7	4.4		

Table 77. Observed prey species delivered to the nest, Woods Canyon BA, Arizona 2023.

Sex	Fish		Total	Percent
	RT[1]	TS		
Male	19	1	20	51.3
Female	18	1	19	48.7
Total	37	2	39	
Percent	94.9	5.1		

[1]RT=rainbow trout, TS=trout species.

Table 78. Bald eagle habitat analysis at the Woods Canyon BA, Arizona, 2023.

River km[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.1	PO	Left	Partial	1	RS	CF
0.2	PO	Left	Partial	1	RS	CF
0.4	PO	Left	Partial	2	RS	CF
0.6	SC	Left	No	4	RS	CF
0.6	PO	Left	Partial	4	RS	CF
0.6	SC	Left	No	4	RS	CF
0.6	PO	Left	Partial	1	RS	CF
0.7	PS	Left	Yes	2	RS	CF
0.7	SC	Left	No	4	RS	CF
0.7	SC	Left	No	1	RS	CF
0.7	PO	Left	Yes	2	RS	CF
0.7	SO	Left	No	1	RS	CF
0.7	PO	Left	Partial	4	RS	CF
0.7	SC	Left	No	4	RS	CF
0.8	SC	Left	No	2	RS	CF
0.9	PO	Left	Partial	2	RS	CF
0.9	SC	Left	No	1	RS	CF
0.9	PO	Left	Yes	2	RS	CF
1.0	PO	Left	Partial	1	RS	CF
1.0	PO	Left	Partial	1	RS	CF
1.2	PO	Left	Partial	1	RS	CF
4.1	PO	Right	Partial	1	RS	CF
4.7	PO	Right	Partial	2	RS	CF
4.9	PO	Right	Yes	1	RS	CF

[1]River kilometer.
[2]PO= pine/conifer, old growth 20-30+m, PS=pine, small <20m, SC=snag conifer.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=coniferous forest.

Table 79. Bald eagle habitat use at the Woods Canyon BA, Arizona, 2023.

River km[1]	PW[2,3]	PH	CL	PV	PP	DW	PK	PD	PE	Total	Percent
0.1	137	--	--	--	--	--	--	--	--	137	1.5
0.2	268	332	--	--	--	--	--	--	--	600	6.8
0.4	19	--	30	--	--	--	--	--	--	49	0.6
0.6	210	35	--	--	--	--	--	--	--	245	2.8
0.7	3,511	317	74	--	19	25	--	--	--	3,946	44.4
0.8	126	--	--	2	--	--	--	--	--	128	1.4
0.9	1,229	632	70	--	10	--	13	12	4	1,970	22.2
1.0	523	410	--	--	--	--	--	--	--	933	10.5
1.2	25	--	--	--	--	--	--	--	--	25	0.3
4.1	35	--	--	--	--	--	--	--	--	35	0.4
4.7	205	--	--	4	--	--	--	--	--	209	2.4
4.9	545	31	--	--	--	--	--	--	--	576	6.5
999.9	--	--	--	25	--	--	--	--	--	25	0.3
Total	6,833	1,757	174	31	29	25	13	12	4	8,878	
Percent	77.0	19.8	2.0	0.3	0.3	0.3	0.1	0.1	<0.1		

[1]River kilometer. 999.9=out of view.
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, CL=perched close to mate, PV= perched vocalizing, PP=perched preening, DW=drinking water, PK=perched with prey, PD=perched drying, PE= perched eating.